MAY, 1985

FUSION JOURNAL OF

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

"TORONTO SKYLINE"

PRESIDENT'S MESSAGE

It is hard to realize that this is the last time I will use this page to address you as President of the A.S.G.S. The year has passed quickly; and although many of the things I had hoped to accomplish remain unfinished, I am confident that under the leadership of Jerry Cloninger and Dave Chandler these programs and many more will come to fruition, thereby insuring a secure future for our society.

As you read this message, the plans for our 30th symposium in Toronto, Canada, will have been completed. I urge you to attend this meeting if at all possible. The Canadian Section has provided you with an opportunity to participate in an excellent technical and social experience.

If we are to continue to grow professionally as scientific glassblowers, it is essential that all of us participate in and contribute to these symposiums and the other programs that exist in our society.

It has indeed been an honor and a privilege to serve as president of your society. All of my years of membership in the A.S.G.S. have been a rich and rewarding experience. Although I shall look forward to continuing to work for this society which means so much to me, I know I will never be able to repay you for the professional experience and the honor you have bestowed on me.

Wilbur C. Mateyka
President, The A.S.G.S.

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Volume XXXII May, 1985 Number 2

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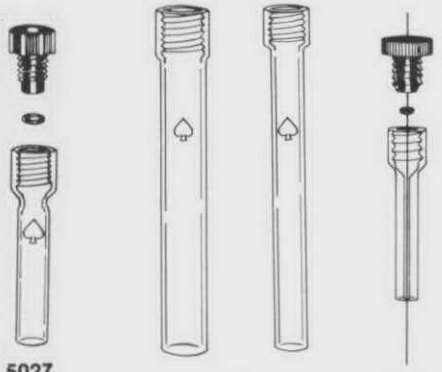

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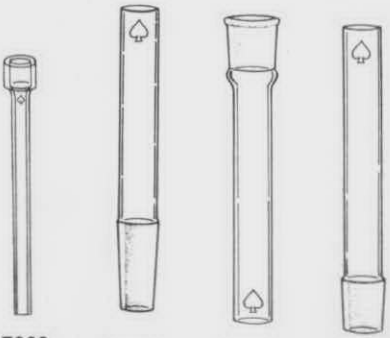

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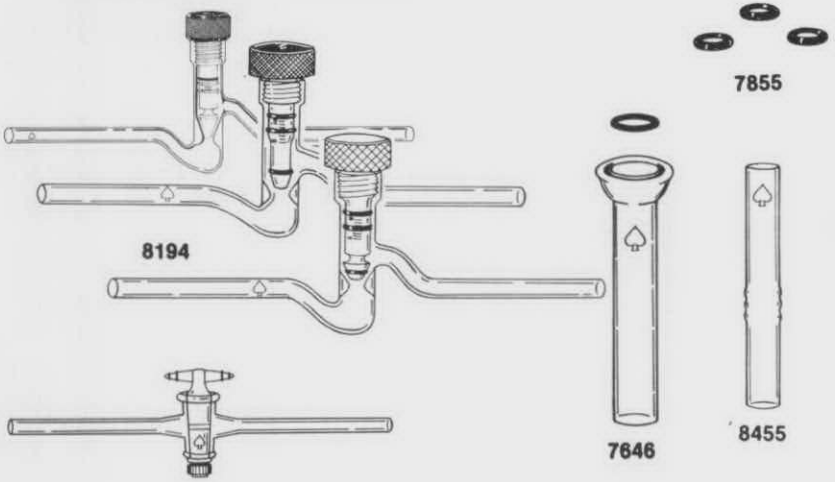

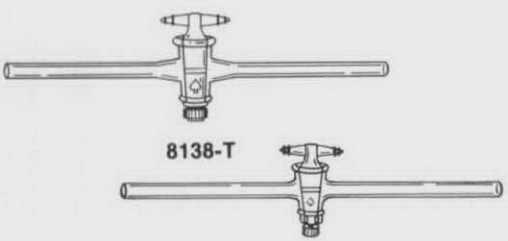

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The Elections Committee Reports . . .

By virtue of the authority vested in us as the Elections Committee of The American Scientific Glassblowers Society and in accordance with the bylaws as amended by the Board of Directors, October 11, 1975, we do hereby state the following:

The Elections Committee unanimously declares that the following officer has been elected by popular acclaim to serve the term indicated:

Pres.-Elect	David Chandler 43 Brookside Crst. Kitchner, Ontario Canada N2N 1H2	. . . . . 1 year

The following officers were elected by the membership last year and have the terms of office indicated to serve:

President	Jerry A. Cloninger 2816 Arden Way Smyrna, Georgia 30080	. . . . . 1 year
Secretary	Joseph S. Gregar 464 Nassau Avenue Bolingbrook, Illinois 60439	. . . . . 1 year

These officers together with the Sectional Directors elected by the members of the local Sections, the immediate Past President, and President-Emeritus, will constitute the Board of Directors for the coming year.

The incoming President, Jerry Cloninger, and the present Board of Directors have decided that the A.S.G.S. budget for 1985-1986 will be such that there will not be the need for a dues increase; therefore the Elections Committee was absolved from preparing a ballot for this purpose, this year.

A.S.G.S. Elections Committee
Arthur Dolenga
In concurrence – Peter J. Severn
Ray Steiner

Amendment to the bylaws as approved by the Board of Directors *October 11, 1975.*

"In the event that the name of only one individual is to appear as the candidate for any national office, that individual may be declared elected by popular acclaim. This will be accomplished through a letter stating same submitted to the Secretary of the Society by the Chairman of Elections Committee and attested to by at least one committee member."

AWARDS COMMITTEE

Thank you, once again, for hearing my pleas for nominations. For the second consecutive year we have more than one candidate for each award. This of course is as it should be, for there are many members in our society who are deserving.

I hope to see you all at this year's Awards Presentation in Toronto, Canada. Thank you once again.

David Chandler,
Awards Committee Chairman

"PUFFER" By Lillie²

The American Scientific Glassblowers Society

30th Annual Symposium & Exhibition

I would like to take this opportunity to invite you to attend the 30th Annual Symposium and Exhibition in Toronto. Whether this will be the first time that you will have attended or if you have attended regularly each year, I am sure you will find this Symposium a rewarding experience.

Among the many activities, I would like to highlight the following:

- The topic of the Keynote Address will be "Managing in a Stressful Environment" and will be presented with a handout. A special invitation is extended to the spouses to attend.

- A technical paper is being presented on the fabrication of a Quartz Electron Spin Resonance Cell with a 0.25 mm Path Length, with its construction being carried out in the workshop program.

- The Society Education Films will be presented on videotape and for the first time, workshops from the 1983 and 1984 symposia will also be available on videotape.

- For relaxation, plan to spend Wednesday evening at Black Creek Pioneer Village and Friday afternoon at the Woodbine Race Track. For the spouses, some interesting tours and special events have been planned for your enjoyment.

I look forward to welcoming you to Toronto.

Yours truly,
L. Frederick Leslie,
30th Symposium Chairman

30th Symposium Registration Fee

MEMBER ADVANCE REGISTRATION	$50.00
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30th Symposium Seminar Fees

MEMBER SEMINAR FEE	$65.00
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KEYNOTE SPEAKER

Dr. John H. Howard from the University of Western Ontario in London Ontario, will present the Keynote address at the 30th Annual Symposium of the American Scientific Glassblowers Society at the Westin Hotel in Toronto Ontario, at 8:30 a.m. on Wednesday, June 19, 1985. His subject will be Managing in a Stressful Environment.

Dr. John H. Howard

Professor Howard was born in London, Ontario, Canada where he now resides with his wife and two daughters. He teaches at the School of Business Administration, University of Western Ontario.

Professor Howard is an engineer, has an MBA, and received his doctorate degree in the area of Management Psychology from the Harvard Business School. He has been involved in research and teaching at both Harvard and the University of California at Berkeley. Professor Howard also worked full time in industry for five years.

Professor Howard works as a consultant to a number of business and government organizations around the world and, during the past 10 years, has been engaged in an extensive study of the problems of stress on people at work.

Professor Howard has published over 50 articles on management topics which have originated from his research. He has given lectures to many management and professional groups throughout the world. In 1976, he won the National Business Writing Award sponsored by the Royal Bank of Canada. Along with two colleagues, he recently published a book entiled *Rusting Out, Burning Out or Bowing Out: Stress and Survival on the Job.*

Among his own antidotes for stress are sailing, tennis, cross-country skiing and jogging.

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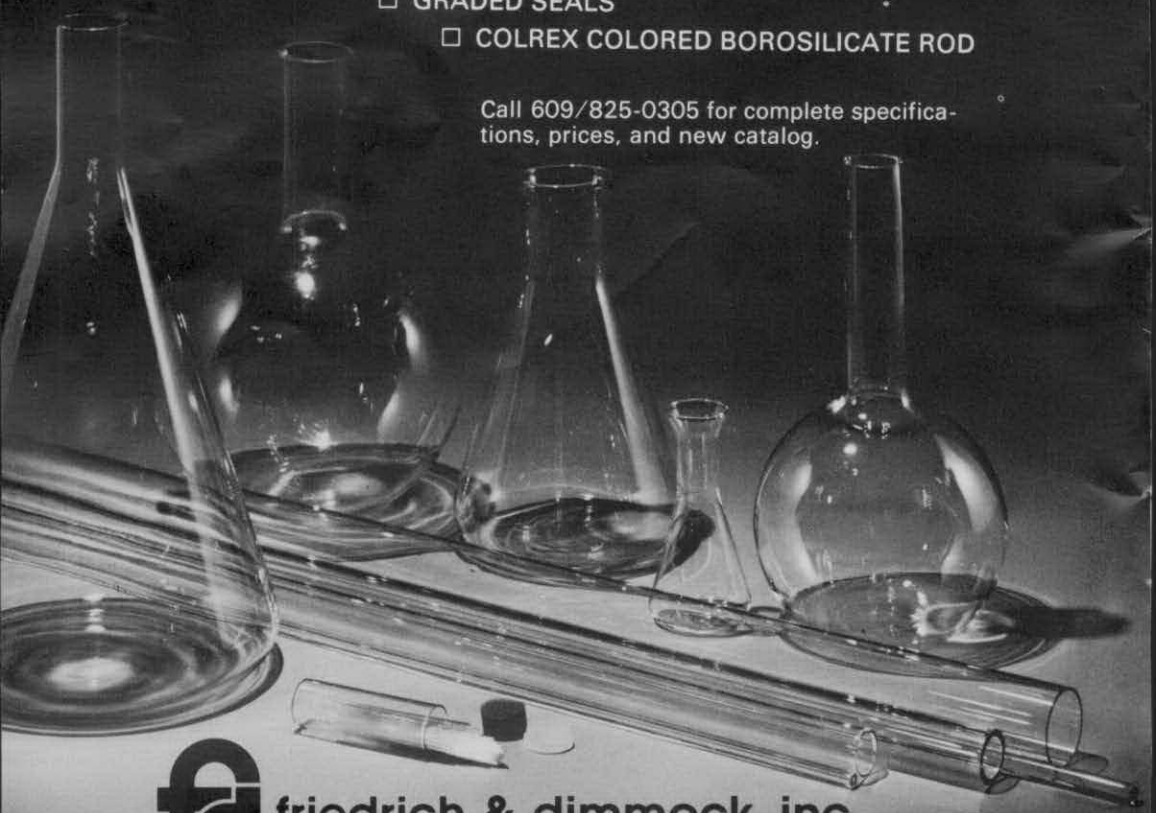

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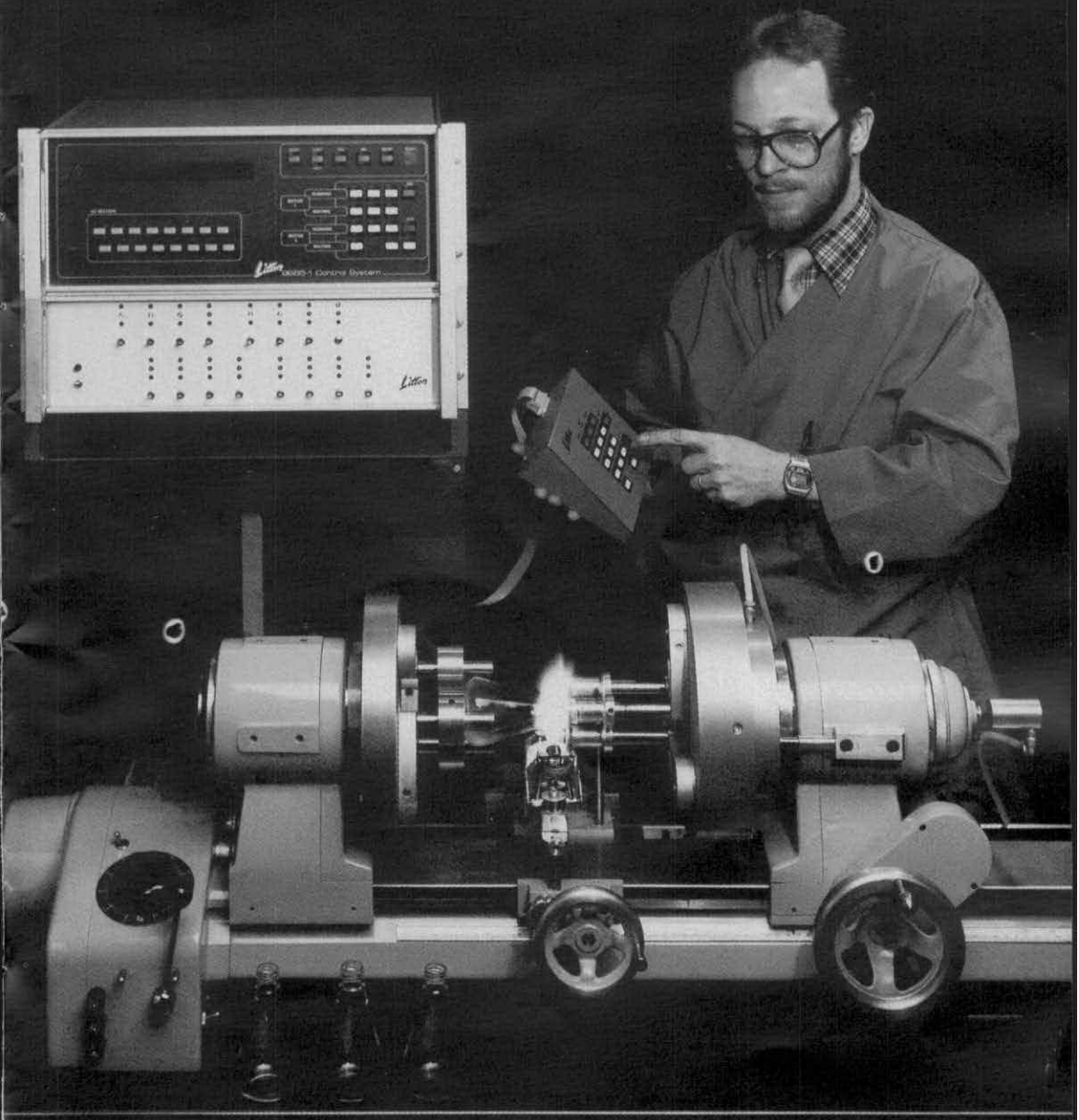

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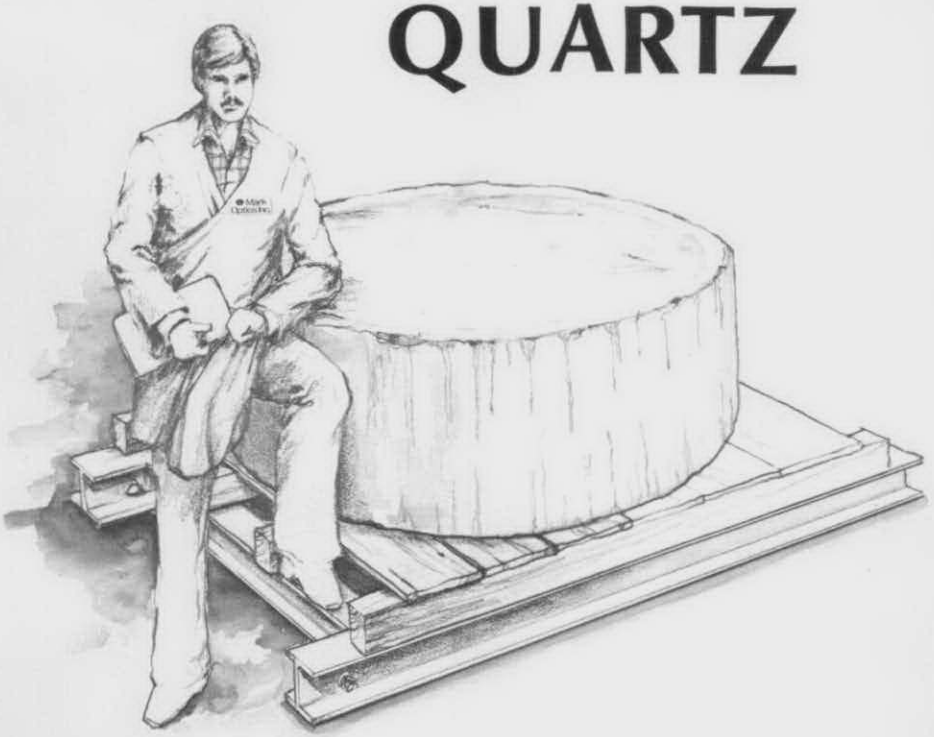

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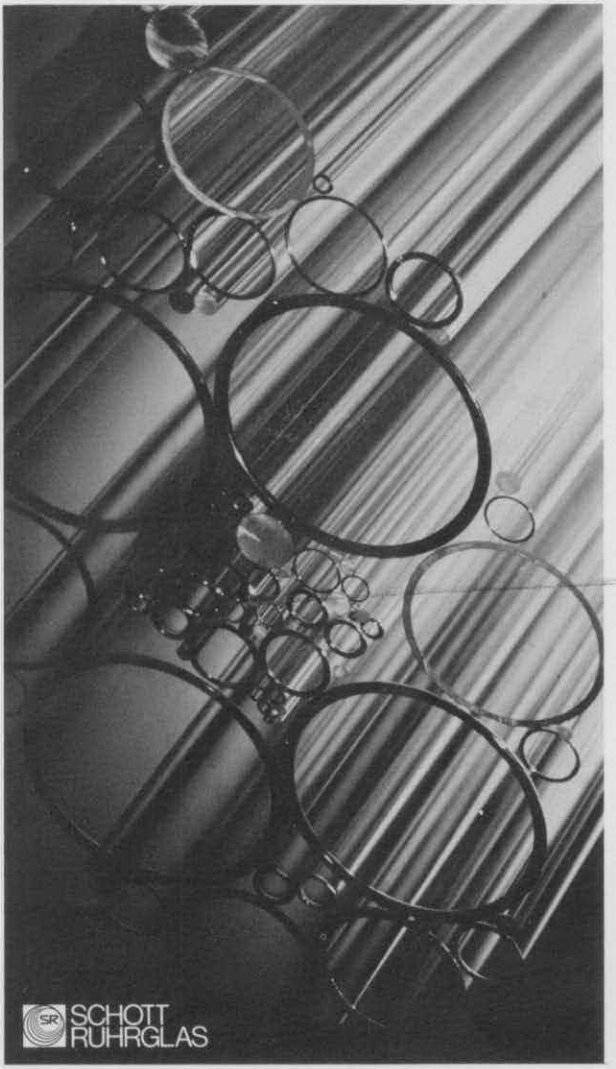

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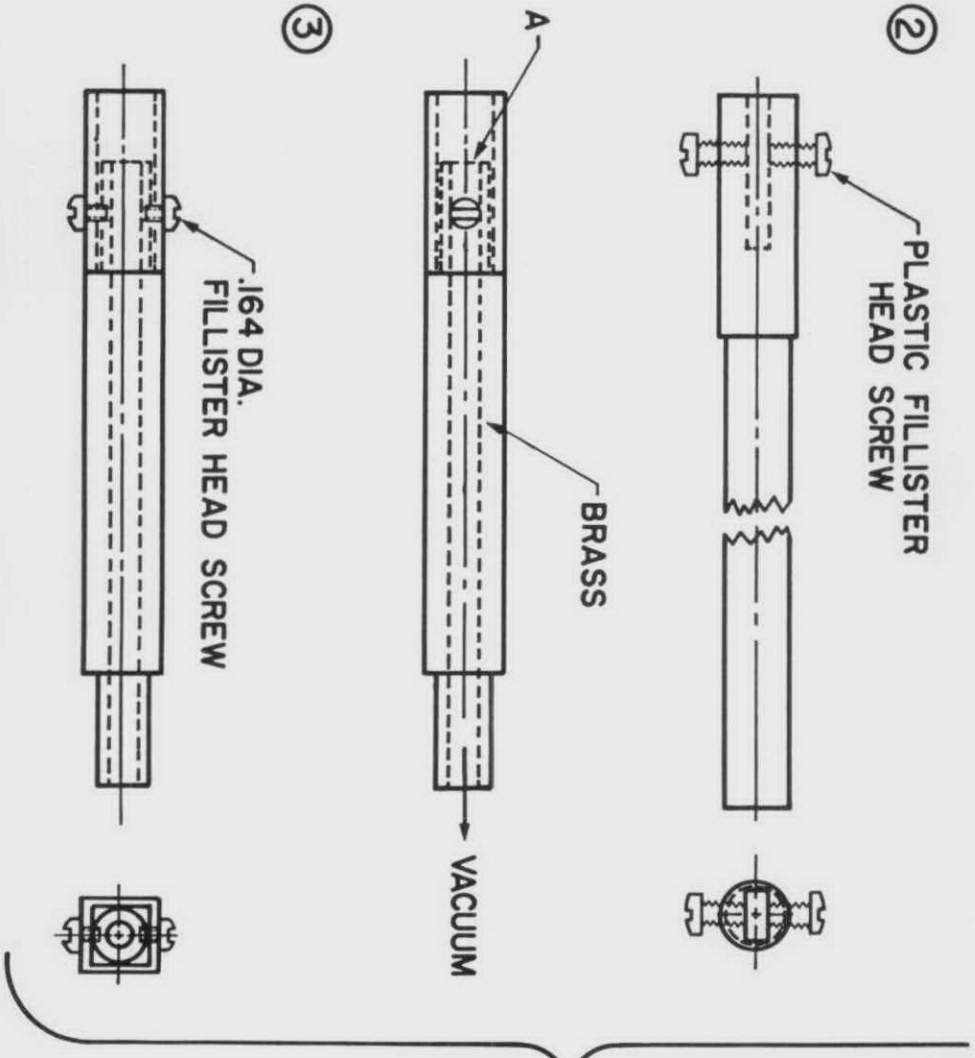
LAMP SHOP HINTS

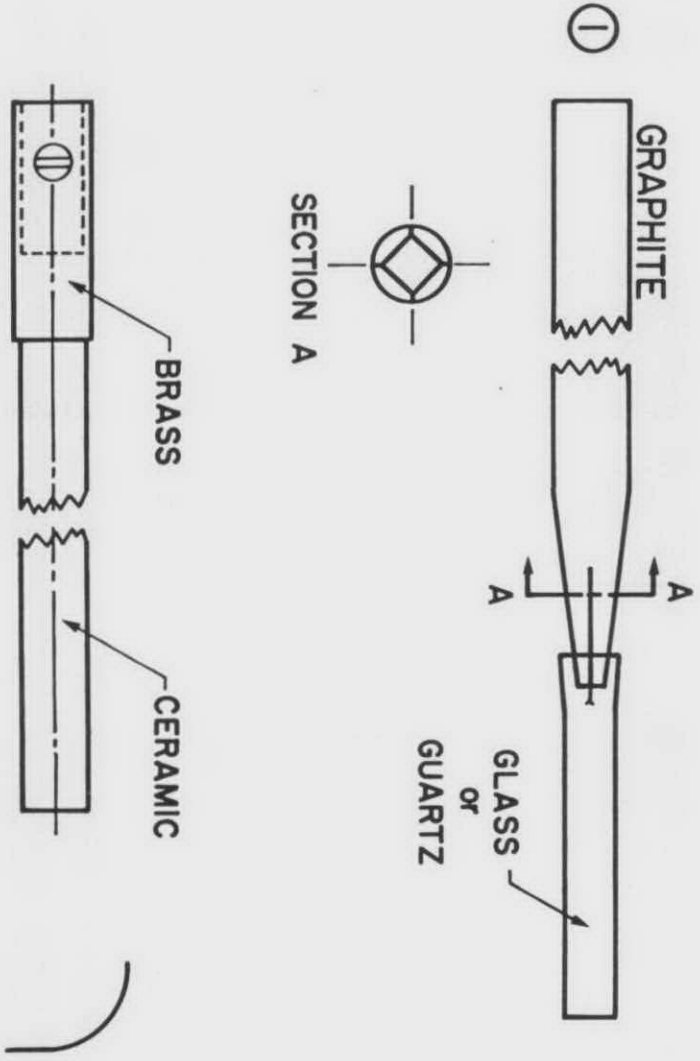
We are frequently called upon to tubulate quartz cells of 1, 2 and 10mm pathlength. The request is usually for very few at one time, but when called upon recently for twenty 10mm path cuvettes to be tubulated with 12mm tubes, the bench preparation and torch



FIXTURES FOR TUBULATING CUVETTES

spotworking seemed crude and time consuming. With a little thought and some help from the machinist, these tools evolved as shown in the drawings.

1. Graphite forming mandrel
2. Brass holder for 2mm path cell
3. Brass vacuum holder for 1 cm^2 cuvette



The graphite forming mandrel (1) is chucked in the tail stock chuck of the lathe while the work piece is held in the head stock chuck. The end of the quartz tube is heated to the suitable softening point and the graphite is quickly inserted to the correct depth to match the size of the cuvette end. Now chuck the brass vacuum holder (3) in the head stock chuck and connect a vacuum pump with the hose and swivel to the other end of the holder. The face of the brass tube (point A) has been machined flat and square so that when a vacuum is applied, it will hold an inserted cuvette in place while making the seal to the quartz tube held in the tail stock chuck.

Not only have we reduced our work time many times over, but the finished product has a more professional appearance.

I have also shown a holder (2), which we use to hold 2mm path cells while we tubulate. The fixture for holding 1mm path cells is made the same way using ceramic handles and nylon screws for both.

(3) is made entirely of brass. The cuvette holder end is a seamless square tube 5/8" OD X .0625" wall, while the other end is 5/8" brass rod drilled and shaped as shown. The two are aligned with each other and held with screws.

Dave Blessing

BIOGRAPHIC SKETCH —

DAVID CHANDLER PRESIDENT-ELECT

David Chandler was born in Richmond, Surrey, England on June 23, 1934. He arrived in Canada in 1967 and became a Canadian citizen in 1970. David lives with his wife, Jacqueline, in Kitchener, Ontario, Canada. They have three children: David, Dawn, and Colin.

He started his glassblowing career in July, 1949 with Jencons Scientific Ltd., and worked for the company until 1967. This was interrupted for two years, 1952 thru 1954, when he served for that period with the Royal Army Medical Corps.

David has been employed at the University of Waterloo, in the Department of Chemical Engineering, for the past 18 years. Within the university community, he has served 3 years as a Credit Committee Chairman and is presently the Vice President of the University of Waterloo Faculty and Staff Credit Union.

He joined the A.S.G.S. and the Canadian section in 1967. At the section level he has served as chairman, secretary, and director and has participated in section meetings on a regular basis. At the national level, he presented workshop demonstrations at the Albany and Rochester symposiums; has served on the B.O.D. from 1980 until the present and has been the National Awards Chairman since 1984. This year he is the Exhibits Chairman for the symposium in Toronto, Canada.

For hobbies, he has taken courses in stained glass, soapstone carving, oilpainting, and artistic glassblowing. He is, also, an avid sports fan; favorite sports being baseball and hockey.

NOTICE — NOTICE — NOTICE

Announcing the new policy for special reduced rates for admission to the American Scientific Glassblowers Society National Symposium.

These reduced rates may be available to special interest groups such as students of the Art of Scientific Glassblowing. The procedure for obtaining these special reduced rates is:

1. A petition must be submitted to the Board of Directors by a member in good standing.
2. The petition must be submitted well in advance to allow time for the board to act.
3. The petitions will be reviewed by the board on an individual basis.
4. For more information contact your sections Board of Director.

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Conductive Coatings On Glass

P. Halliwell

What an enormous field that title covers.

My interest as some of you may already know confines itself to

Transparent Coatings of a Low Resistance.

Transparent – the Oxford Dictionary tells us in 'Having the property of transmitting light so as to render bodies lying beyond completely visible'. This is exactly the reason why it interested me and hopefully, after this morning, interest some of you!

How often when we have fabricated a piece of glassware that has to be heated for one reason or another does it get stuffed inside a metal or ceramic tube wire wound or wrapped up with insulative tape or whatever – wouldn't it be nice if we could heat or insulate our masterpiece and let the chemist or whoever see what is going on inside, tremendously important in fields of distillation and sublimation; these are just a few of the reasons that some four years ago we began our – search if you like – for a compatable method and substance to help us achieve this ideal. I am not going to describe the intricacies of conduction, how we came to choose the correct mixtures, or even load you up with tables and data. No, I am just going to outline a brief history of the basic idea and tell you the system we ended up with – a system that will work.

It was shortly after World War II that reference began to be made in the literature as to the preparation of oxide films which combining the useful properties of optical transparency and high conductivity could be used amongst other things as heating elements on glass surfaces to prevent misting (inherent apparently on bombing and fighter sorties) during the war.

The deposition of conducting oxide films, however, was not a new development even then – in 1907 a German Scientist called Badeker had prepared conducting layers of cadmium oxide on glass by heat oxydising sputtered Cd-films in air, (a technique which probably contributed greatly to his early death).

Glass as we all surely know is the best all purpose transparent substance available – but in its normal solid state it is such a poor conductor of electricity that it is widely used as an electrical insulating material. However, when certain metallic oxides in fluid form are caused to react with glass heated close to softening, that piece of glass can be rendered electrically conducting without interfering with the original glass properties or light transmission – still up to 95%.

When the filmed surface is measured for electrical conductivity it will be found that the coefficient of electrical resistance which is in the order of a million megohms per square area for an unfilmed glass surface, has been reduced to 100,000 ohms or less depending on what dopeant are used. Differently expressed the electrical conductance of the glass surface has been increased millions of times.

Films of these characteristics have been successfully applied to glass surfaces by spraying – dipping or fuming, however, in producing our films of low resistance (less than 150 $\Omega/\square$) film resistivities measurements are usually made between opposite edges of a square sample of the conducting film and are expressed as $\Omega/\square$, spraying techniques have proven the most successful and is the method adopted. But let us not get carried away. It is not a simple case of purchasing a transparent coating and spraying it onto hot glass – far from it, for a start there is nothing commercially available to purchase! All the ingredients are available yes, but it is up to the individual to formulate his own mixture.

O.K., so what do we spray on them? Well here again as you could imagine a very deep subject, so as suggested I am only going to discuss what we found suitable. Simple tin oxide coatings as most of us will know may be formed when a solution of stannic chloride is sprayed or fumed onto glass at red heat, the resulting hydrolysis forming tin oxide – but because pure tin oxide coatings have a very high resistance they are unsuitable for carrying currents for heating purposes – so we have to render the pure tin oxide unpure by dopeing the solution with, in our case, Indium Trichloride ($InCl_2$) and Ammonium Hydrogen Difluoride (NH_4F HF) just a brief note about the chemicals involved.

(Appendix)

Solution 1:

Good up to 200℃ when sprayed around 100 - 250Ω
A combination of $InCl_3$ (Indium Trichloride) plus $SnCl_4 5H_2O$ (Hydrated Stannic Chloride) made to 1 litre in n-Butyl acetate. (Alcohol is used to prevent fuming of Stannic Chloride).

Solution 2:

For temperatures up to theoretically Pyrex softening point a combination of $SnCl_4 5H_2O$ Hydrated Stannic Chloride plus NH_4F HF Ammonium Hydrogen Difluoride in 60% n-Butyl acetate 40% methanol.

When using these mixtures it is essential to use adequate protective clothing and respirators, especially in the second recipe where HCL and HF fumes are liberated.

The method is quite simple, heat the Pyrex item to 650℃, prepare mixtures and have the spray equipment (we used a 'devilbliss' gun and pressure tank) ready. When glass is ready rotate in the case of a tube evenly, and spray evenly. Test for clarity and resistance.

It is worth remembering, however once an item has been sprayed it cannot be flameworked again without destroying the coating. We are still experimenting with Silica, our first efforts proved spectacular – we had heated the silica to around 900℃ quite well, but as soon as the spray hit the surface it turned into a flame thrower.

The equipment layout too is quite important, fume cupboard near oven, spraying equipment in front of fume cupboard – obviously it is easier with two men, one to remove the hot glass from the oven and the other to complete the spraying operation, difficulties still may be encountered in obtaining clear films of a low predetermined resistance reliably, this happens because of one variable in the system the exposure of the hot glass to the spray, thereby varying the film thickness – generally speaking the thicker the film the less the resistance and transparency. Obviously this can be overcome mainly with experience, but it is something that should be borne in mind if you are to try the method out:

The oven temperature is constant
The solution strength is standard
The nitrogen pressure is fixed
The spray exposure time is up to you.

This paper was presented at the 1983 Symposium
We are indebted to the author,
and the B.S.S.G.

Flange and Profile Forming Techniques

The following paper covers the techniques which produced the magnificent, tooled glassware shown at the Dunedin "Gather" and, I hope, much further afield by now. The objects themselves say all that is necessary of the skill required and shown by their existence.

There are many different techniques used in glassblowing to form flanges and profiles. The following are a few that we have found very useful.

1. Basic flat flange: Select tube to be used preferably with even wall thickness. An uneven wall will excentuate when forming flange and complicates procedure. There are formulas for calculating how much glass goes into a certain size flange*, (ref. I.C.P. Smith "Glass Flat Flanges" Vol. 6 No. 3 Journal of British Society of Scientific Glassblowers) but these are rather complicated and long winded. It pays to keep a note on how much glass is used in order to produce matching flange. Experience will tell you in the first instance how much to use (we used approximately 50mm overhand on 90-95-100mm tubing). Figure one illustrates the tube to be flanged set up in the lathe. We have had a steel jig made up to hold the internal carbon support rod which has proved very useful. The scale on the jig allows operator to reproduce the internal diameter precisely. This is the ideal way of holding rod but failing this a retort stand G-clamped to lathe bed will suffice. The lathe is set at very low revs to reduce twisting but can be sped up as glass shrinks back. The heated glass is eased back up against backing carbon with a hand held paddle. This is a relatively straight forward procedure producing a very nice square shape as a result. A carbon rod of substantial diameter is desirable to reduce flexing and resist intense heat. We have used 25mm diameter. Ref. M. Lock B.S.S.G. Journal Vol. 17 No. 4.
2. Recessed flange: The procedure for forming this flange is the same as for a basic flat flange. The only difference being the internal carbon rod. A rod, of again, 25mm is machined to match desired shape of recess. A little more care is involved with this method.

FIG. 1

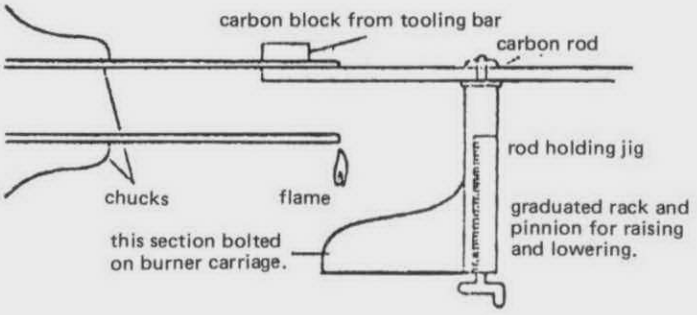
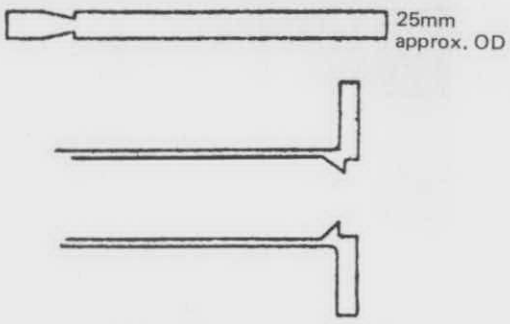


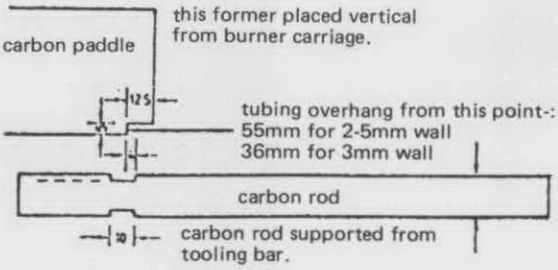
FIG. 2



Profiled rod for recessed flange.

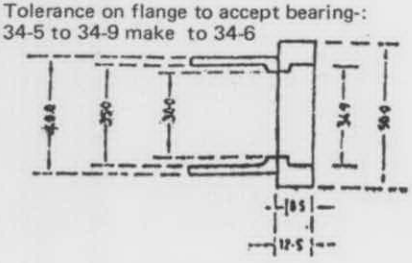
Figures 3-4 illustrate how same technique can be used to form bucchi flanges.

FIG. 3



Carbon formers, sizes and relationships.

FIG. 4



A rotary evaporator: flange.

3. A very straight forward method of making o-ring ball joints. A carbon flat is set up in tooling bar of lathe at a 45° angle. Ball joint is placed in chucks so that when carbon flat in tooling bar is lowered contact is made on ball surface. (It is wise to select o-rings first and make groove to match). Set stop on tooling bar so that corner of carbon flat depresses into molten glass to a depth of approximately 2mm. A thin intense band of heat is needed so as not to distort overall shape of ball joint.

   A thin groove will result to which an o-ring can be seated. The cup/socket half of joint requires to be lightly flame polished so 0-ring can form seal on glazed surface.

Submitted by GRANT FRANKLIN, DSIR, Chemistry Division, Lower Hutt

MEET OUR MAN FROM GREAT LAKES SECTION JOE RITZER

In 1918, Joe was stationed in Edgewood Arsenal in Maryland; he was sent to Dow Chemical in Midland, Michigan on a war project. He was later re-assigned to the Cleveland National Lamp Works.

One day a piece of expensive glass equipment was broken. Since all the glass came from Germany it wasn't feasible to return it for repairs; that's when he had his first experience with glass.

After the war, in 1926, Joe returned to Dow for employment, and soon people found out about his skill in repairing glass. What started out as a part time job turned into a full time glass shop which, in its peak, employed seventeen glass blowers.

Joe is a charter member of the Great Lakes Section and was active in the society until his retirement in 1962.

At the age of 88, Joe enjoys his retirement in Midland and still keeps a watchful eye on his Dow Glass Shop.

Letter to the Editor . . .

April 8, 1985

Mr. James E. Panczner
Editor, Fusion
The American Scientific Glassblowers Society
1507 Hagley Road
Toledo, Ohio 43612

Dear Jim,

Thank you, and the officers of the society for honoring me by having my name appear on the masthead of Fusion as "Director Emeritus". I must admit that it was gratifying to again see my name in print after these years of retirement. Although I have been very inactive in society affairs since leaving office, I have followed, with deep interest, the workings of the A.S.G.S. From what I can see from the information available to me, the society is still continuing to progress and is maintaining its position in the scientific world that we strived for so many years to attain.

It is so gratifying to me when I look at the roster or read the publications of the society, to find names that I do not know as members, officers and contributors to the publications and the symposia. This means to me that we must have done something right in the early days in laying the groundwork for the perpetuation of a truly national society.

I am not aware of any duties that may accompany my title, but if there is anything that I, with my limited capabilities can do for the good of Fusion or the society, please let me know! Meanwhile, continue the good work as editor, and give our best regards to our office manager Bev. who, we know from experience is always busy on society affairs.

With best personal regards
George A. Sites
Director Emeritus

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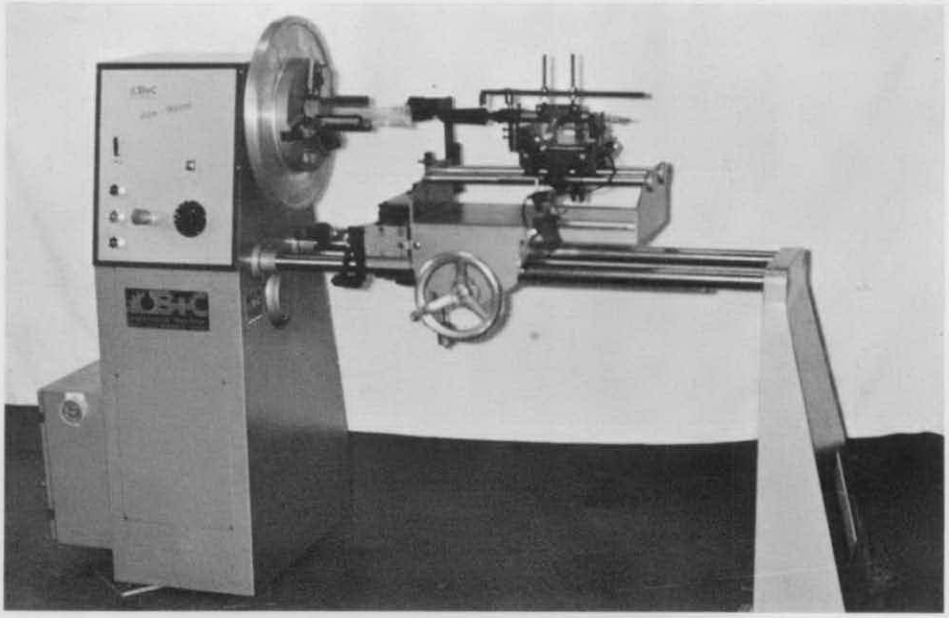

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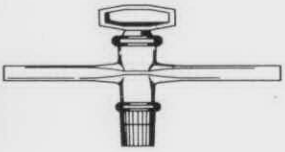

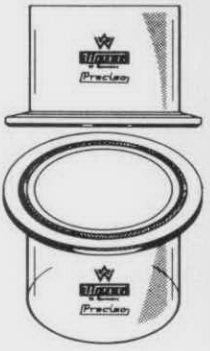
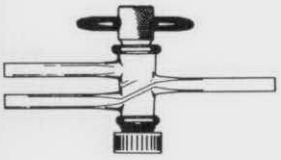
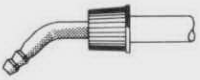

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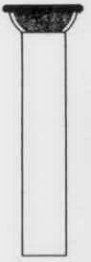
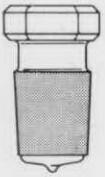
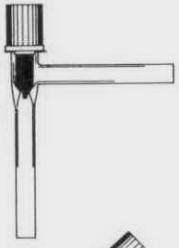




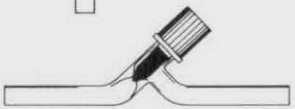


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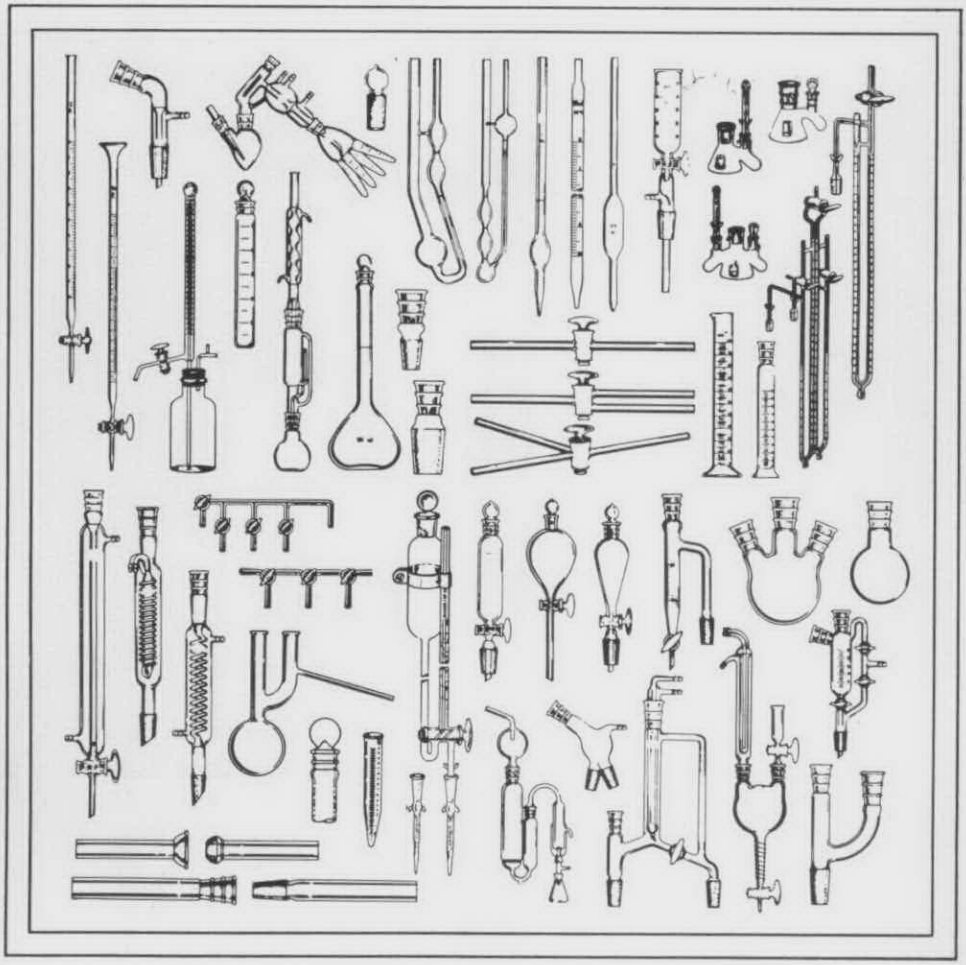

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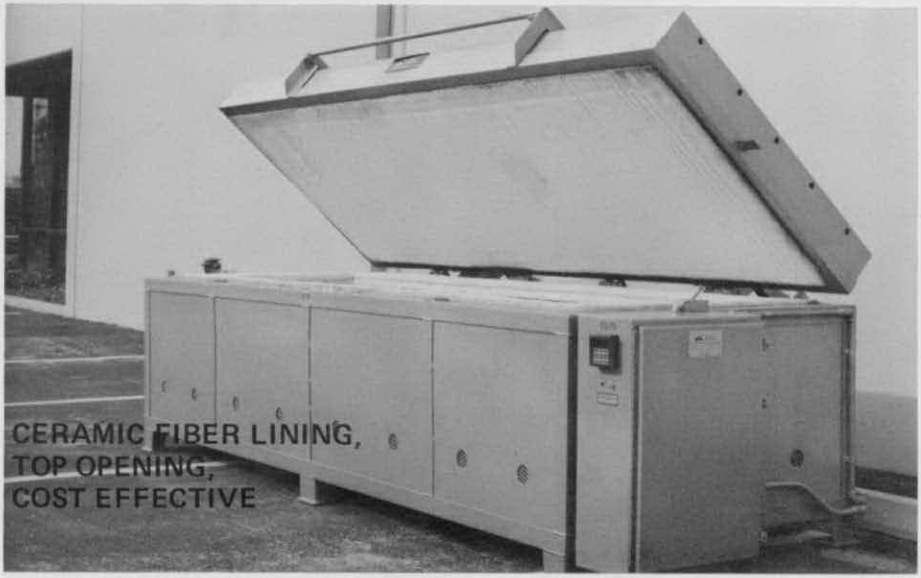

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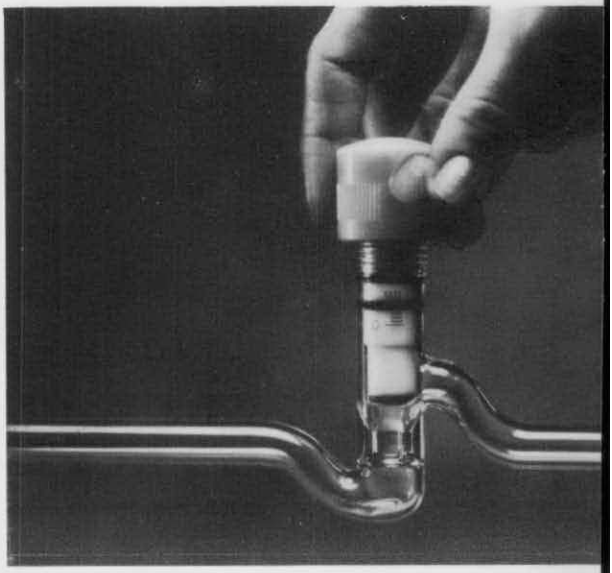

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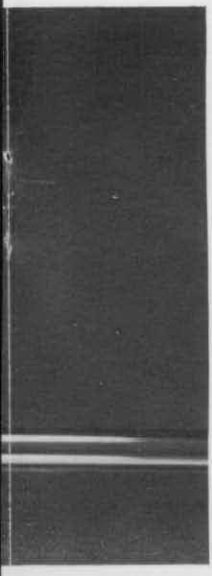

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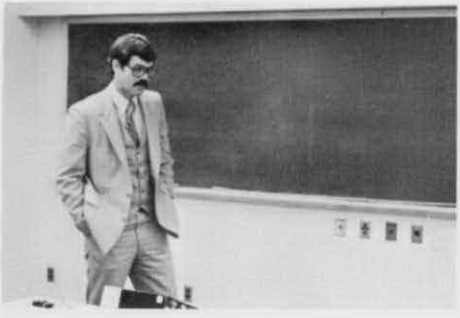
SECTION NEWS

Southern California Section

The Southern California Section of the A.S.G.S. held its spring meeting on March 29, 1985 at the UCLA Chemistry Department. Chairman Gary Coyne introduced Dr. Frederick Whitehurst, an agent with the F.B.I., who holds a PhD in Chemistry. Dr. Frederick's program dealt with the problems of scientific glassware filtering into the illicit drug trade. Included in the presentation were slides from actual cases where laboratories were discovered that manufactured PCP. Following a question and answer period, a short business meeting was held.



Dr. Whitehurst – FBI

Our host Ray Carew (L) and Aniceto DeCastro (R), Vice Chairman.

Gary Coyne announced that the new officers for 1985-86 would be: Gary Coyne - Chairman, Aniceto De Castro - Vice Chairman, Siegmund Grozinger - Secretary/Treasurer.

Jim Merritt and Gabor Faludi will remain as Director and Alternate Director, respectively. A motion was passed that anyone having laboratory equipment that they wished to sell could advertise it in a flyer and it would be sent out with each meeting notice. The suggestion of donating equipment to the section and auctioning it off to raise money was also passed.

Ted Bolan cutting plate glass.

Ted talking about cutting plate.

On hand for the meeting was Ted Bolan, our national executive secretary, who gave us an update on the 30th Symposium, as well as a demonstration on cutting plate glass.

We would like to thank Ray Carew for hosting the meeting and for providing the refreshments and deli spread.

Richard P. Gerhart
Secretary/Treasurer

New England Section

Our third meeting of 1984-1985 was held on February 14th at G. Finkenbeiner, Inc. in Waltham, MA. More than thirty members and their guests attended the meeting. The sponsors for the evening, in addition to our host, G. Finkenbeiner, were Ace Glass, Inc. and Glass Tech, Inc.

Don Sellar, Ace Glass, Inc.

A buffet was served early in the evening while our members arrived from different areas of New England. Our business meeting was called to order by Chairman Dave Hovey. Ted Bolan made a request for technical papers to be given this June in Toronto. Our officers plan to reactivate the phone squad, which is used to communicate information about upcoming meetings. Along with the phone squad, we are putting together an information package in the form of a roster of our New England Section members. Our combined meeting with the Hudson-Mohawk Valley Section is still in the planning stages, but details will be worked out soon by the officers of both sections. Our business meeting was closed.

Miss Meyer answers member's questions.

Miss Vera Meyer with "The Glass Harmonica".

Don Sellar from Ace Glass, Inc. gave a brief and informative presentation of new products offered by his company. Don invited our section to visit Ace Glass sometime in the fall. That invitation certainly will be considered!

The business meeting begins.

Gerhard Finkenbeiner, our host and demonstrator.

We then had the fortunate opportunity to listen to Vera Meyer play Gerhard Finkenbeiner's Glass Harmonica. Miss Meyer is a musician who has an interest in this very unique instrument produced by G. Finkenbeiner, Inc. The instrument's sound and Miss Meyer's talent were fascinating; a performance we will not soon forget. We all thank Miss Meyer for taking time out of her busy schedule to perform at our meeting.

Gus Abel, a true craftsman, having fun.

Peter Hawkett demonstrates his artistic ability.

To complete the evening we went down to Gerhard's shop and were treated to three glass-working demonstrations by Gerhard Finkenbeiner, Gus Abel and Peter Hawkett.

The New England Section thanks our host Gerhard Finkenbeiner, our sponsors Glass Tech, Inc. and Don Sellar of Ace Glass, Inc. and Gus Abel and Peter Hawkett for sharing their talents with us and making our meeting a success.

Gary L. Anderson
Secretary

Midwest Section

The Friday, March 1, 1985 meeting of the Midwest Section was held at Elgin Precision Glass Co. in Elgin, Illinois. Tours and demonstrations were given in the plant where we observed the precision cutting, drilling and beveling of various shapes and thicknesses of plate glass. We observed thicknesses of up to 3/4" being cut with the greatest of ease.

Also shown was the horizontal heat and air tempering of plate glass, which strengthens it to four to five times of its original strength.

The tour was followed by hors d'oeuvres and soft drinks, whereafter we went to the Ramada Inn for the Attitude Adjustment Hour sponsored by Kimble Glass Co., represented by Mr. Larry Capper and Mr. Bob Calabro.

Following an excellent dinner, Bob Ponton thanked Elgin Precision Glass and Kimble Glass for sponsoring the meeting and also thanked Elgin Precision Glass Co. for bearing the mailing costs for the meeting. He introduced Steve Steinbis of Elgin Precision Glass and Larry Capper of Kimble. Larry raffled off the door prizes donated by Kimble, which was followed by a thank you from Bob.

Robert Ponton, Midwest Section Chairman.

Rob Jayneo, Steve Perkins, Jack Shannon, Steve Biernan.

Bob Ponton nominated John Squeo as a section director, seconded by George Jahn.

A previously mailed ballot for new section officers was then presented for consideration. Don Edwards made a motion that the ballot stands as listed, seconded by Jim Morris.

The ballot and John Squeos' nomination were approved by those present.

To ascertain our opinions before he goes to the next national directors meeting, Bob Ponton asked for a vote on allowing $1000.00 per year for travel and out-of-pocket expenses for officers of the national A.S.G.S. This allowance was approved by those present.

Michael Casselli and Larry Guzman were mentioned by Bob as donors to our new section library.

Bob mentioned being approached by national officers to have the midwest section stage a symposium, and in turn Joe Gregar remarked that everyone in the section wants a symposium, but no one wants to do the work.

Dave Blessing was nominated for the J. Alexander Award and Jim Morris was nominated for the Helmut Drechsel Achievement Award.

Ted Bolan urged our members to be active in the society.

A motion to adjourn was made at 9:25 by Chester Swopes; seconded by Dennis Greunke.

Bob Calabro

Russ Kloess, Monsanto, Mrs. Kloess.

Thank you to Elgin Precision Glass Co. and to Kimble Glass Co. and to all of those involved in making the evening well spent.

Great Lakes Section

Come help us celebrate!

The Great Lakes Section will be celebrating our 25th Anniversary on September 14th, 1985.

Plans are underway to make this event one to remember. We would like to invite all sections to our celebration.

Details have not been finalized but more information will be sent to your local directors in time for us to receive your reservations.

Mark your calendars!!

International Scene

Japan

The October session of the Japanese Society of Scientific Glassblowing was held on the 16th at Toshiba Science Institute in Kawasaki, 20 km south of Tokyo. We had 60 attendants. Mr. Keiichi Mukai, one of our councilors, made the opening address at 10:30 a.m. and two talks were given by guest speakers on the following subjects:

"On the Low Melting Glasses"
Mr. Makio Kamiya, manager, Toshiba Glass Co., Ltd.

"Photolex, a Optical Cleaner"
Mr. Tatsumi Hiramoto, director, Ushio Electric Co., Ltd.

The talks were received very well by the attendants. Following the lecture, the attendants were split into two groups and they were conducted by attractive ladies to look around the science institute. The institute holds from a tiny electric lamp to a huge electric train; almost everything along the electric field. The session adjourned at 3:00 p.m.

At 4:00 p.m. a joint session of the board of directors and editorial committee was held at a club house of the company and future activities of the committee were discussed. The meeting adjourned at 6:30 p.m.

Correspondent
Coe Gotoh

Pittsburgh Tri-State Section

Seventeen members and guests of the Pittsburgh Tri-State Section met for a dinner meeting at Del's Restaurant on March 15th.

Chairman Bob Tobin conducted the business meeting following the meal. A nominating committee was appointed to present a slate of officers for election at our fall meeting . . . Director Larry Harmon discussed the upcoming Toronto symposium and encouraged attendance.

Left to right – Lee Jasper, Ben and Mrs. Seal.

Thank you to Walt Surdam and Jim Carson of Chemglass, for coming to Pittsburgh and sponsoring the meeting.

Left to right – Francis Roth, Larry Harmon, Ben Seal, and Jim Carson.

Left to right – Bob Richter, Bob Medley, and Lou Gray.

Larry Harmon
Secretary/Treasurer

Hudson-Mohawk Valley Section

The Coated Abrasive Division of the Norton Company hosted our third meeting in Watervliet, NY on March 22, 1985. After being shown a video cassette tape which gave us an overview of the Norton Installation, we broke up in three groups and toured the vast complex, enjoying many facets of the coated abrasives operation. It was most interesting to see and learn the many backing materials used with six primary types of abrasives, adhesive coatings, the systems of applying grains, viewing tempering furnaces and quenching stations, then the cutting of the end product, which had collected on massive rolls, into belts we use in grinding and polishing operations. Our host, Mr. Joe Cietek, Product Engineer, followed with a brief talk showing slides to tie in aspects not seen on the tour.

A business meeting followed with Chairman Ward Cornell appointing a nominating committee consisting of Dan Wilt, Joe Walas, and Tim Landers. An updated report on the next meeting to be held on May 11 was given, and will be a combined effort with the New England Section featuring workshop demonstrations.

Director Bill Wilt and National Executive Secretary Ted Bolan talked briefly on the many aspects of our upcoming symposium. It was gratifying to see that our section will be well represented in Toronto.

Respectfully submitted,
Gordon Good
Secretary/Treasurer

News From New Zealand

GLASS-SCI
GATHER OF GLASSBLOWERS – AUCKLAND DECEMBER 7th, 1984

Following the success of the "Gather" of glassblowers in Dunedin in August it was felt that a similar event should be held in the north of the North Island to cater for those who had been unable to come south. Held on December 7th the second "Gather" of glassblowers turned out to be just as great a success as the first.

The first part of the day was spent at Auckland University where Chemistry Department glassblower Mike Wadsworth showed his method of drawing square bore tubing, an excellent demonstration of a method which was both effective and much simpler than many methods used to achieve a similar result.

Following the session in his workshop Mike conducted a tour of some of the complex high vacuum installations in the Department including apparatus such as a quartz coil spring balance and an all glass gas pump. Lunch at the staff club was followed by a visit to the Fine Arts Department's hot-glass studio where we watched glass being taken from the furnace and shaped by the age-old "off hand" methods.

At 3 p.m. everyone travelled across the city to Carter Chemicals premises at Pakuranga for afternoon tea and workshops/demonstrations of a funnel and general awkward shape holding device by Grant Platt from Massey University, longitudinal tube splitting and tubulature tool by John Penno from Otago and a hand coil winding system by Gary Purdy of Waikato. (This last demo was all the more fascinating for the fact that it was most convincingly done with no glass at all!!)

Dinner was an enormous and excellent barbecue not only supplied courtesy of Carter Chemicals but cooked with a great deal of enthusiasm (and a fair amount of noise) by mein host himself Brian Carter. Most of those present ate too much. Much, much too much.

The evening was spent watching slides and videos on glass and the meeting closed at 10 p.m.

Thanks must go not only to Carter Chemicals Ltd. for their sponsorship but also to their entire staff for turning out and looking after the glassblowers in the way that they did, and also to Mike Wadsworth and others from Auckland University for convening the meeting and giving of their time on the day.

J.C. Penno

Question and Answer Report

QUESTION NO. 1

How are fritted discs fabricated?

How can I seal 10mm molybdenum rod to quartz?

ANSWER:

Enclosed please find some literature regarding fritted disc fabrication. Most of us in the U.S. purchase our fritted disc ware so I cannot offer any first hand knowledge from experience. I understand that Karl Walther sent you the name of the company that makes tools for shaping and tooling glass and I am not aware of any other company.

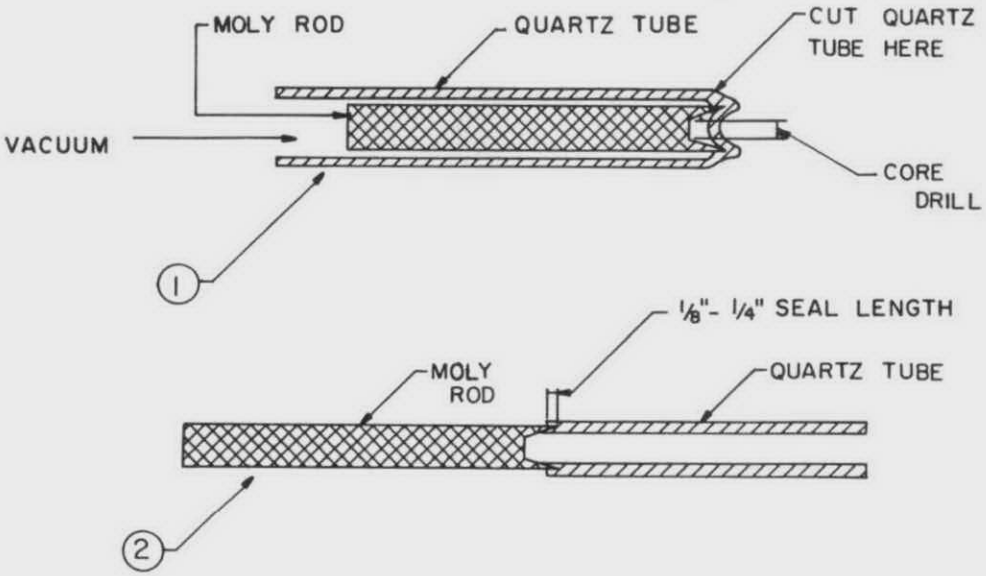
I have also enclosed some information regarding molybdenum to quarts sealing. Molybdenum foil can be sealed into a quartz press but again vacuum is used to prevent oxidation. The mismatch of coefficient of expansion would most likely rule out the sealing of 10 mm rod to quartz unless the end of the rod could be machined to a feather edge for a housekeeper seal as shown in Figure 1 and 2 of the literature. The sketches below offer a suggestion and a method that the author would attempt.

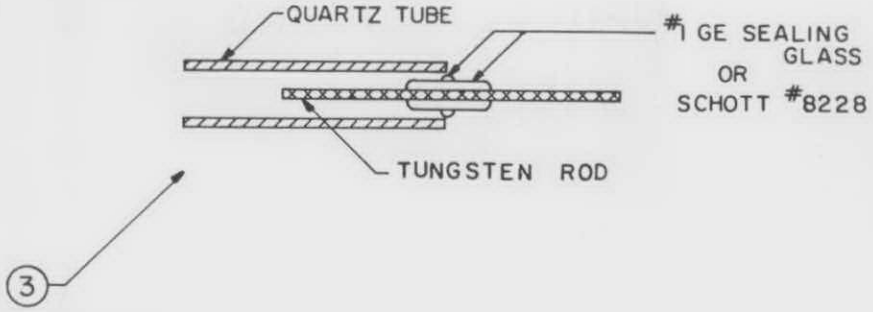
Sketch numbers 1 and 2 are enclosed.

Quartz can be sealed to tungsten rod under some conditions. With experience and patience, a thin sheath of sealing glass (#1 GE quartz-pyrex sealing glass or 8228 Schott sealing glass) can be clad on a tungsten rod followed by a button sealing bead which can then be sealed into the end of a quartz tube. See sketch below.

Sketch number 3 is enclosed.

The tungsten rod should be rotated rapidly in a lathe while the sealing cane is brought close to it and both heated with a hydrogen-oxygen flame to the extent that the molten glass will wipe a thin sleeve on the tungsten. Care must be taken in adjusting and positioning the torch so that no oxide collects on the tungsten. The resulting interface should be bright and shiny since any oxide on the tungsten under the glass sheath will cause the glass to crack or pull away from the rod. Now the button sealing bead can be added to the sleeve which, in turn, will be fused into the end of a quartz tube.





QUESTION NO. 2

Is there a procedure for sealing zinc selenide windows to glass tubes?

ANSWER:

I have not sealed zinc selenide windows to glass tubes but have had success with zinc sulfide window seals. In checking my literature and comparing coefficients of expansion of the two materials I feel that they may be similar enough to be treated the same and sealed to glass in the same manner.

Enclosed is some information supplied by Eastman Kodak regarding a product that they market as Irtran. Only Irtran #1 & 2 are still available from them but you will note that Irtran #4 is zinc selenide and Irtran #2 is zinc sulfide. I have enclosed only those pages pertinent to your application – coefficients of expansion, grinding and polishing, mounting methods, suggested sealants etc. If you desire their complete publication it is referred to as Kodak Publication U-72 and the address is Eastman Kodak Co., Rochester, N.Y. 14650.

The method which I have used for sealing Irtran #2 (zinc sulfide) to glass is given in the Question and Answer section of the February, 1982 issue of Fusion. I am currently attempting to get some sample material for experimentation with this seal using zinc selenide (Irtran #4). If the results are favorable I shall pass them on in a future issue. I would welcome any in-put from our membership on this topic. A present vendor from Irtran #4 is Ratheon Research, 131 Spring Street, Lexington, MA 02173.

There is a more detailed report on file in the home office but far too detailed to print. Copies may be had by requesting them from the home office.

QUESTION NO. 3

Where can I purchase transparent conductive coated glass?

ANSWER:

I am aware of three companies that market this product which I will list below.

Corning Electronics Materials, Corning, NY 14830.

Practical Products Co., 7820 Concord Hills Lane, Cincinnati, OH 45243

Metavac, Inc., 45-68 162nd Street, Flushing, NY 11358.

Metavac will do custom work on your supplied glass or quartz material if it is necessary.

Sincerely,
David Blessing
Question & Answer Chairman

OPTICAL POLISHING

By T. Butcher, Sira Institute

INTRODUCTION

The main purpose of this paper is to cover some of the methods used by manufacturers to make optical components, such as lenses and mirrors etc.

Different ways of grinding and polishing glass, and why a different approach and attitude is needed to produce similar components in crystals will be covered, along with the basic processes of making a lens and how new materials and machines can help or hinder the production engineer.

MAKING A LENS

Starting with glass, our first problem is to look at what the designer has specified and the number of optical elements needed which will determine whether slab or moulded glass is to be used. If small quantities are called for, slab is the obvious choice, but it should be borne in mind the extra work involved to reach the same stage as a moulded blank, i.e.

1. Sawing the slab into slices slightly thicker than necessary, grinding both sawn faces to thickness, by either loose abrasive on flat steel plates, or by milling using metal bond diamond impregnated tools.
2. Turning the sheet glass into round discs, slightly over-size to allow for final edging. There are two ways of doing this:

   (a) One way is to cut the sheets into squares, and wax one on top of another to produce what is called a stack. The number that can be machined at one time depends on the diameter and thickness of each disc.

   Obviously in production it is necessary to make as many as possible in the shortest possible time, but to do this, the glass or crystal must be heated slowly so as not to crack or fracture the material, but just enough to melt the wax; therefore, a wax with a low melting point is desirable.

   Unfortunately, the lower the melting point, the weaker the wax, which means that certain materials which are prone to thermal shock, and are soft and brittle, have to be handled with extreme care. These materials can sometimes only be machined one at a time due to their nature. This means that all the machining has to be done very carefully and slowly. Other materials can withstand a considerable amount of heat without quite so many problems so several pieces can be stuck together using a hard wax and be machined at high speeds without fracture or breakage.

   (b) Another way is to cut round discs from sheets or slabs of the selected material with a core drill.

   A core drill is basically a steel tube with a suitable machined shank to enable it to fit a drilling or milling machine. The cutting end should be slightly thicker than the main body, and made up of either diamond grit impregnated in a metal bond such as bronze, or electroplated borazon grit, and is at the end and sides of the tube. The latter method is much cheaper but will not stand up to long production runs.

   The milling or drilling machine to which the core drill is attached should have a hollow spindle to allow coolant to be pumped through the centre of the drill.

To assist with the removal of ground glass, slots should be cut across the end face of the drill. This will enable the cutting edge to be kept clean and reduce any build-up of unwanted material.

If this is not done, the cutting edge will become clogged which will reduce the efficiency of the drill and result in damage to both the drill and the material being cut.

PRODUCING A CURVE ON A BLANK

Let us assume that one of the sides has to be convex. I will now outline 2 ways of producing this.

1. The most common way is to use a Spherical Generator with a diamond cup wheel enabling both convex and concave surfaces to be produced. This machine has a rotating spindle to which the lens blank is fixed either by a vacuum or a collet. It is then slowly brought into contact with the diamond cup wheel which is driven at high speed by an independent motor. This unit is tilted to the required angle, and will remove the glass very quickly, and produce a blank with, not only the required curve, but to the required thickness. These blanks are ready to be malletted and blocked up, and then smoothed in a true tool.
2. The other way of producing a curve takes longer and involves perhaps 4-6 tools of different radii. The lenses are malletted with pitch and arranged in the first tool, and a hot runner pushed down into the pitched lenses. If the heated runner is pushed down too far into the pitch it could cause damage to the back surface of the lens if this has already been polished.

   Another problem is that if the fillet of pitch is too thin, it is unable to absorb any change in temperature, and the lens will spring away from the block, due to stresses being released in the pitch.

   The next stage is to grind the block in a roughing tool using a course abrasive to remove the corners of the glass, then proceed through the range of tools, using a finer emery each time, until the final true tool.

Whichever method is used, the final true tool is the most important because the true shape and form of the finished lenses are governed by the quality of this tool. A close watch must be kept for wear on this tool, bearing in mind that the metal can wear away almost as fast as the glass, so the skill of the optical worker in keeping the tool to within a few fringes cave to the test plate, is most important to any production.

Diamond wheels, although expensive to buy initially, last for a considerable while, produce a lens blank in a very short time and cut out the need for lengthy operations.

Producing shapes such as rectangles, squares or prisms which need to have square sides and a high degree of parallelism, can be made using conventional metal working machinery such as Vertical Millers and Surface Grinders.

POLISHING SPHERICAL SURFACES

After final smoothing using fine emerys such as W7-303-302½, the block is ready for polishing. This is carried out using a polishing powder made into a slurry and worked between the glass and polisher, in a motion that rolls across, and rotates around in order to polish the entire block evenly.

For example, if polishing a concave block, a convex polisher would be fixed to a vertical spindle, and the block would be placed on top. A poker arm with a ball end is lowered down into a recess in the block so that the block is free to rotate and pivot.

The speed of the spindle and the stroke of the arm should be variable so that both the sphericity and the radius of curvature can be adjusted by means of concentrating wear on either the edge or the centre of the block if pitch is being used as a polisher, additional localised wear can be encouraged by cutting grooves around the edge or in the centre of the polisher.

Because of the nature of pitch, the heat generated during polishing will allow the pitch to flow and slowly return to a spherical form at the same time as the block has a good uniform polish, and is correct to the test plate fringe pattern. Once again, the skill of the operator in controlling the whole process, is of critical importance.

PROBLEMS FOUND IN POLISHING SHOPS WHERE CRYSTALS ARE TO BE POLISHED

The modern optical workshop has to cope with so many different types of new materials that revised skills and methods of approach are needed to achieve the same high degree of figure and polish that the ordinary glass workshop produces. Most companies that work in these fields have had to learn the hard way, that is to say, 'try it and see' as information about these techniques is difficult to find and often misleading, as there are no hard and fast rules laid down by manufacturers.

It is not uncommon for separate manufacturers, starting out with the same materials but working on them in completely different ways, to obtain the same finished product.

The most important factor in any polishing shop is cleanliness. Any dust or dirt can be stirred up by people moving about within the vicinity of the machine. A polishing machine itself can cause air turbulence around its spindles. Owing to the movement of the arm, part of the block and also the polisher itself will be exposed to the air constantly during the polishing operation. As the block and the polisher are both wet, this will encourage dust to settle and eventually become embedded in the pitch, producing sleeks and scratches on the material being polished. The only remedy is to renew the polish and start again.

Dust particles can find their way into polishing slurrys, sponges and brushes used to clean the lenses. It is very easy to become careless in an optical workshop, and find yourself using the same cleaning articles on benches and machines. This is definitely not advisable, and a useful guide is to colour code all tools such as spanners etc., and cleaning articles used in different areas. For example, roughing – smoothing – polishing – coating plant – to recognize instantly the articles they should be using.

FINAL CENTRING AND EDGING

Again, different manufacturers have evolved their own methods of optical and mechanical centring. There are four main ways to achieve this; reflection, transmission, mechanical dial gauge or transducers and opposed bell chucks. All of these systems have been used for many years but with varying degrees of success.

A number of manufacturers have problems in meeting the new standards of precision optics. Some of the systems work well for standard optics, but for high precision centring of special lenses, the mechanical methods used can sometimes fail to meet this high degree of precision, due mainly to bad design of mechanics.

Some manufacturers can align the element with a high degree of precision on to a bell chuck, but most of the problems occur when moving the bell chuck from the centring to the edging machine.

Another problem is mounting the lens in a cell true to the optical axis, and retaining it so that it stays on axis, and in some cases, having to absorb mechanical and thermal shock.

**This paper was presented at
The 1983 Symposium.
We are indebted to the author,
and the B.S.S.G.**

SAFETY AND HAZARDS REPORT

March 28, 1985

The Editor,
FUSION
J. A.S.G.S.

Dear Sir:

The recent Safety Report (FUSION, February, 1985, Page 71) on sources of silica contamination prompt me to suggest a major source can be from the cut-off machine.

As a beam of sunlight (for those so blessed with access to natural lighting) or other incidental light will reveal, the operation of the "saw" is accompanied by a fine mist about the machine, including the facial area of the operator. Unless frequent and scrupulous maintenance procedures are followed this mist will be comprised of water borne ground glass. In many instances the case probably exists for the wearing of a suitable mask.

Discarding the recirculation system and connnecting to the domestic water supply may be in order. Of course, for those living beyond the equatorial regions, temperature regulation will be required for some part of the year!

Yours sincerely,
R. G. Campbell
Glassblower

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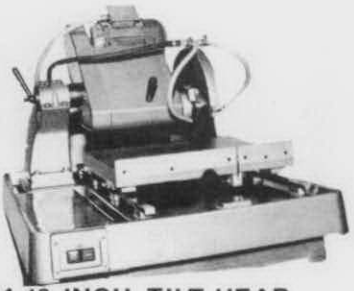

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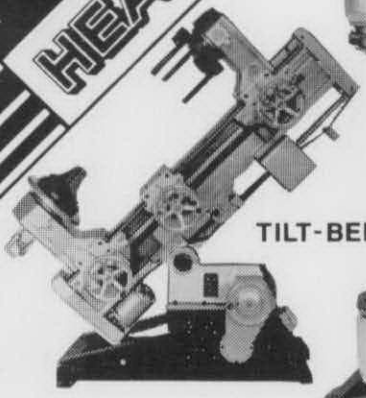

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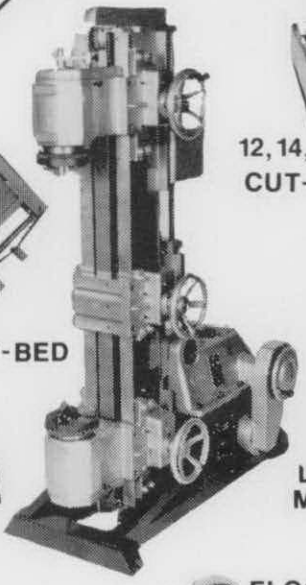
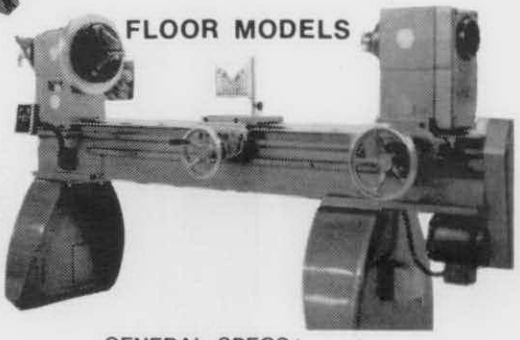


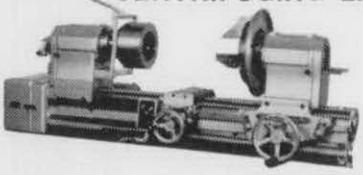
LAPPING
MACHINES

BENCH MODELS

FLOOR MODELS



CENTRIFUGING LATHES



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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****.*

HIGH VACUUM VALVES

Wheeling, Illinois: William A. Sales Ltd. recently announced the addition of J. Young line of high vacuum valves to its line of products for the scientific glassblower. The J. Young valves are offered in sizes from 1 through 25 millimeter bore and are guaranteed to 10^{-6} Torr. For more information contact William A. Sales Ltd., 419 Harvester Court, Wheeling, Illinois 60090. Phone 312-541-1300 or 1301.

WILLIAM A. SALES LTD. APPOINTS SALES MANAGER

Wheeling, Illinois: William A. Sales Ltd. distributor of borosilicate and quartz tubing and rod has appointed Mr. Harlan Wolfe National Sales Manager. Mr. Wolfe has been associated with the Laboratory Glass Business for several years and will continue in his new assignment to promote glass products including custom ware.

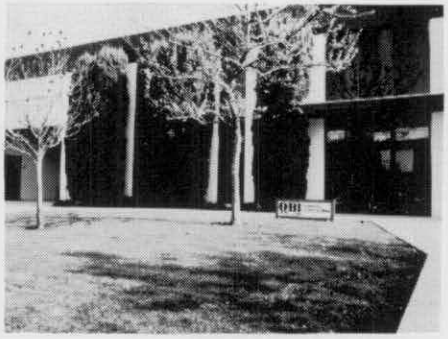
SCHOTT PRODUCTS

Wheeling, Illinois: William A. Sales Ltd. has been named the midwest distributor for the full line of Schott Tubing and Rod and other glass products. Mr. Sales explains that this is a natural adjunct to the present distribution of quartz products. Many sizes of Schott material are in stock presently and a full stock should be available by August, 1985. For a complete catalog contact William A. Sales Ltd., 419 Harvester Ct., Wheeling, IL 60090.

QBI EXPANSION PROMPTS MOVE TO LARGER QUARTERS

QBI Corporation has more than doubled its production facilities in Santa Ana, California, to keep up with demand for its quartz and borosilicate scientific glass products.

Otto Gruneberg, President, said the move, from 3317 West Warner Avenue to 1915 South Susan Street, Santa Ana, was necessary because of the greatly expanded requirements for the firm's products both here and in other countries.



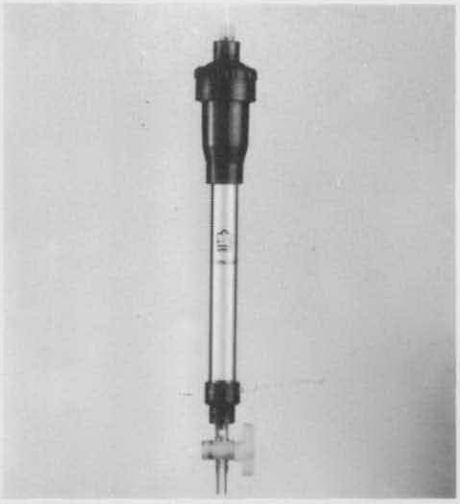
He noted that a number of additional employees had been hired, and that the company had installed several new production machines as well. Included in the new equipment is a glass-blowing

lathe, which will facilitate production of large quartz tubes, up to 355 mm, for the semiconductor industry.

QBI Corporation is a fabricator of scientific glass and quartz apparatus, serving the semiconductor and aerospace industries, laboratories and educational institutions.

NEW CHROMATOGRAPHY COLUMNS ELIMINATE SLIP-FIT CONNECTIONS

Kontes has developed a new line of economy chromatography columns that use luer lock end fittings and threaded reservoir caps – eliminating typical slip-fit connections. FLEX-COLUMNS™ are suitable for gel filtration, ion exchange, affinity and adsorption chromatography in aqueous systems.



FLEX-COLUMNS are constructed by shrinking molded polypropylene end fittings onto precision ground, borosilicate column ends; secure connections are assured. A 20 micron bed support is compatible with a broad range of column packing bead sizes.

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FLEX-COLUMN Flow Adapters are available for 1.0, 1.5 and 2.5cm diameter columns. One flow adapter can be combined with a standard column or two flow adapters with an open-ended column to make an adjustable bed volume column. Open-ended columns are available in lengths from 30cm to 120cm.

Accessories consist of polypropylene and glass reservoirs, luer lock stopcocks, tubing connector kits and several adapters.

For complete information, contact KONTES, P.O. Box 729, Vineland, NJ 08360, or call (609) 692-8500.

NEW TWO AND FOUR LITER ULTRA-WARE FILTRATION APPARATUS

Filtering larger volumes of HPLC solvents can be faster and more convenient using the new, Ultra-ware™, two and four liter, all-glass, filtration assemblies from Kontes.

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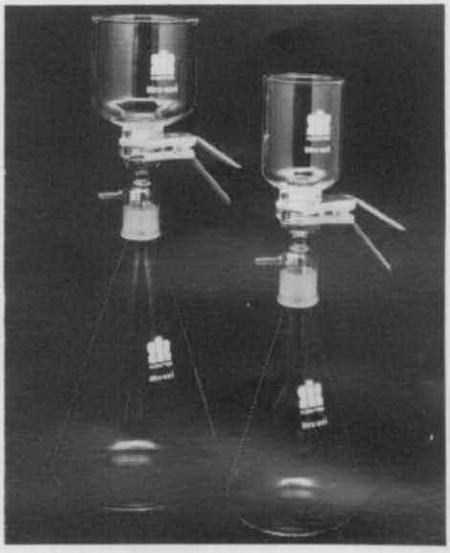
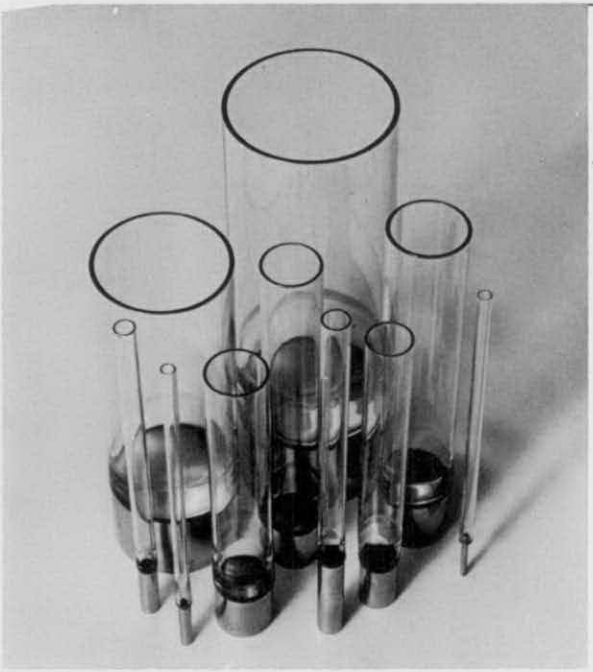


For more information, contact KONTES, P.O. Box 729, Vineland, NJ 08360, or call (609) 692-8500.



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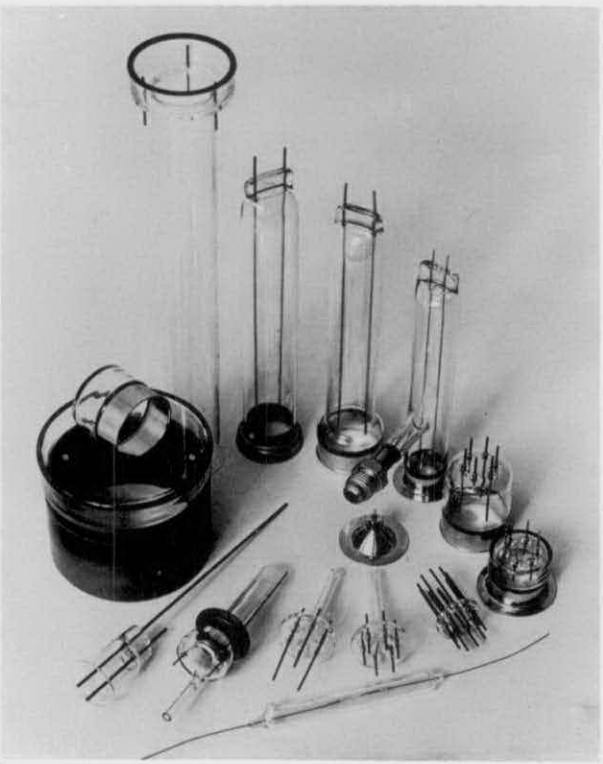

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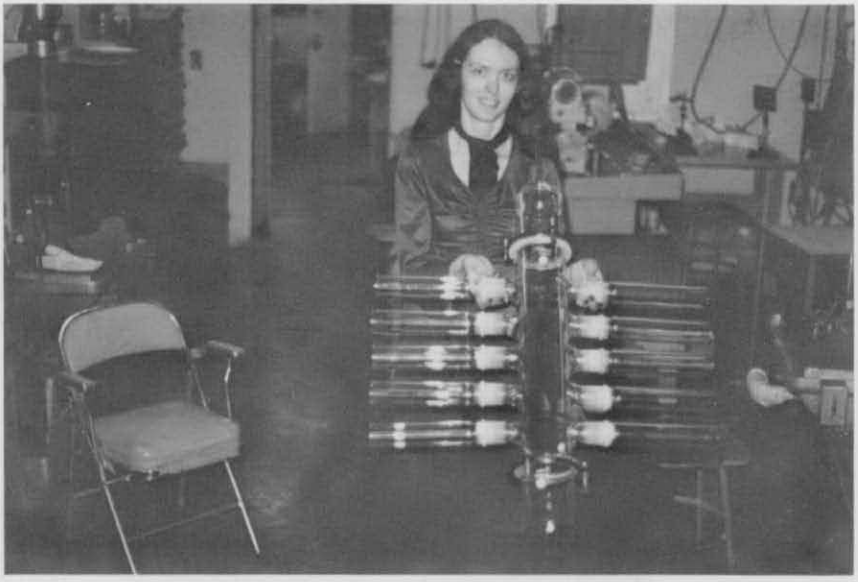

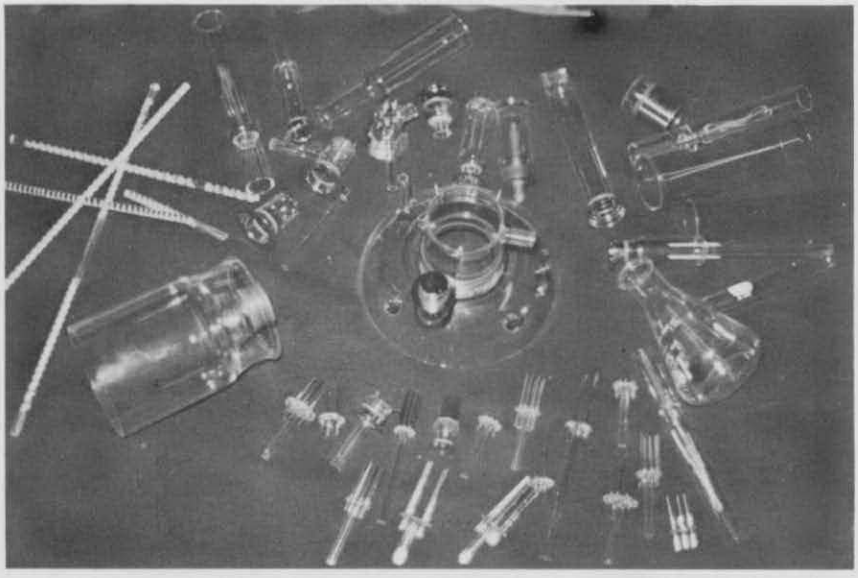

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Reference and Abstract Committee

G.C. – Gary Coyne *W.M. – Wilbur Mateyka*

ASBESTOS

Accuracy of Transmission Electron Microscopy for the Analysis of Ambient Environments, by E. Steel and J. Small, Analytical Chemistry, Vol. 57, No. 1, Jan., 1985, pp. 209-213. "An investigation of the errors associated in using TEM to study the chrysotile asbestos samples in ambient environments. Logically enough, the larger the size of the particle, the less chance there is on missing it!" (G.C.)

Analytical Standard for the Analysis of Chrysotile Asbestos in Ambient Environments, by J. Small, E. Steel, and P. Sheridan, Analytical Chemistry, Vol. 57, No. 1, Jan., 1985, pp. 204-208. " A discussion of how the Environmental Protection Agency (EPA) and the National Bureau of Standards (NBS) decided on what surface asbestos would be "caught" on, what sizes would be looked at (and at the relative success for various sizes) and how it would be found (transmission electron microscopy (TEM)). (G.C.)

CELLS

Quartz Single Crystle Sample Holder for ESR, by D. Ioshpe and D. Shaliel, Journal of Physics E - Sci. Instruments, Vol. 17, No. 12, Dec., 1984, pp. 1129-1131. "A useful design if it is necessary to add RF power to sample while running the ESR test." (G.C.)

CHROMATOGRAPHY

All-Glass System for Preparative Glass Capillary Gas Chromatography, by B. Burger and Z. Munno, Journal of Chromatography, Vol. 262, 1983, pp. 95-102. "An all-glass effluent splitter of virtually dead-volume and a peak collecting device were developed for the recovery of pure samples from the effluent of glass capillary columns." (G.C.)

A New Gas Sampling Device for Gas Chromatography, by D. Deans, Journal of Chromatography, No. 289, 1984, pp. 43-51. "This paper describes a new sampler for taking gaseous samples for gas chromatography analysis. It can be set for precise and selectable volumes and has no moving parts in the sample path." (G.C.)

Sharp vrs. Blunt Crack Hypothesis on the Strength of Glass: A Critical Study Using Indentation Flaws, by Lawn, K. Jakus, and Gonzalez, Journal of the American Ceramic Society, Vol. 68, No. 1, Jan., 1985, pp. 25-33. "A technical study that also included aging (by soaking in water and acid (HF)) as well as a determination of the crack length." (G.C.)

Use of Glass and Fused-Silica Open Tubular Columns for the Separation of Structural, Configurational and Optical Isomers by Selective Coupleation Gas Chromatography, by V. Schurig and R. Weber, Journal of Chromatography, Vol. 289, 1984, pp. 321-332. "Discusses the advantages of glass and fused silica open tubular columns over metal for GC are discussed and verified by experiments. Also details proper preparation of glass prior to use, plus several experiments for metal chelates and biological extracts are described." (G.C.)

EPR SPECTROSCOPY

Improved Temperature Control for Samples in Electron-Paramagnetic-Resonace (EPR) Spectroscopy, by P. Morse II, R. Magin, and H. Swartz, Review of Scientific Instruments, Vol. 56, No. 1, Jan. 1985, pp. 94-96. "Shows design of an E.P.R. cavity dewar used with a Temperature controlled Silicone oil flow system." (W.M.)

FLOWMETERS

Flowmeter Device for Measuring Slow Gas Flow Rates, by A. Ventura and J. Manassen, Analytical Chemistry, Vol. 57,

No. 1, Jan., 1985, pp. 389-390. "This device, which includes electrodes and gate valves, has the ability to control gas flows as slow as 1 ml/hr to 300 ml/hr with an accuracy of 1% (5% at the lowest flow rates). (G.C.)

GLASS-COATING

A Sodium Resistant $Na_2B_4O_7$ Coating of a Glass Cell, by T. Stacewicz and J. Krasinski, Journal of Physics E - Sci. Instruments, Vol. 16, No. 11, Dec., 1984, pp. 1028. "A simple method of laying a film of sodium biborate to reduce the effect of darkening caused by sodium vapors at elevated temperatures." (G.C.)

Overview of Coating Technologies for Large Scale Metallurgical, Optical and Electronic Applications, by R. Bunshaw, Journal of Vacuum Science Technologies B, Vol. 2, No. 4, Oct. - Dec., 1984, pp. 789-799. "This overview is concerned with the various coating methods for a variety of applications. Selection criteria for process/apparatus for large scale applications are presented. Economic considerations are discussed." (W.M.)

GLASS OPTICAL

Calorimetric Study of Optical Absorption of Suprasil W-1 Fused Quartz at Visible, Near-IR, and Near-UV Wavelengths, by R. Swimm, Y. Xiao, and M. Bass, Applied Optics, Vol 24, No. 3, Feb. 1, 1985, pp. 322-323. "The study was done on three samples of W-1 with a cross section of 1.0 cm on edge and 0.5, 1.0, and 2.0 cm lengths." (G.C.)

GLASS-PROPERTIES

Effects of Heating Time on the Thermal Stress Resistance of a Soda-Lime Silica Glass, by R. Sager, H. Tawil, and D. Hasselman, Journal of the American Ceramic Society, Vol. 67, No. 10, Oct., 1984, pp. 651-653. "This study shows that not only the greater the temperature difference of the glass and water (before quenching) will hasten its' fracture, but the shorter time it is held at fixed temperature will also hasten its' fracture." (G.C.)

Electrolysis of Soda-Lime Silicate Glass in Water, by R. Doremus, et. al., Journal of the American Ceramic Society, Vol. 67, No. 7, Jul., 1984, pp. 476-479. "Ratios of mobilities of sodium and hydronium ions in thin soda lime glass were calculated and compared to results of interdiffusion experiments with these ions. The results showed that it is possible to test theories of the reaction of water with glass." (G.C.)

GLASS-STRENGTHENING

Impact Fracture of Thermally Tempered Glass Helecopter Windshields, by M. Abou el Liel, F. Camaratta, and R. Digenova, American Ceramic Society Bulletin, Vol. 68, No. 1, Jan., 1985, pp. C-18 - C-21. "An interesting and practical study. It also mentions that subcritical impact cites exhibit slow crack growth in tempered plates, eventually leading to fracture of the entire plate." (G.C.)

GLASS-QUALITY CONTROL

Micro-Raman Spectroscopy: A Technique for Analyzing Bubbles in Glass, by R. Janssen and D. Krol, Applied Optics, Vol. 24, No. 2, Jan. 15, 1985, pp. 275-279. "This is a nondestructive technique suitable for analyzing bubbles in glass. It uses 90° scattering geometry and bubbles down to 35m can be measured. Not for the usual glass shop, but interesting none-the-less." (G.C.)

HEALTH AND SAFETY

Are You A Victim of Hidden Stress?, by J. Wilensky, Md., Chemical Engineering, Vol. 92, No. 5, Mar. 4, 1985, pp. 87-89. "In the article, there is a list of "symptoms of stress" (a total of 21). It wouldn't hurt to glance through the list and see how many times you nod your head. We often know when we are in a stress situation, but hidden stress is hard for us to see." (G.C.)

LABORATORY EQUIPMENT AND TECHNIQUE

Mixing Liquids in Microseconds, by P. Regenfuss, et. al., Review of Scientific Instruments, Vol. 56, No. 2, Feb., 1985, pp. 283-290. "An Instrument is

Described in which two solutions can be Homogeneously mixed within several micro-seconds." (W.M.)

Versatile Zone Refiner for Liquids and Low Melting Solids, by C. Martin, et. al., Review of Scientific Instruments, Vol. 55, No. 11, Nov., 1984, pp. 1831-33. "Explains the principle of 'zone refining' plus a detailed description of the apparatus." (W.M.)

MASS SPECTROMETRY

Polyimide-Coated Fused Silica as an Extended Probe for In-Beam Chemical Ionization Mass Spectrometry, by G. Jamieson, C. Reuter, and W. Fitch, Analytical Chemistry, Vol. 57, No. 1, Jan., 1985, pp. 121-123. "A low cost, yet effective, direct chemical ionization probe is described which is useful for obtaining chemical ionization mass spectra of thermally labile and low-volatility compounds." (G.C.)

SILVER SOLDER

Use of Indium Solder to Patch Leaks in Silver Solder Joints on Cryostats, by R. Holtz, C. Swenson, Rev. Sci. Instruments, Vol. 56, No. 2, Feb., 1985, pp. 329. "This solder can provide a convenient and effective, last resort, patching material for leaks which occur in metallic low temperature apparatus. An Indium patch retains its integrity even where a leak has occurred due to differential thermal expansions of construction materials." (W.M.)

TEMPERATURE MEASUREMENT 18

An Inexpensive Thermister Thermometer for Beginning Chemistry Laboratories, by S. Srivastava and C. Meloen, Journal of Chemical Education, Vol. 61, No. 11, Nov., 1984, pp. 1027-8. "Describes a Thermister Thermometer which costs slightly less than a 0.1° glass bulb thermometer, yet this thermometer can be badly mistreated and still continue to function." (W.M.)

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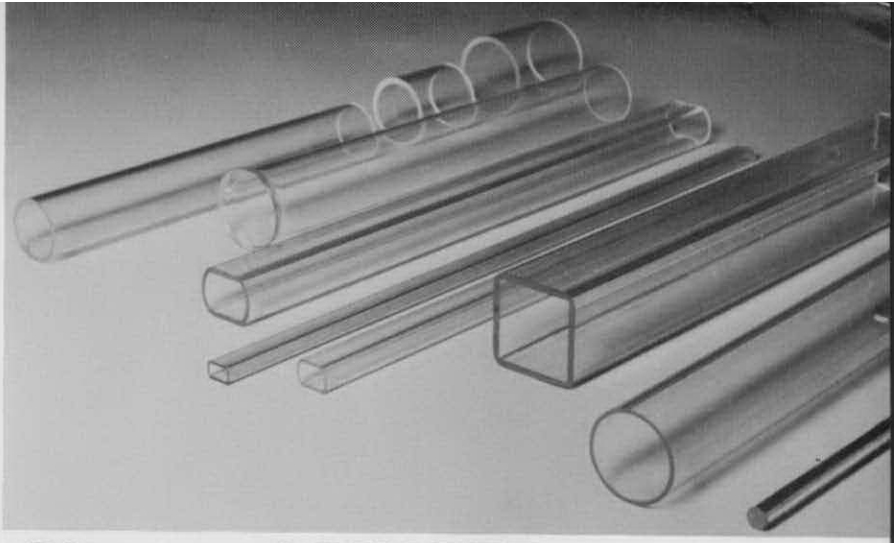

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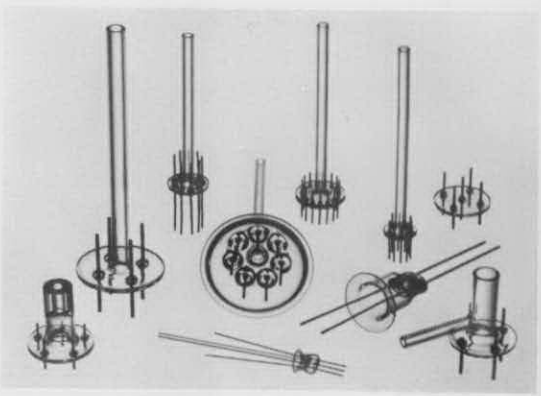

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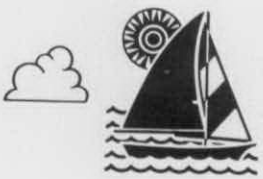

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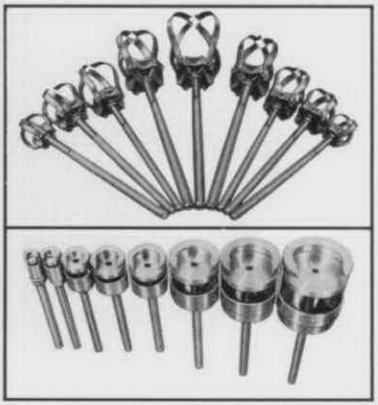

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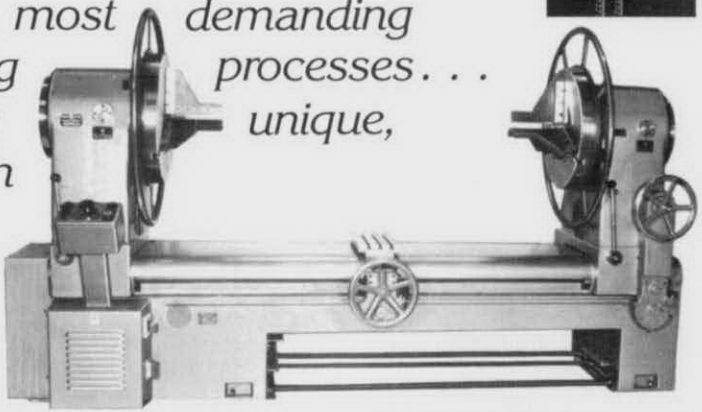

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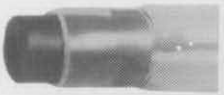

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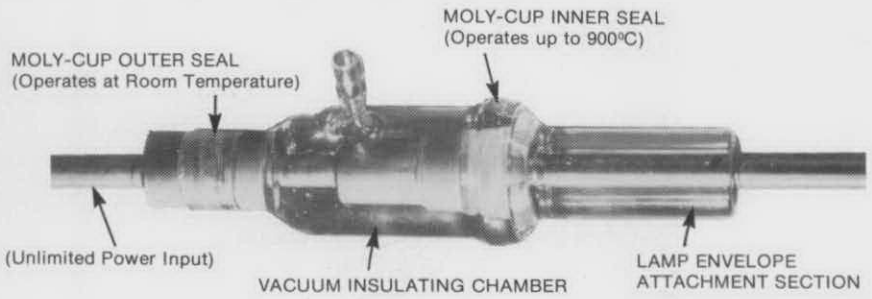

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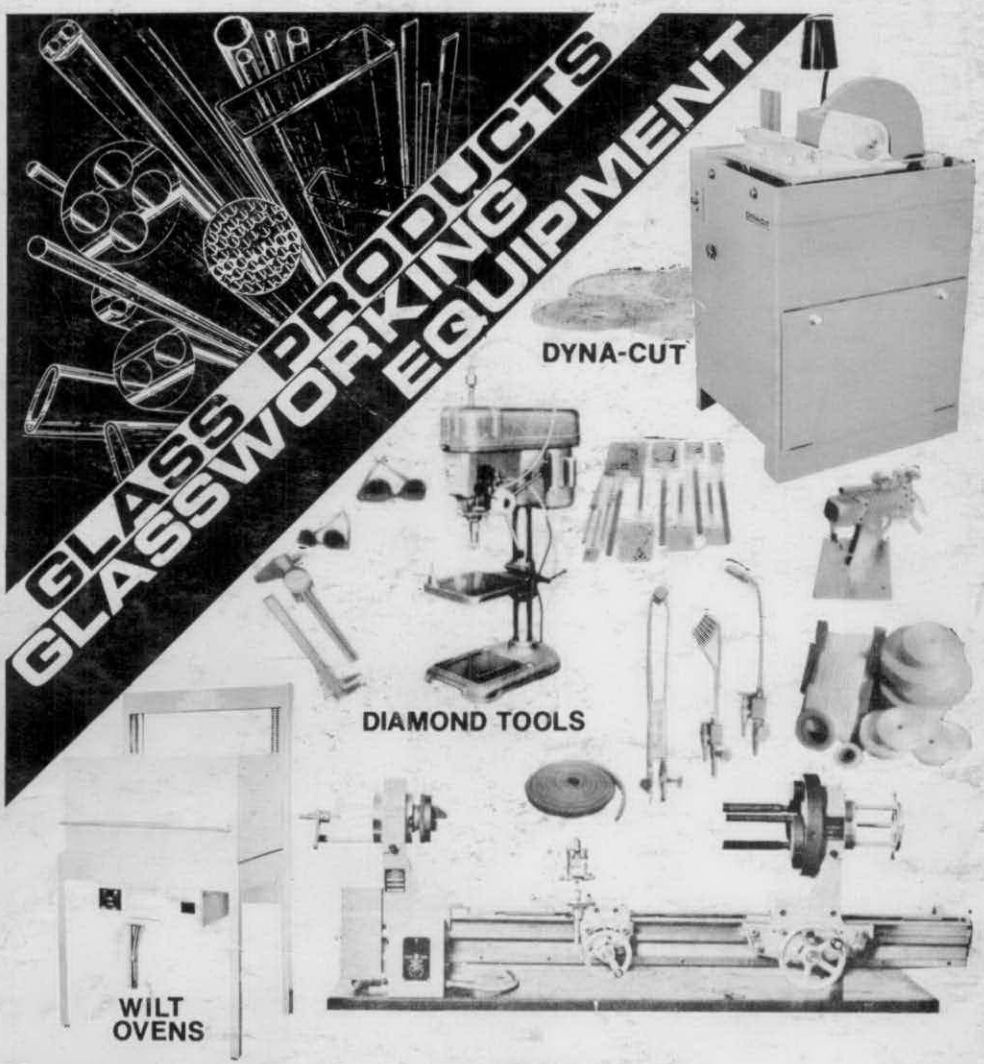

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