FEBRUARY, 1985

FUSION

JOURNAL OF

THE AMERICAN SCIENTIFIC GLASSBLOWERS SOCIETY

1507 Hagley Rd., Toledo, Ohio 43612

Art Dolenga, Jerry Cloninger, Carol Dolenga, Pam Franklin from Corning.

Sieglind Walther, Karl Walther, Ray Buckley from Corning.

PRESIDENT'S MESSAGE

As I compose this message, I am in the midst of a pleasant Christmas vacationwith my family. It strikes me that this time of giving and receiving presents,and sharing experiences and plans for the New Year with loved ones is very much the same as the interactions of our Society Family, The A.S.G.S. We all receive presents from our fellow members in the form of articles, lamp shop hints, and other informationpresented in **Fusion**. The workshop sessions and technical discussions which we hold at our section meetings and our National Symposium are also a way of sharing our abilities and experiences with our peers.

But we must all realize that it is more blessed to give than to receive. It is the duty of each of us, as a member of the family of glassblowers, not only to receive but also to give of ourselves by becoming more active in our society functions. Even though you may not realize it, each of us possesses some talent, some bit of information which could benefit someone else in the society.

If each of us were to resolve to become more active, we could make 1985 the best year in the history of the A.S.G.S.

Let's all do it.

Wilbur C. Mateyka
President

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Maximum Accessibility and Minimum Heat Loss With Wilt Bell Type Ovens

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SECTION NEWS

Metropolitan New York Section

The first meeting of the 1984-85 season was held at the Ehring Tavern in the Bronx with a total of 23 members attending. The meeting was hosted by Kimble Glass, which included a buffet dinner and Kimble reps Dave Marks and John Frechette.

Some important business was discussed with all agreeing that 4 alternate directors would be available to represent our chapter at the German Symposium Directors' meeting and one appointed by our director Richard Scholz. Rudy Schlott seemed to be the favored volunteer because of his experience. Ted Bolan requested additional papers for the Toronto Symposium and answered questions.

The meeting adjourned and afterward Dave Marks, our 50/50 winner, made a nice gesture by donating his winnings to the treasury.

Respectfully submitted,
John E. Pucylowski
Secretary

The second meeting of the 1984-85 season was held on November 2nd 1984, at the Ehring Tavern in the Bronx. We had 19 members in attendance. Acting as chairman elect, Elco Machek directed our meeting. We discussed plans for the Christmas party and usual business.

An auction was held, and auctioneer Ottmar Safferling did an entertaining job. Wale Apparatus Co. donated a pair of new quartz/didymium #8 glasses, and a special torch tip. Members contributed odds and ends and Dimitru Costea and Scott Brickel donated some nice artistic work. The 50/50 winner was Tom Hanlon of Corning, who donated his winnings to the chapter. The auction took in $250.00.

The third meeting of our section, and Christmas meeting, was held at Ehring Tavern in the Bronx with 60 members present. Special thanks to Wilt Industries, Wilmad Glass, Lunzer, Wale Apparatus, Schott Glass, Mercer Glassworks, Eck & Krebs, and Manfred Mirsch who made this wonderful time possible.

We were honored to have President Wilbur Matekya, and his wife Helen, and President Elect Jerry Cloninger in attendance. Ray Buckley of Corning Glass Works, presented Karl Walther a Steuben bowl gift, for being the first president elected to our society, 20 years ago. Thanks to Susan Wilder and Dimitru Costea for the art work for the auction. The winner of the 50/50 was Walter Surdan. The next two meetings will be held April 12th and May 10th.

Respectfully submitted,
John Pucylowski, Secretary

Great Lakes Section

The 1984 fall meeting of the Great Lakes Section was held at Fred Birkhills Studio in Pinckney, Michigan. Fred has a very nice pot furnace set up for art glass production. His love of glassblowing is evident by the many fine pieces on display. Needless to say, this made for a very fun and interesting meeting for the men and the women alike. Thank you Fred for having your furnace ready and allowing those of us who had the courage to dip in and try it out.

During our business meeting, we voted to start a sectional award. This award is to honor members of the Great Lakes Section who have greatly contributed to its success.

Our meeting was well represented with 45 people in attendance. Among them were our national officers Wilbur Mateyka, President; Jerry Cloninger, President-Elect; and Ted Bolan, Executive Secretary. Also attending, were Jim and Bev Panczner from our home office. We would like to thank our national officers for their support and attendance of our sectional meetings. We know you guys log a lot of miles each year. Believe me it's well appreciated by all of us.

Bev Panczner reheating, Leo Dusek in background. (Even the Executive Manager has to work at our meetings.)

We later relocated to the Holiday Inn in Howell, Michigan. We were treated to a fine dinner courtesy of Kontes Glass, represented by John Maris.

Highlighting the evening was the presentation of a Steuben bowl to past president Art Dolenga. Art and his wife Carol were surprised and honored to receive such a stunning gift from Corning Glass. The bowl was presented by Pam Franklin, Corning's representative for our area. Art, Carol, the members of the Great Lakes Section and the American Scientific Glassblowers Society would like to thank Corning for their support and generosity towards our society.

Fred Birkhill demonstrates furnace techniques. Background L-R, Wilbur Mateyka, Mary Sprague, Dave Beaubien, Jerry Cloninger, Ted Bolan.

Dinner at Holiday Inn, Howell, MI, courtesy of Kontes Glass.

We would also like to thank Kontes Glass for their financial support in hosting such a fine dinner.

Respectfully submitted,
Randall R. Hansen, Secretary-Treasurer

New England Section

On behalf of the officers and the membership of the New England Section, we hope everyone had a safe and joyous holiday season.

The elected officers for the 1984-85 year are: Chairman, David Hovey; Co-chairman, Patrick DeFlorio; Treasurer, Peter Gale and Secretary, Gary Anderson.

Our first business meeting of 84-85 was held on October 18th at the Chelmsford Elks Club in Chelmsford, MA. Over 40 people attended our Oktoberfest, complete with knockwurst, sauerkraut and beer.

Our business meeting was called to order by Chairman David Hovey. We are already making plans for the 1987 Symposium to be held in Boston. Our special guest, Mr. Theodore Bolan, Executive Secretary, talked briefly about our commitment to the 32nd Symposium. The contracts for the Symposium have been signed with the Sheraton-Boston Hotel.

The business meeting was closed and our two sponsors for the evening, Dan Wilt representing Wilt Industries, Inc. and Robert McKellin, representing Wale Apparatus Co., gave short, informative presentations of new products from their respective companies. Thank you Wilt Industries and Wale Apparatus for your sponsorship.

Bob McKellin is showing a new burner.

Videotapes of the 1983 Symposium workshops were shown to top off the evening.

We also bid farewell to Andre Spaan, who has retired from Ingold USA. Andre has given so much of his time to our New England Section and the National Society. His leadership and guidance have been truly appreciated and will be missed. Andre and his wife Mary will be retiring to Cornwall, England. We wish Andre and Mary best of luck and hope to see them both at future Symposia.

Our second meeting was held on December 5th at the Lord Wakefield in Wakefield, MA and was attended by more than 40 people. We began the evening with a delicious buffet which was sponsored by GTE Sylvania Quartz Division, represented by Mr. Robert Larson and Mr. Bill Finch.

Dan Wilt displaying a new over contoller.

Left to Right: Dick Ryan, Gary Anderson, Dave Hovey, Peter Gale.

Left to Right: Bill Ryan, Gordon Good, Larry Williams.

Left to Right: Teri Totte, David Hovey, Bob Larson, Bill Finch.

A short business meeting was held. Dick Ryan gave a Board of Directors report. Dick Ryan and Robert DiGiacomo were accepted as Chairman and Co-Chairman of the 32nd Symposium in 1987. Plans for a possible joint meeting of the New England Section and the Hudson-Mohawk Valley Section were discussed. We hope these details can be worked out since such a meeting would be very beneficial to both sections. Our business meeting was closed.

A slide presentation of the GTE Sylvania Quartz Operation located in Ipswich, MA was given by Bob Larson and Bill Finch. Thank you GTE Sylvania for your sponsorship.

Gary L. Anderson

Ohio Valley Section

The fall meeting of the Ohio Valley Section was held on October 27, 1984, in Lexington, Kentucky. Wilbur Mateyka hosted the meeting in his shop at the University of Kentucky. Thirteen members attended. After coffee and donuts, the women left for a tour of the Kentucky Horse Park while the members went downstairs to Wib's shop.

Wib showed us his methods for fabricating round bottom dewers and cell fabrication using transfer tape. Ted Bolan gave a demonstration of working with stained glass. Dick Grant followed with a demonstration of a Dremel tool mounted in a drill press for grinding and cutting slots in glass. Van Gillum showed us his idea of using a spark plug insulator as a swivel adapter.

The business meeting followed. Topics of discussion included the 1986 National Symposium, election of section officers, and awards nominations for 1985. Afterward, we viewed A.S.G.S. workshop films. The meeting adjourned and a buffet dinner was served at U.K. and enjoyed by all.

Respectfully submitted,
Michael A. Burchfield
Secretary/Treasurer O.V.S.

Delaware Valley Section

The first 1984-85 meeting of the Delaware Valley Section was held on October 18, 1984, at the Five Points Inn, Vineland, NJ.

Chris Mee, left and Joe Amadei hold a powder metalurgy mold and finished product.

Joe Amadei explains the powder metalurgy process.

Members and guests, 55 in all, were treated to cocktails sponsored by Kimble Glass, Vineland, NJ. After our dinner, Kimble Glass representatives showed Owen-Illinois' video tapes entitled "Fire and Sand" and "Powder Metalurgy Molds". Joe Amadei discussed how super alloy steels are being produced from borosilicate molds.

Our thanks to Kimble Glass for sponsoring a fine and informative meeting.

Edwin A. Powell
Secretary/Treasurer

Southwestern Section

The Southwestern Section held a meeting in Dallas on October 27, 1984.

The turnout was small but enthusiastic. The main subjects were our future programs, equipment, safety, and delays in getting delivery on material. Many interesting points were brought out.

Joe Roberts of Heraeus - Amersil answered questions regarding fused silica and quartz. Joe did a great job, but then he should, since before joining Heraeus - Amersil he was working in the field.

The social was sponsored by Heraeus - Amersil (thanks folks). This part worked out fine, but then it should have, since Kennedy organized the bar. Everyone left looking forward to our next meeting.

Sincerely yours,
Shorty Yeaman

We are pleased to report that, contrary to an ugly rumor, the Southwestern Section is alive and shows sign of renewed activity.

Thanks to the efforts of Sectional Director, Fred Kennedy, a Special Meeting was held in Dallas, Texas on Saturday, October 27th, 1984.

The meeting was opened by Section Chairman, Shorty Yeaman, who welcomed the almost 20 who attended from all over the state of Texas. Unfortunately none of our members from Louisiana, Arkansas, Oklahoma or New Mexico were able to attend but a good number replied to the meeting announcement with enthusiasm.

After an informative discussion of sectional business and possible future meeting topics and locations, the group adjourned to social hour refreshments. A special thanks is extended to HERAEUS-AMERSIL and their representative JOE ROBERTS for the refreshments and genial hospitality.

Derald Cleckley
Secretary

Hudson-Mohawk Valley Section

The second meeting of our section was held at the Glassblowing Labs of the University of Massachusetts in Amherst, MA. We had the pleasure of viewing the Newport Beach Symposium workshop tapes with interesting comments from our national executive secretary Ted Bolan who was present when the camera recorded these events. Ted comments were particularily appreciated by those among us not privileged to attend the symposium workshops.

A brief business meeting followed with a report from Director Bill Wilt discussing among other things, the symposium in Toronto in 1985, followed by Cincinnati in 1986, and Boston in 1987, adding the Philadelphia area for 1988. Bill and Ted both mentioned there is still a need for papers and fabrication demos in Toronto.

Chairman Ward Cornell stated his plans to call a meeting in late February or early March and that a joint meeting with the New England section in April/May is in the works.

Respectfully submitted,
Gordon Good
Secretary/Treasurer

Southern California Section

Members of the Southern California section held their first meeting of the 1984-85 session at California State University, Los Angeles. Our host for the evening was Gary Coyne.

The agenda for the evening included an edited edition from the video tapes taken at the 29th Symposium workshops. Because of these tapes, members who could not attend the Symposium were able to see large kovar seals; window sealing with and without vacuum chucks; tooling; large quartz flange sealing; coil winding and the use of computerized lathes.

A short business meeting followed. The possibility of buying a copy of the Symposium video tape for our local section ended on a positive note. Following this, a show of hands provided information needed to help complete a questionnaire which will be used by our National Society.

Our thanks to Gary Coyne for hosting this first meeting, and for providing the refreshments.

1st meeting, our host, Gary Coyne.

1st meeting, the group gathers.

On November 17, 1984 the Southern California section held its third meeting of the year at Witig Scientific, located in Anaheim, California. Our host for the evening was Siegmund Grozinger distributor for Schott Glass. The meeting began with a 15-minute video cassette tape produced by Schott Glass that explained the many aspects of which Schott Glass is involved with at its world-wide facilities.

Our chairman, Gary Coyne, then introduced Jurgen Kramer, the Schott representative from the Mainz, Germany plant, who answered several questions from the members about the Schott products.

Our Sectional Director, Jim Merritt, reminded us that anyone interested in going to Germany for the International Symposium should contact the home office before January 1, 1985.

Left, chairman Gary Coyne, right, our host Siegmund Grozinger.

Ah, The Food!

All business taken care of, Siegmund turned on the oomph-pah-pah music, rang the dinner bell and feted all present to an original "Novemberfest" with a complete variety of German sausages, salads, sauerkraut, cold cuts, as well as a little traditional German libation.

Many thanks to Siegmund for such an enjoyable meeting due to his warm hospitality, which was appreciated by all.

The Southern California Section of the A.S.G.S. held its fourth meeting of the year on December 17, 1984 at the Peppermill Restaurant in Pasadena, California. Following a cocktail hour, the members enjoyed a delicious prime rib dinner provided by Mr. Barry Du Ron, our host for the evening. Mr. Du Ron is the representative for Ace Glass Inc. After the dinner, Mr. Du Ron fielded questions from the members on Ace's products and future distribution possibilities. Also on hand was a display of various types of hi-vacuum teflon stopcocks for the members to inspect. The evening concluded wishing all a happy holiday season.

Left, Barry Du Ron, Right, the Coynes.

The happy diners.

Our thanks to Barry Du Ron and Ace Glass Inc. for making this dinner meeting possible through their generous participation and yuletide spirit.

Richard P. Gerhart
Secretary/Treasurer

San Francisco Bay Section

Our annual Art-glass show was held on the 15th of December, 1984 and was hosted by Mr. Jack Allen at Quartz One in San Jose, CA.

Frank Szephegyi, this year's Christmas Show Chairman kept the show on the move by not only directing operations, but by demonstrating his exceptional skills of sales and glassblowing throughout the day.

Frank's daughter, Anna, and Mrs. Patricia Horn were indispensible when it came to keeping orders straight and packaging purchases.

In spite of inclement weather and a shortage of help this year's show can still be considered successful and the profits will again be sent to the Eastfield Childrens Home in San Jose, CA.

Respectfully submitted,
Harry Horn

New Zealand Holds 2nd "Gather"

On Friday, December 7th a second "Gather" of glassblowers was held in Auckland in the North of New Zealand's North Island and was attended by twenty people. It followed much the same format as the meeting held in Dunedin in August and was just as great a success.

The first part of the day was spent at Auckland University where Chemistry Dept. glassblower Mike Wadsworth gave a most interesting demonstration of his method of drawing square bore tubing and then took us on a tour of some of the complex high vacuum installations in the Department.

Mike Wadsworth of Auckland University sets up Lis Tube drawing demonstration while Grant Platt looks on.

Greg Purdy and Ron Snell study the Stubre display set up at Carter Chemicals Ltd.

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 blown and shaped by the age-old "off-hand" methods.

At 3 p.m. everyone travelled across the city to Carter Chemicals premises at Pakuranga where further glassworking demonstrations were conducted by Grant Platt, John Penno and Gary Purdy, followed by an enormous barbecue served up by genial host and master steak-chef Brian Carter.

The evening was spent in viewing audiovisual presentations and discussions and the meeting closed at 10 p.m.

Many thanks to convenor Mike Wadsworth and also to Carter Chemicals Ltd. for once again providing the generous sponsorship that helped make the event such a success.

Many people have now expressed the hope that the initiative of the past few months will be continued and that New Zealand's scientific glassblowers will continue to meet and exchange ideas and views at least once a year in the future.

Sincerely, John Penno

EDITOR NOTE – On behalf of the members in the American Scientific Glassblowers Society, let me offer our congratulations to all the glassblowers in New Zealand for the successful second gathering of your members. All things great start out small, as we here in the A.S.G.S. know. If there is anything any of us here can do to help in any way feel free to call on us all.

Again congratulations and keep up the good work.

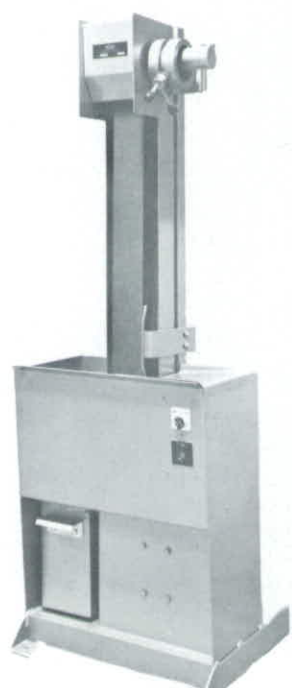
Jim Panczner, Editor

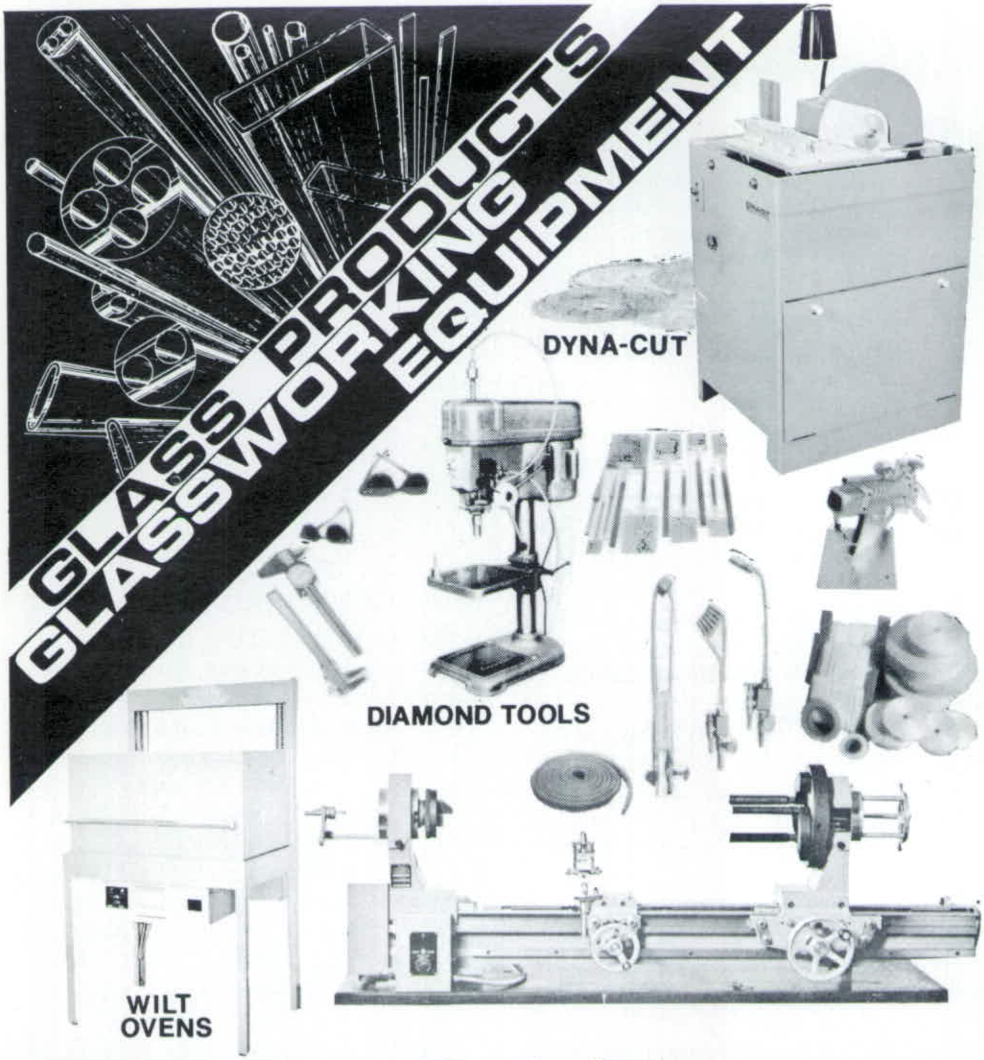
What's New In Audio/Visual

Owen Kingsbury has assumed the responsibility for handling the A.S.G.S. tapes of the 10 films and the symposium workshops. Please direct all requests to him in the future for use of the tapes.

Owen's telephone number at work is: 919/757-6237 and his address is:

East Carolina University
Chemistry Department
Greenville, NC 27834




GLASS PRODUCTS
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WILT OVENS

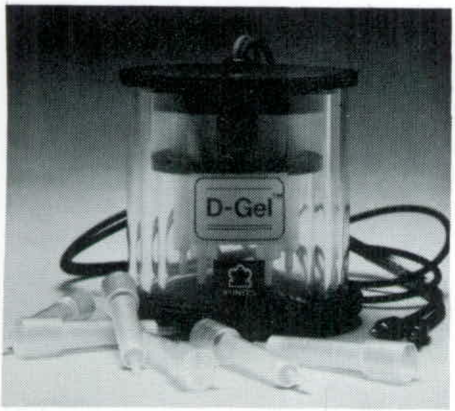
New Products and Literature

*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**.*

D-GEL™ ELECTROTRANSFER SYSTEM

The Kontes D-Gel Electrotransfer System is a rapid, inexpensive system for DNA recovery from electrophoresis gels.

DNA restriction fragments, synthetic oligonucleotides, primers and linkers can be easily recovered from agarose or polyacrylamide gels. The operating principle of the D-Gel system is electroelution of nucleic acids from electrophoresis gels onto DEAE Cellulose or DEAE Anion Exchange Resin. Typical recovery of DNA fragments smaller than 10 K bp is 80-90%. Particularly effective when dealing with synthetic oligonucleotides, the D-Gel achieves a 90-100% recovery rate. In addition, the D-Gel obviates the phenol extraction required by the low melting agarose technique and substantially improves nucleic acid recovery compared to electroelution onto dialysis membranes.



A D-Gel Electrotransfer System Starter Kit, catalog number K-566800-0000, is currently available from Kontes. Included are a D-Gel Cell, 12 transfer chambers, 5 gm treated DEAE Cellulose, 7.5 ml DEAE Anion Exchange Resin and detailed instructions. The kit is $395.00.

TM D-Gel is a trademark of Epigene.

SPLIT-LENS QUARTZWORKING SPECTACLES

WALE APPARATUS is pleased to announce that split-lens spectacles for quartzworking are now available from stock. These glasses are available with either didymium or clear glass on the upper 1/3 of the lens and shade 6 or 8 welders glass on the lower 2/3. Unlike other split-lens spectacles available, WALE spectacles offer all glass construction on the lenses (plastic welders shade lens construction tends to warp due to reflective heat). These spectacles are made with universal fit frames.

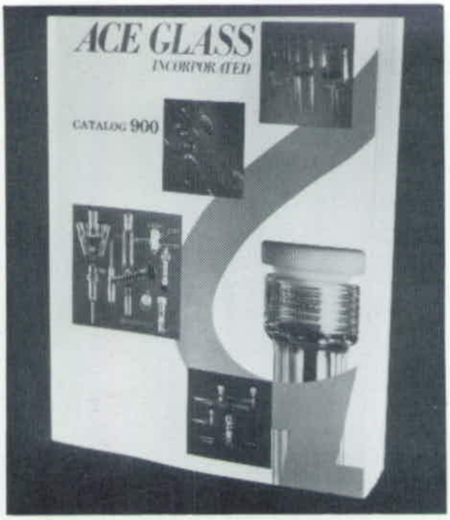
WALE split-lens spectacles are available with clip-on, flip-up frames in both didymium and clear glass uppers.

Also available on special order: lower 2/3 in welders shades 4, 5, 7, 9, and 10.

For further information contact: WALE APPARATUS CO., 400 Front Street, P.O. Box D, Hellertown, PA 18055 or call (215) 838-7047, ask for Mr. Dennis Wargo.

NEW 464 PAGE ACE CATALOG 900

Vineland, NJ – New 464 page Ace Catalog 900 features a complete selection of laboratory glassware and apparatus



including large Chromatography, Photochemistry and Environmental Apparatus sections. Ace-Threds, no-grease, no-clamp time saving connectors, are featured on adapters, glassblower items as well as parts of other Ace apparatus. Ace Glass Incorporated, P.O. Box 688, Vineland, New Jersey 08360.

DIGITRY INTRODUCES GB4 PROGRAMMABLE TEMPERATURE CONTROLLER

Medford, MA – Digitry's GB4 Programmable Termperature Controller sets a new standard for reliability, accuracy and ease of use. The micro-processor-based unit monitors and controls · one to five ovens/furnaces – each with up to ten set points – automatically and independently.

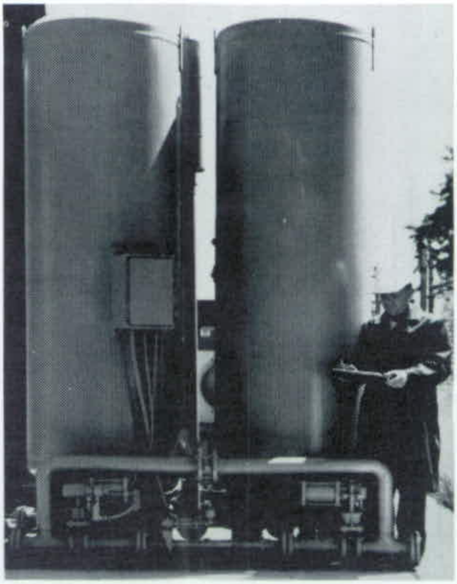
This programming flexibility allows a virtually limitless number of temperature profiles. No computer programming knowledge required. Simpy key in the time-temperature set points and the GB4 calculates the slopes.

No more waiting to fire up or to make set point adjustments. No more product damage from delayed temperature changes. No more temperature profile limitations or uneven ramping.

The GB4 is the second generation of programmable temperature controllers designed and manufactured by Digitry Company. For complete information contact, Digitry Company, Inc., Box 700, 33 Ship Avenue, Medford, MA 02155 (617/391-3800).

NEW TONNAGE SYSTEM FOR OXYGEN GENERATION

Xorbox, Division of Greene & Kellogg, Inc., Tonawanda, New York, announces the availability of a new tonnage system for oxygen generation for industrial applications.



Each system is designed to produce the oxygen purity, flow rates and pressures best suited for each individual application. These systems range in capacity from 2,000 SCFH to 40,000 SCFH.

Applications include oxygen enrichment of furnaces, pulp and paper manufacturing, sewage treatment, mini steel mill operations and chemical oxidation processes.

Xorbox tonnage units are designed for easy installation and operation. The valves and controls are pre-assembled and delivered on skids. The absorbent vessels are shipped separately for final on-site assembly. Assembly and start-up of the plant can be accomplished in less than three days.

Xorbox oxygen generation systems require only minimal attention from plant personnel to insure continued high performance.

For more information about Xorbox tonnage systems, call or write to Xorbox, a Division of Greene & Kellogg, Inc., 290 Creekside Drive, Tonawanda, New York 14150/(716) 691-7474/(800) 838-7331/Telex No. 64-6116.

NEW 22 LITER SOLVENT RECOVERY SYSTEM

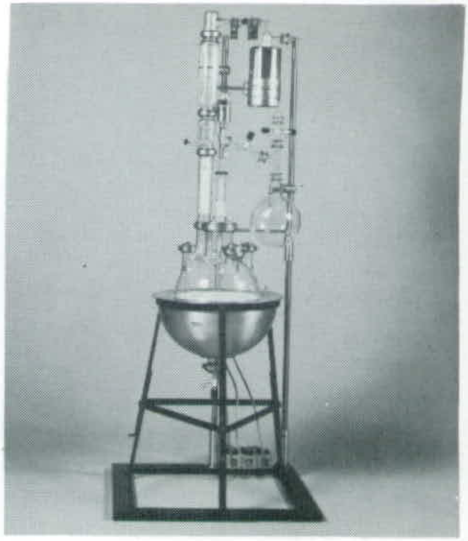
A 22 liter solvent recovery system is available from Kontes.

The complete unit shown is ideally suited for the repurification of solvents used in manufacturing and R&D processes. The unique modular construction allows easy conversion to steam, fractional or reduced pressure distillation as well as reflux with addition, organic synthesis, or other custom operations.

All connections are greaseless – either beaded pipe with T-bolt stainless/Teflon® couplings or 0-ring groove $ 35/25 ball and socket joints.

The convenient bottom outlet has a 2" connection for easy flask cleanout.

Column, stirring and vacuum modules are available separately, as is a system



support and a complete line of accessories.

Optional versions include 12,50 and 72 liter units.

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

BIO/SEPARATIONS – PREMIERE ISSUE

"Bio/Separations – October 1984" is the first issue in a continuing series featuring sample preparation and separation products for the Life Sciences.

Reflecting a new focus on Life Sciences at Kontes, the premiere issue contains detailed profiles on innovative chromatography, electrophoresis, filtration and sample preparation products. Of special interest are 5 new items: Flex-Column ® economy chromatography columns with luer lock fittings for fail-safe operation, Disposaflex ® chromatography columns and 50 place column rack for convenient assay of up to 50 biological samples, 2 and 4 liter Ultra-Ware ® micro filtration apparatus for faster HPLC solvent clean-up, Pellet Pestle for resuspending biopolymers in 1.5 ml microtubes, and a D-Gel ® Electrotransfer System for DNA recovery from electrophoresis gels.

Future issues of "Bio/Separations" will contain products dealing with molecular biology, protein chemistry, cell biology, microbiology and the other Life Sciences.


BioSeparations

NEW Separations Products for the Life Sciences

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

NEW LOWER COST STAINLESS STEEL BELL JARS OFFERED

A new Line of advanced design stainless steel bell jars is now being offered at substantial savings over competitive models, according to Xiron Vacuum Products Division, 1251 West Sepulveda Blvd., Suite 418, Torrance, CA 90502.

Available in diameters of 18", 19.5", 24", 25.5" and 32", these bell jars are designed for new system applications or for upgrading existing vacuum systems. Interchangeability is assured by a variety of adjustable bell jar hoist rings, or top and side mounting hoist brackets.

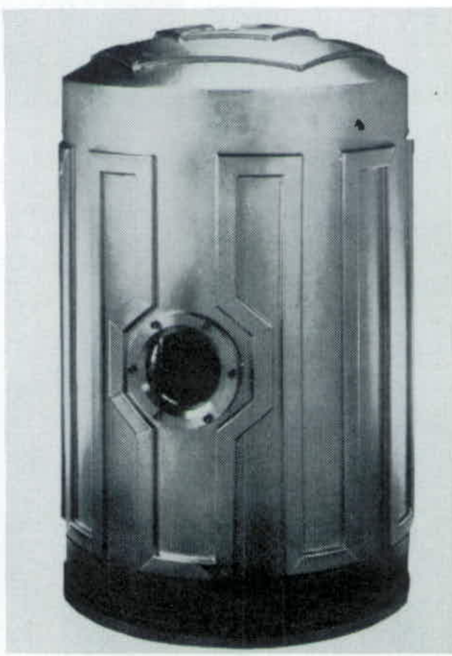
Made of type 304 stainless steel in all vacuum areas, with 100% interior welding, the bell jars feature interior surfaces electropolished 2B, with a frosted electropolished exterior finish. A 4" wide angle Pyrex view port is standard, and is normally positioned 12" above the base plate.

All Xiron bell jars are subjected to rigid quality control monitoring during construction and must pass stringent final inspection procedures, including helium leak rate examinations.

Advanced assembly techniques and high volume production permit Xiron to pass along savings to customers, a company spokesman said. He also noted that a full refund is offered within 30 days of purchase, if the product fails to meet cutomer expectations.

Optional water cooling is provided by utilizing serpentined stainless steel cooling channels to achieve maximum thermo transfer efficiency.

Other options include additional viewing ports, bottom O-Ring flange seal, feedthrus and water cooling.

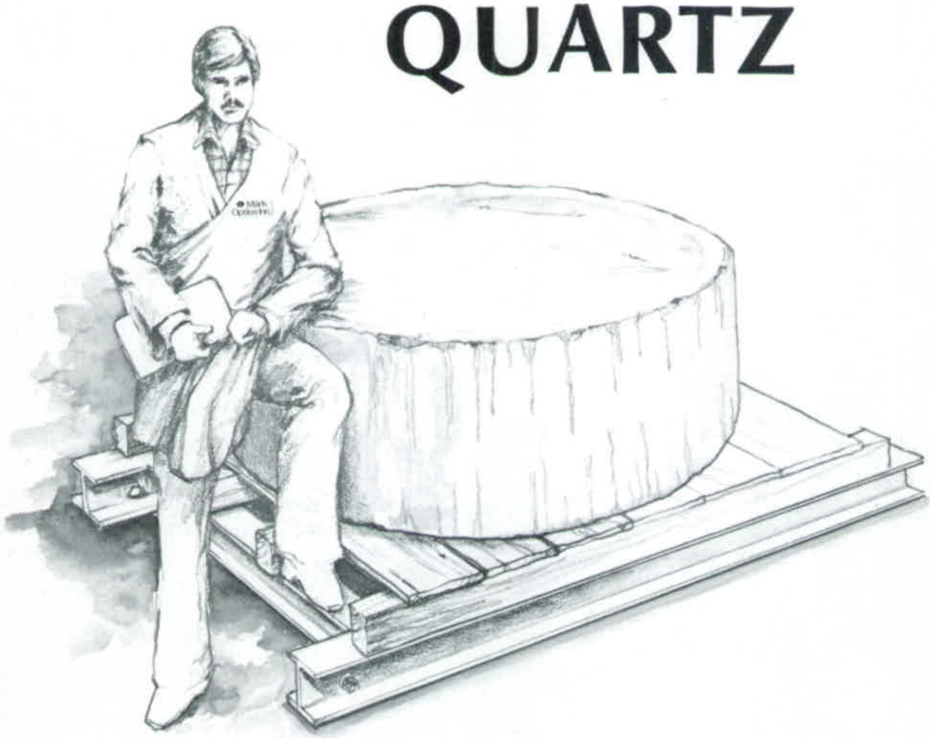


Xiron also offers custom bell jars, chambers, and high vacuum system design, engineering and construction services.

ROTHENBURG—GERMANY

We are off to Germany in 1986 to attend the 3rd International Glassblowers Society Meeting. We have 100 confirmed as of January 1, 1985. There is still time to sign up, but now there is a $25.00 late charge which is NOT refundable. The meeting site has been changed to Nurnberg, Germany. We will be staying at a new 1000 bed hotel in Nurnberg. We will be flying out of Los Angeles, Chicago or New York City. For more details watch your FUSION JOURNAL.

Put yourselves in this picture – come to the 3rd International Meeting at Nurnberg, Germany.



Reference and Abstract Committee

Appeal for Help

Because of my weak knowledge of lasers, it is sometimes hard for me to recognize new uses of lasers vrs. new lasers. This applies to new techniques vrs. new technology as well. Because there is such a vast amount of papers that cite lasers, it is difficult for me to skim all the articles looking for the difference.

CELLS – ELECTROCHEMICAL

Microcell for Cyclic Voltammetry, by I. Fujita and C.K. Chang, Journal of Chemical Education, Vol. 61, No. 10, Oct., 1984, pp. 913. "A simple cell to construct, requires only 0.3 ml of solution." (W.M.)

CHROMOTOGRAPHY

Purification of Air Sensitive Organometallic Compounds by a Modified Flash Chromotography Procedure, by K.A.M. Kremer and P. Helquist, Organometallics, 1984,3, pp. 1743-45. "A key component of the apparatus is a specially designed flow-controller." (W.M.)

DECORATION

Discovery in Decoration – New Riches for Glass, Ceramics, Ceramic Industry, Vol. 123, No. 3, Sept., 1984, pp. 24-31. "A history, overview, and modernization of the patterns on dishes, glasses and ceramics by ALL methods. Non-technical and very interesting." (G.C.)

GLASS – COMPONENTS

Strategic Risk Analysis of Raw Materials in the Glass Industry, by George H. Edwards and D.W. Anderson, American Ceramic Society Bulletin, Vol. 63, No. 11, Nov., 1984, pp. 1391-93. "A study of the raw components of glass and their availability. This was analized by two dimenions: 1) the internal sensitivity of the loss of the material and 2) the external probability of that loss." (G.C.)

GLASS – PROPERTIES

An Apparatus for Precise Measurement of Glass Homogeneity by Shelyubsku's Method, by SatoruInoue, Masyuki Yamane, and Takashi Serizawa, American Ceramic Society Bulletin, Vol. 63, No. 11, Nov., 1984, pp. 1412-15. "Shelyubsku's method (transmittance of mono-chromatic light is passed through a Christiansen cell containing glass particles and an immersion liquid is determined) is not suitable for use with highly homogeneus glasses. This paper shows how by applying pressure and adjusting the path of light, it can be used for highly homogeneus glasses." (G.C.)

Batch-free Time vrs. Crucible Volume and Soda Type in Glass Melting, by Barrie H. Bieler and John A. Bunting, American Ceramic Society Bulletin, Vol. 63, No. 11, Nov., 1984, pp. 1405-07. "This paper concerns itself in the latter question and used a) 50% NaOH solution, b) 8 mesh ground flake caustic (98% NaOH, 2% H_2O) and c) 73% caustic pre-reacted with batch followed by batch granulation on a disk." (G.C.)

Effect of Atmosphere on theElectrical Conductivity of Sodium Tungstophosphate Glasses, by Dean J. Geraci and James E. Shelby, Journal of the American Ceramic Society, Vol. 67, No. 10, pp. 654-57. "The DC electrical conductivity of this glass was measured as a function of glass composition, melting history, and ambient atmosphere. The color of the glasses was a function of composition and melt history while the electrical conductivity was dependent of the concentration of protons in the atmosphere." (G.C.)

Low Melting Glasses in the System B_2O_3-ZnO-CaO-P_2O_5, by Jean M. Clinton and William W. Coffeen, American Ceramic Society Bulletin, Vol. 63, No. 11, Nov., 1984, pp. 1401-04. "This is a study of low melting ($<$1000°C) lead free glasses that are chemically durable." (G.C.)

Thermal Expansion Uniformity of Materials for Large Telescope Mirrors, by S.F. Jacobs, D. Shough, and C. Connors, Applied Optics, Vol. 23, No. 23, Dec. 1., 1984, pp. 4237-44. "A detailed study of the thermal expansion uniformity of fused quartz (Heraeus-Amersil TO8E), borosilicate glass (Schott-Duran and Ohara E6, Corning 7160, 7740). Also mentions Corning 7940 and 7971. (G.C.)

GLASS – RESEARCH

Current Glass Research in Japan, American Ceramic Society Bulletin, Vol. 63, No. 9, Sept., 1984, pp. 1130-32. "A list of titles of research papers of glass research in Japan." (G.C.)

The State of Glass Science, by Norbert Kreidl, American Ceramic Society Bulletin, Vol. 63, No. 11, Nov., 1984, pp. 1394-98. "Title is self explanitory. Article talks more of technology related glasses." (G.C.)

GLASS – STRENGTHENING

Effects of Etched Depth on Glass Strength, by Chandan Kumar Saha and Alped R. Cooper, Jr., Journal of the American Ceramic Society, Vol. 67, No. 8, Aug., 1984, pp. 158-59. "A study of increasing the strength of glass by etching it in HF is discussed." (G.C.)

Tensile Fracture of Glass Capillaries Under Controlled Inner and Outer Wall Environments, by Charles A. Nielson and Iain Finnie, American Ceramic Society Bulletin, Vol. 63, No. 11, Nov., 1984, pp. 1422-26. "From the apparatus described, results show that by decreasing the partial pressure of water vapor, the fracture origens go from the outside to the inside." (G.C.)

GLASS – SURFACE

Effects of Cracks on Water Sorption of Glass, by V.R. Howes and A. Szameitat, Journal of the American Ceramic Society, Vol. 67, No. 10, Oct., 1984, pp. 218-19. "A perfect glass surface will reach total water sorption in a relatively short time (10 min.). After 30 min. glass (with the scratch of a glass knife) is still sorbing water at a very constant rate. This is relevant to the kinetic fracture and fatigue of glass. (G.C.)

Slow Fracture Model Based on Strained Silicate Structure, by T.A. Michalske and B.C. Bunker, Journal of Applied Physics, Vol. 56, No. 10, Nov., 15, 1984, pp. 2686-93. "This study offers a model for explaining the slow fracture of glass by water on an atomic basis. A little technical, but fascinating." (G.C.)

OPTICAL FIBERS

Alternative Method of Preparing Chalcogenide Glasses, by Peter J. Melling, American Ceramic Society Bulletin, Vol. 63, No. 11, Nov., 1984, pp. 1427-29. "Chalcogemide glasses are good for infrared transmitting optical fibers. This paper discusses methods of improving glass purity." (G.C.)

Losses at Corner Bending in Optical Waveguides: An in Situ Measurement Method, by Yasuyuki Okamura and Sadahiko Yamamoto, Applied Optics, Vol. 23, No. 20, Oct., 15, 1984, pp. 3506-08. "Describes the preparation of the fibers and the experiment set-up using a microcomputer - assisted video camera to measure loss at the corner bend in an integrated optical waveguide." (G.C.)

A New Class of Glasses for Double-Crucilbe Optical Fibers with High Numerical Aperatures, by G.A.C.M. Spierings, C.M.G. Jochem, T.P.M. Meeuwsen, and G.E. Thomas, Journal of the American Ceramic Society, Vol. 67, No. 10, pp. 657-63. "A series of boron and germanium free silicate glasses were developed for core glass (with borosilicate outer core) for optical fibers with a numerical aperature in the range of 0.3 - 0.5." (G.C.)

PATENTS

On a Clear Day, You Can See The Patent Office: An Inventor's View, by Robert J. Redding, Intech, Vol. 31, No. 10, Oct., 10, 1984, pp. 33-42. "An insightful article on the values of getting a patent. You would still be wise on talking to a patent attorney." (G.C.)

The Origin and Development of the American Patent System, by Morgan Sherwood, American Scientest, Vol. 71, No. 5, Sept.-Oct., 1983, pp. 500-06. "Title says it all, includes commentary on what can be patented and the administration of the patent system." (G.C.)

POLISHING

Polishing Technique for Titanium, by Eberhard Prochnow, Applied Optics, Vol. 23, No. 23, Dec. 1, 1984, pp. 4279. "Polishing techniques for other metals do not work with titanium. Here is a procedure that claims to work." (G.C.)

SILICA

Preparation of SiO_2 Glass from Model Powder Compacts, by Michael D. Sachs and Tseung-Yuen Tseng, Journal of the American Ceramic Society, Vol. 67, No. 8, Aug., 1984, Part I - pp. 526-32, Part II - pp. 532-37. "Part I is a study of the formation and characterization of powders, suspensions, and green bodies are described. Part II describes the sintering behavior of powder compacts formed from spherical, nearly monosized SiO_2 Particles." (G.C.)

Synthesis of High - Purity Silica Glass by the Sol - Gel Method, by Iwad Matsuyama, Kenzo Susa, Shin Satoh, and Tsuneo Suganuma, American Ceramic Society Bulletin, Vol. 63, No. 11, Nov., 1984, pp. 1408-11. "This paper studies the Sol-Gel process and studies ways that it can be made successful for bulk production of high purity, bubble free silica glass." (G.C.)

SILVERING

Recovery of Silver and Cobalt from Laboratory Wastes, by Donald F. Foust, Journal of Chemical Education, Vol. 61, No. 10, Oct., 1984, pp. 924. "A useful way to recover elemental silver or silver nitrate from spent silvering solution." (W.M.)

SUBLIMATION

New Large - Scale Laboratory Sublimer, by G. Slone, Rev. Sci. Instruments, Vol. 55, No. 10, Oct., 1984, pp. 1700-01. "A new sublimer is described in which a glass condenser is surrounded by a close-fitting, rotating helical scraper of stainless steel. Sublimation takes place from an annular chamber below the condenser. The sublimate is scraped from the condenser and falls into a collection flask." (W.M.)

TEMPERATURE MEASUREMENT

Infrafed Thermometers Can Help Improve Melter Termperature Control, by Richard Marshall, Glass Industry, Vol. 65, No. 10, Oct., 10, 1984, pp. 16-19. "A discussion of the problems of thermocouple and the advantages of infrared detectors including present and future applications." (G.C.)

VACUUM – EXHAUST

Simple Vacuum Pump Exhaust Filter, by R.A. Forman and H.D. Kratz, Rev. Sci. Instruments, Vol. 55, No. 9, Sept., 1984, pp. 1503. "Based on an automotive air cleaner. The major virtues of the system are ease of coupling to an external exhaust and the availability of filter elements." (W.M.)

VACUUM – SEALS

Reliable Slip-on Vacuum Coupling for Low-Temperature Apparatus, by J.W. Stasiak and R.W. Guernsey, Jr., Rev. Sci. Instruments, Vol. 55, No. 9, Sept., 1984, pp. 1504-05. "A reliable slip-on scheme is described. The novel aspect of this concept is the use of silicone fluid as the sealing agent." (W.M.)

Obituaries

It is the sad duty of the Editor to report to the membership the deaths of three of our members.

James J. Dempsey of Yorktown Heights, NY died on November 12, 1984 at the age of 62. He was employed as a glassblower by IBM for 23 years. He served in the US Army Signal Corps during World War II. James became a member of the A.S.G.S. in November, 1964. He is survived by his wife, Julia, and two sons and two daughters.

F. Joseph Mallory of Monroeville, PA has passed away. He joined the A.S.G.S. as a regular member in December of 1955. He was a member of the Pittsburgh Tri-State Section, where he served as Vice Chairman 1968-1969, Alternate Director 1973-1976. Joseph retired from US Steel in November, 1980.

Kurt Wurster of Whippany, NJ has passed away. Kurt joined the A.S.G.S. in September, 1956. He owned and operated the K.W. Thermometer Co. Kurt served the A.S.G.S. as a member of the nominating committee 1961, and was chairman of the Tri-State Section 1964-1966.

May I express the deepest condolences of the membership of the A.S.G.S. to all the survivors of these three members.

"PUFFER" By Lillie[2]

ROSTER CHANGES

The name of William A. Campbell was omitted from the roster, by error. Bill was one of the charter members of the A.S.G.S., and apologies go to him for the omission. Please enter into your roster:

WILLIAM A. CAMPBELL (retired)
DOGWOOD DRIVE, RR #1
CHESTER, NJ 07930

Joseph N. Pyle is **self-employed** and the name of his company is: Lab Glass Blowing.

Peter Petersen also is self-employed and the name of his company is: Peter Petersen Scientific Glassblowing.

TORONTO
ONTARIO—CANADA

30th Annual Symposium and Exhibition

The Westin Hotel, site of the 30th annual symposium, is located in the heart of downtown Toronto. It offers elegance, warmth and luxurious guest rooms. Banking, a drug store, the post office and other services and facilities are located nearby. Many of the most popular sightseeing attractions are within easy walking distance. For those of you who might like to use public transportation, a subway station is just outside the hotel door.

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The Westin Hotel has a cut off date of . . .

MAY 15, 1985

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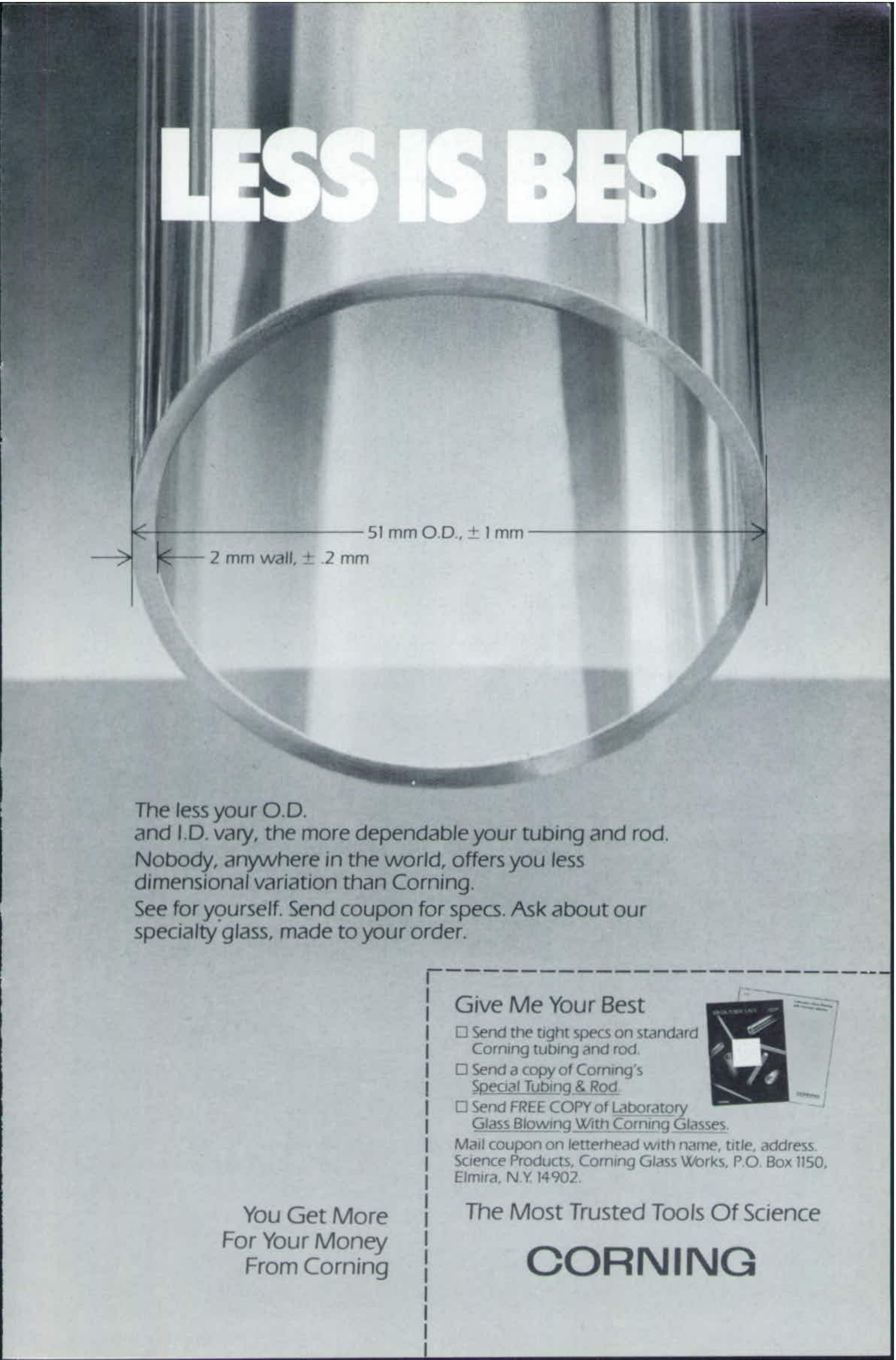
Don't be disappointed. Reserve your room well in advance.

Rates for the Westin Hotel are: Single room per night – $95.00 Canadian, Double room per night – $105.00 Canadian.

Our Exhibits Chairman, David Chandler, would like to thank the following exhibitors, on behalf of the A.S.G.S., for their early registration: B+C Glastechnische Maschinenbau- und Vertriebs, B.D.H., Carlisle Burners, Chemglass Inc., Corning Glass, Elgin Precision Glass, G.M. Associates, GTE Products Corporation, General Electric, Johns' Scientific Inc., Kontes Glass Co., Litton Engineering Laboratories, Lunzer Industrial Diamonds Incorp., Lurex Mfg. Co., Nortel Mfg. Ltd., Pegasus Industrial Specialties Ltd., Peter Petersen, Robu Glass, Wale Apparatus Co., Wilmad Glass Co. Inc., Wilt Industries Inc., and Xorbox.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AVOIDING DEPOSITION OF BLOOM ONTO OPTICS AND OTHER CRITICAL FUSED QUARTZ SURFACES

A nuisance in quartz working, bloom can especially be ruinous for a project incorporating optics.

The methods of choice for fusing to quartz optics would be by diffusion bonding[1] or solder glass sealing. Aluminum and indium[2] solder seals can be employed if the apparatus will not be exposed to high temperatures, and of course there are adhesives ranging to the polymides which can withstand many 'nasty' environments and service temperatures to 1000° F (537° C)[3]. More typically we apply fire to material and simply do it.

To yield a window sealed to the end of a tube, prop the optic into place snugly, in from the end of a length of tubing, then fuse the tube to the optic. Finish by cutting off the excess tubing and chamfer the edge using the side of the cut off saw blade.

Once attached to tubing, the tubing can be cut close to the optic creating a collar which can be flame-worked more easily and with less concern for bloom.

When it's necessary to flame-work the edge of a critical quartz surface and bloom is a concern, try painting clean Aqua-dag[4] diluted four or five fold with distilled water onto the critical surface. If your Aqua-dag is clean it will vaporize without a trace in the immediate region of flame-working, but will protect covered surfaces from bloom. Be certain that the flame is always directed away from the protected surface(s), and as always, bloom on non-critical surfaces can be cleaned up by burning it back into the glass once the piece is completed.

[1]Diffusion bonding, Early, K D, G Abel, Proc Sym ASGS 22 (1977) 51-53.

[2]Pressure-made soft-metal vacuum seals for glass and ceramics, Neuhauser, RG, Vacuum v29, no 6/7 (1979) 231-235.

[3]Epo-tek 390m Epoxy Technology, Inc., Box 567, Billerica, MA 01821.

[4]Aqua-dag supplied by Wale Apparatus Co, Box D, Hellertown, PA 18055-0201.

Submitted by Michael Olsen

GLASS SOLAR CELL ROOF TILES DEVELOPED BY JAPANESE FIRM

A "solar cell roofing tile," a special glass roof tile containing many little solar batteries that will do away with the expensive and cumbersome roof-top installation of a special solar cell panel, has been commercially developed by Sanyo Electric Company of Osaka, Japan.

Sanyo Electric's new product, trade-named "Amorton Roofing Tile," is a transparent glass tile containing amorphous silicon solar cells capable of generating 2 watts of power per tile under full sunlight. The company is technically sure of increasing that capacity to 3 watts before commercializing the new product in the next two years.

In developing the new product, the company has had to reform the shape of electrodes in the necessary reactor furnace and gas blowing mode for piling up amorphous silicon film on the glass tile, and use a laser beam to cut the film into many cells. The ultimate product has come out as a glass tile with 11 rows of such cells, attaining a photovoltaic, light-to-electricity conversion efficiency rate of 6 percent.

Reprint from National Glass Budget — *JPS*

FUSION

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b. Issued 1st of Month of issue date.

c. Copy to set due 1st of preceding month. Complete plates and space reservations due 1st of preceding month. Inserts due at printing plant 5th of preceding month. Last forms close 2 weeks prior to publication date.

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CIRCULATION INFORMATION

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Letter to the Editor . . .

Dear Mr. Panczner,

You probably will not remember me, but I met you at the 1979 Symposium in Detroit while I was in the States on a Rotary Scholarship.

I understand that Mrs. Panczner has been most helpful to Mr. Brian Carter of Carter Chemicals Ltd. in Auckland in the matter of sending us videos and subsequently films for a meeting here. As you can see from the report sent with this letter they arrived in time and were most useful.

Fusion and the BSSG Journal have been our only real contact with what is going on in our field overseas and there has until now been very little contact between glassblowers in this country, hopefully we are now starting to change that.

My apologies for the delay in sending this, I have held it up in order to include a copy of the Glassblower's Newsletter we are starting and I will forward subsequent issues of these as they come out.

Some of those attending the meeting in Dunedin, relaxing between films.

There is as yet no formal society for glassblowers in New Zealand and when we decided to call a meeting of N.Z. scientific glassblowers and people in related work the terms Symposium or Conference seemed too grand so when somebody suggested that a collection of glassblowers must surely be a "gather" that's what we advertised it as.

The first "Gather" of glassblowers was held at Otago University on Friday, August 17th and exceeded all expectations. Twenty-seven people registered for the whole meeting coming from all over the South Island and from as far away as Wellington in the North Island 1000km away. In addition numbers of interested Otago University staff attended during the afternoon workshops session.

Static displays included scientific glassware both modern and antique, glassworking lamps, modern and antique, novelty glass and glass paperweights. (The collecting of glass paperweights is much less common here than in the U.S.). Various glassworking techniques were demonstrated inclduing bending techniques used in the neon industry demonstrated by Trevor Clements, a method of splitting tubing longitudinally demonstrated by John Penno, a simple method of tooling tubulatures demonstrated by Adele Child and a very entertaining session on how to (and how not to) cut flat glass by Paul Hutchins.

After an excellent meal the evening was spent in viewing slide presentations from Schott Glass on scientific glassware production and from Paul Hutchins on architectural glass, and two films very kindly supplied by the A.S.G.S. Home Office. (The Home Office went to a considerable amount of trouble to help us obtain these and we would like to express our very sincere thanks).

The meeting officially ended about 9:30 in the evening and unofficially not for at least another hour, a sure sign of success. Already there is talk of holding a similar meeting in the North of the country at Auckland and a national glassblowing Newsletter has been initiated.

Thanks are due to Carter Chemicals Ltd. for meeting the costs of the "Gather" and once again thanks to the A.S.G.S. for their help.

John Penno
Convenor

Glass

A maker of lenses asked,

What of Glass, Master?

He then answered:

Glass is one of Earth's miracles, like fire and water.

It is a solid object, so real, yet so transparent, it defies the senses.

It is wondrous, though made of the most common materials, sand and lime.

Yet if one element is changed in quantity or substance, you have not Glass.

If you subtract the sand and use common earth, you have not Glass.

If you subtract the lime and replace it with lemon, you have not Glass.

If you subtracted the sand and added sugar, you would have not Glass.

What would you then have, Master, the man asked.

Lemonade, the Master replied.

Submitted by
Murray P. Connors

Question and Answer Report

QUESTION NO. 1

Is there any information available concerning the hazard posed by amorphous silicon dioxide which is sublimed from quartz at high temperatures?

ANSWER:

The information below was submitted several years ago and to my knowledge has not been updated. We would appreciate any input from the membership regarding later studies. See Safety and Hazards this issue.

QUESTION NO. 2

Is there a procedure for sealing zinc selenide (Irtran No. 4) windows to glass tubes?

ANSWER:

This is another follow up on a question which appeared in a previous issue of Fusion. This information was sent to me by Czeslaw Deminet and may be very helpful to some of our members.

ZINC SELENIDE

Referencing a paper written by P. E. Wierenga et. al., zinc selenide window assembly was manufactured at PPL. The assembly consisted of a 3" diameter, .250" thick ZnSe window blank, a sealing glass, pyroceram 7583 manufactured by Corning Glass Works, and a cup made from Carpenter 49 metal available from Carpenter Technology Corporation.

The pyroceram 7583 is a devitrifying solder glass; that is, after the initial firing of the glass above its softening point (370°C), the glass crystallizes raising its softening point (>600°C) and therefore improving its thermal stability. The thermal expansion of this sealing glass is 83 x 10^{-7}/°C for temperatures 25-480°C, the setting point of the glass. ZnSe has a thermal expansion of 82 x 10^{-7}/°C for that same temperature range. The metal used has a thermal expansion of 82 x 10^{-7}/°C, but this is not controlled. Carpenter Technology manufactures the metal for its magnetic shielding qualities and not its thermal expansion. It was then advisable that each batch of metal be checked on a dilatometer in order to determine its thermal expansion.

Because of the thermal stability of the sealing glass, a leaking window assembly could not be re-fired as in the crystalline quartz assemblies, in order to seal the window. This created a problem during the sealing technique testing phase because one ZnSe blank cost more than $1,000. Another less expensive window material with a similar expansion to ZnSe was therefore needed in order to perform adequate sealing technique tests.

PPG Industries manufactures a .250" thick glass which exhibits an expansion of approximately 84 x 10^{-7}/°C from 25 to 300°C at a much lower cost (approximately $5/blank). This material was therefore used to determine the proper sealing technique for the ZnSe window.

The window assembly was manufactured using the following sequence:

The metal cup was oxidized by heating it to 500°C in air for one hour. A slurry was made of the sealing glass and painted on the oxidized cup to a thickness of approximately .100". The glass blank was placed on the slurry and a two pound weight was placed on the glass blank. A fixture was used to assure concentricity of all parts. Because ZnSe oxidizes above 320°C in air, an inert atmosphere is necessary in order to seal the window assembly. The assembly was placed in a stainless steel container, and the container was sealed and flooded with argon during the entire sealing process. The stainless container was placed in an air furnace and heated as fast as the furnace would allow (approximately 5-6°C/min) to 380°C, held for one hour, and then heated to 480°C, held for 5 minutes, and then cooled. Three PPC Industry glass windows were made in this manner before an actual ZnSe blank was used. The ZnSe window assembly was then manufactured successfully.

Sincerely,
David Blessing
Question & Answer Chairman

CALL FOR PAPERS

The Technical Papers Committee of the Society is soliciting papers for presentation at the 30th Symposium to be held June 16-21, 1985 in Toronto, Ontario, Canada, with subsequent publication in the "Proceedings".

Any member having a subject of interest and who would be willing to prepare and present such a paper at the Technical Sessions is invited to submit a brief summary or abstract of the material to the Papers Committee as soon as possible.

Membership in the Society is not a prerequisite for the acceptance of a paper for the Symposium. Therefore, any reader having knowledge of an authority on a subject pertaining to glass or glassblowing that would be educational to those attending and to readers of the Proceedings, is requested to invite this person to submit a resume of the subject to the Committee for consideration.

All summaries should include

1. Paper title
2. Author's name
3. Author's title
4. Company name and mailing address
5. Approximately 150 word abstract and certification that material may published by the A.S.G.S.

All communications regarding technical papers should be addressed to: Robert G. Campbell, Department of Chemistry, Queens's University, Kingston, Ontario K7L 3N6, Canada, Phone: 613/547-3221

The Papers Committee will supply details concerning the requirements for the preparation of the manuscript for oral presentation and publication, upon acceptance of the subject.

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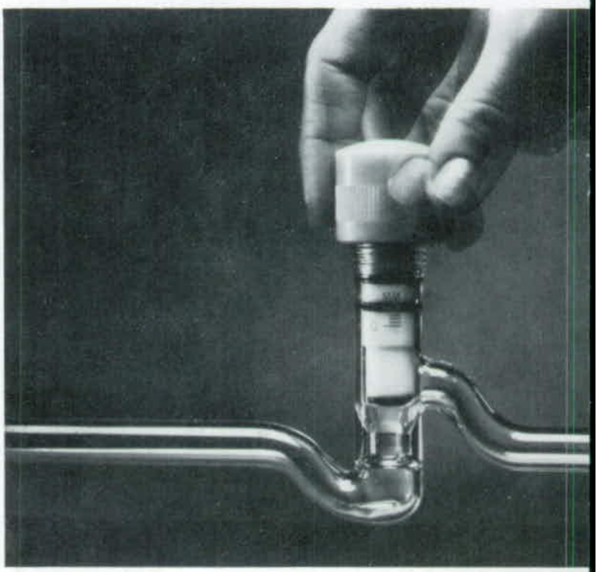

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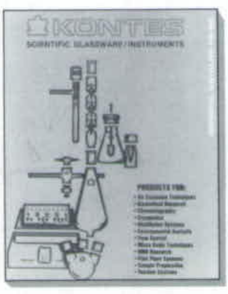

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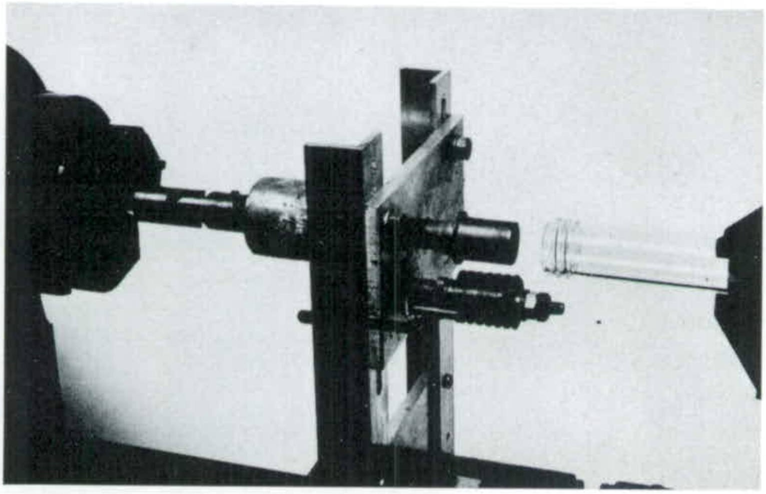
Glass Screw Threads

K. George, Dept. of Botany, University of Bristol

The method of making glass screw threads outlined here is designed for a small glassworking lathe and it is within the capability of most workshops to construct a similar machine.

It is a two stage process involving preforming the glass tube to the correct size and then rolling a thread between a reamer and a threaded roller.



The equipment is very simple and bolts to the carriage of a small glassworking lathe. The reamer screws onto a threaded shaft which is driven by the headstock chuck. It is important to ensure that the reamer is running true and is concentric with the glass tube to be threaded. The roller, which is free running, should be capable of being raised into contact with the glass. This can be achieved either by a simple pivot (see photo) or by a slide system. but both must be capable of taking the smallest reamers and rollers. An adjustable depth stop can be fitted to enable the movement of the roller to be pre-set to give the correct thread diameter.

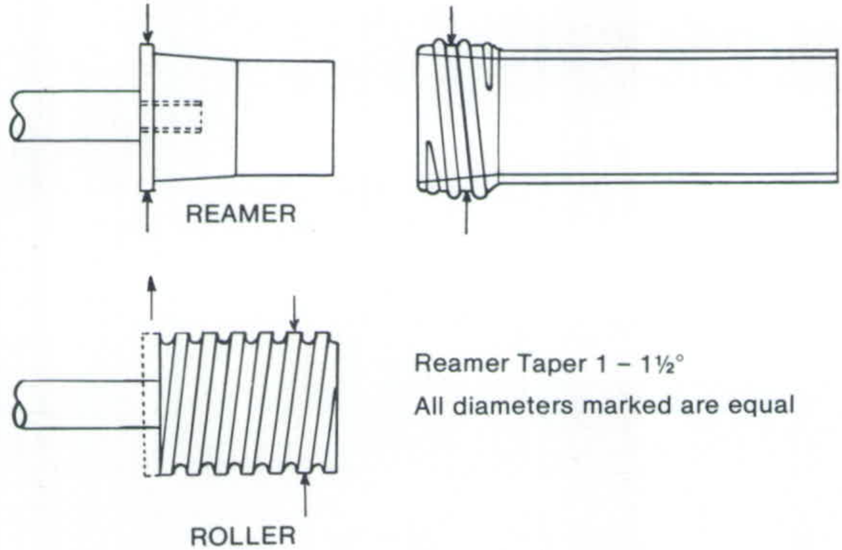
The Reamer

The reamers are made of steel (mild steel, being the easiest to machine) because brass has a tendency to deteriorate due to the heat involved.

The length of the reamer should be 2X the length of the finished thread. This enables some support to be given to the tube during the rolling process.

A taper of 1 - 1½ degrees on the reamer ensures easy removal of the completed thread. (see fig. 1).

Figure 1



The diameter of the reamer will be dependent upon the size of the thread to be made and upon the tubing used (e.g. wall thickness). The non-tapered part of the reamer should be a good fit inside the glass tubing to be used. If the reamer is too tight problems can be encountered when the reamer is hot and expands. As a guide to reamer diameter the tubing, before preforming, should fit to mid-point of tapered part of reamer.

The raised rim on the reamer gives a square end to the screwthread and in fact if made to correct diameter (see fig. 1) can be used as a depth stop when the roller is raised.

The Roller

The material again is steel, although brass can be used as the roller is not subjected to the same amount of heat as the reamer.

There are two important rules to be observed before rollers can be made.

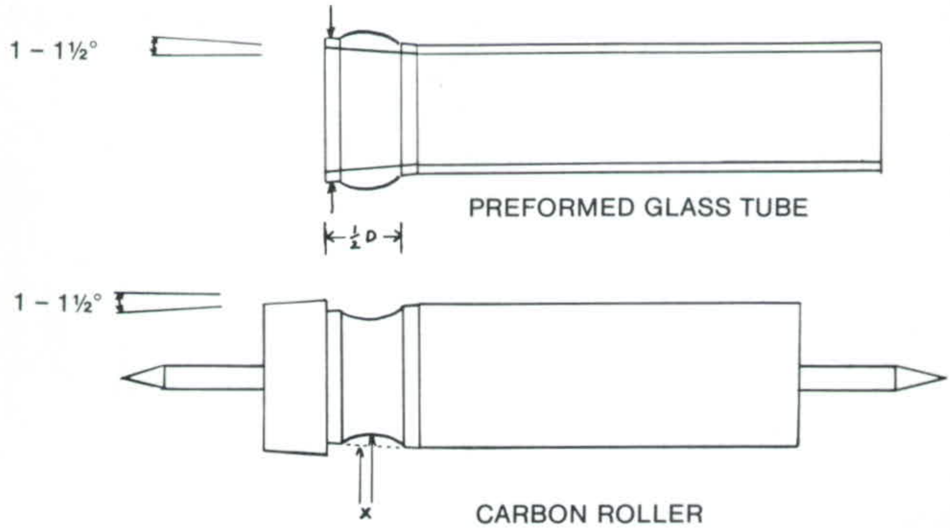
1. The outside diameter of the roller must be equal to the diameter of the glass thread (measured across the root or base of the thread, see fig. 1). If these dimensions are not equal then the roller will not match with the thread being formed at each revolution and the result will be an untidy straight tube.

2. A left hand threaded roller is required to form a right hand glass screwthread.

The thread form or shape should be rounded, with any corners radiused. Threads per inch will be dependent upon size of screwthread to be made. Glass screwthreads have a fairly wide tolerance when compared against engineering threads and pitch and thread depth can be measured quite easily.

If the reamer is to be used as a guide for the diameter of the glass thread then a non-threaded part will be needed on the roller to match the rim on the reamer. (see fig. 1).

Figure 2



Preforming the glass tube

Preforming correctly is the key to success with this method.

The glass tubes are preformed to this shape for two reasons.

1. To give a smooth start and finish to the thread.
2. To give as near as possible the same diameter as the roller.

The length of the preformed section should be approximately half the diameter of the tube, or long enough to give 2 - 2½ full turns of thread.

The thickness of the preformed section should be 90% of the depth of the required thread (see 'x' fig. 2). If this dimension is greater than the thread it can result in an oversize thread.

With the glass tube in the lathe and the preforming carbon roller brought into contact with it, the glass can be fed into it and tooled with a carbon rod, to the correct shape. The preformed tube should be tooled with a taper to match the 1 - 1½ degree taper on the carbon roller. (see fig. 2.).

After preforming, the glass tube should fit to the rim on the reamer and the diameter at the end of the glass tube should be approximately equal to the diameter of the threading roller.

A different preforming roller is usually needed for each size of thread, and may differ in shape from the illustration to take account of greater variations between tube and thread diameters. In other words it may be necessary to tool the glass out more until the correct diameter is achieved.

Forming the thread

With a supply of preformed tubes to hand, and with the equipment mounted on the lathe and checked that it is aligned correctly, we can begin to form the threads.

The preformed tube is held in the tailstock, and with a handtorch warming it up, is brought onto the reamer. It will be necessary to pre-heat the reamer and roller to avoid chilling the glass. Only the preformed part of the tube should be softened, and when judged to be at the right temperature, the roller can be smoothly raised into position. Depending on the temperature and the amount of glass, when a good thread is formed, the roller can be released. The thread should be formed as quickly as possible (normally between 6 - 10 revolutions). The glass screwhead can be removed and the process repeated. No pre-heating will be required if the reamer and roller are not allowed to cool and the quality will improve as the equipment reaches its operating temperature. Graphite wax is used as a lubricant and to prevent corrosion when storing reamers and rollers.

The speed of the lathe is not critical, around 120 rpm being adequate. Problems with the reamer unscrewing were overcome by reversing the direction of the lathe. This also has the advantage of forcing the glass against the reamer and ensures a square end to the tube.

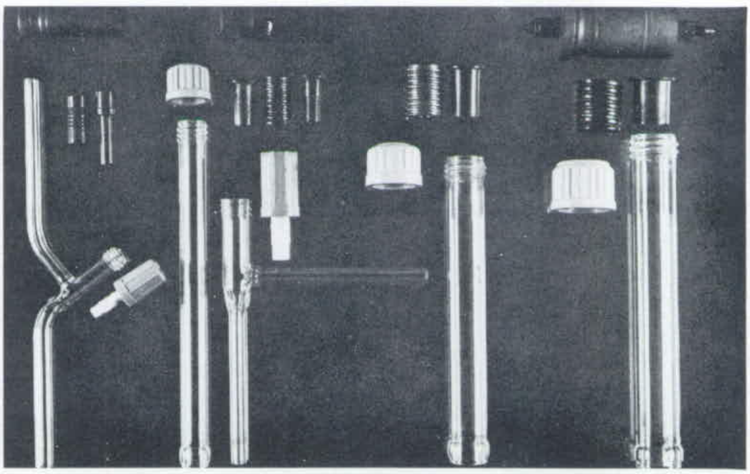
In conclusion

1. The diameters of the roller and the glass thread must be equal. A different roller will be required for each size of thread.

2.. There must be a good fit between the preformed tube and the reamer.

3. Only a left hand roller will produce a right hand thread.

This method will produce cheap, acceptable screwthread joints and, using commercially available PTFE keys, general purpose stopcocks can be made if the tubing is selected carefully.



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Reprint from October, 1984 Journal

Experimental Distillation Apparatus

P.L. Timms, School of Chemistry, University of Bristol

Distillation has been used since early times for purification and it is still one of the more common operations in the laboratory and in industry. Glass distillation apparatus is used in the laboratory for the separation of mixtures of volatile compounds, for the purification of water and organic solvents and for the removal of solvents from solutes. Distillation as a method of analysing complex mixtures has been superseded by gas-liquid chromatography; indeed, preparative scale GLC and other forms of chromatography are now preferred to distillation for separating many mixtures when the quantities of materials are not too large.

The practical problems of distillation involve the separation of mixtures of volatile but unstable and air sensitive compounds, and the removal of high boiling solvents from delicate organo-metallic compounds. The high reactivity of the materials makes chromatographic methods unsuitable. The thermal instability of the compounds requires that all the distillations are done under vacuum at as low a temperature as possible. However, before I discuss these problems, I have been asked to give a bit of background to the theory of distillation and, in particular, to the effects of reducing the pressure. I must stress that in this review section I am not putting forward any new ideas but summarising what can be found elsewhere, e.g. in "Techniques of Organic Chemistry", Vol. 4 (ed. A. Weissberger) 2nd Edition, Interscience, 1965.

Separation by distillation is possible when two compounds differ in volatility and boiling point. If two compounds, A and B, form an ideal mixture, then the boiling point of any mixture of the two will fit on the lower curve in Fig. 1 and the composition of the vapour in equilibrium with the liquid will fit on the upper curve. Any region in a distillation column which allows equilibrium to be established between liquid and vapour as represented by the dotted line in Fig. 1, is called a 'theoretical plate' (the term 'plate' is used in relation to the type of distillation column in which the boiling vapour moves up through a series of stacked plates and equilibrium can be established between liquid and vapour over each plate). The more theoretical plates in a column, the more efficient it is. Efficiency is also dependent on throughput as each theoretical plate will occupy a greater length of the column when the vapour stream is moving more rapidly, i.e. the higher the throughput the lower the number of theoretical plates. A good column will have about 25 theoretical plates. The number of theoretical plates required to give clean separation between compounds A and B with boiling point T_A and T_B (in degrees Kelvin) is given by the equation,

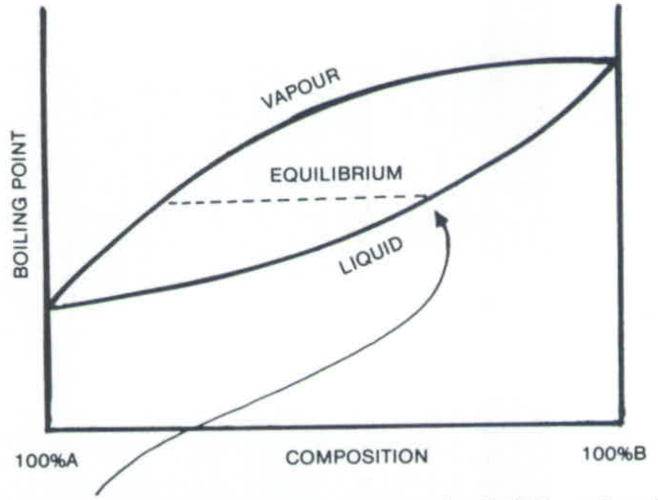
$$\text{theoretical plates} = \frac{T_B + T_A}{3(T_B - T_A)}$$

i.e., a column of 25 theoretical plates could cleanly separate a compound boiling at 100°C (373 K) from a compound boiling at 110°C (383 K).

The purpose of going from atmospheric down to lower pressures in distillation is to be able to work at lower temperatures and so avoid decomposition of compounds. However, two things happen at lower pressures which tend to make distillation apparatus less efficient than at atmospheric pressure. First, a given mass of vapour will move faster along

Fig. 1

VARIATION OF BOILING POINT AND VAPOUR COMPOSITION FOR AN IDEAL LIQUID MIXTURE



A "theoretical plate" corresponds to each section of a distillation column in which liquid/vapour equilibrium is established.

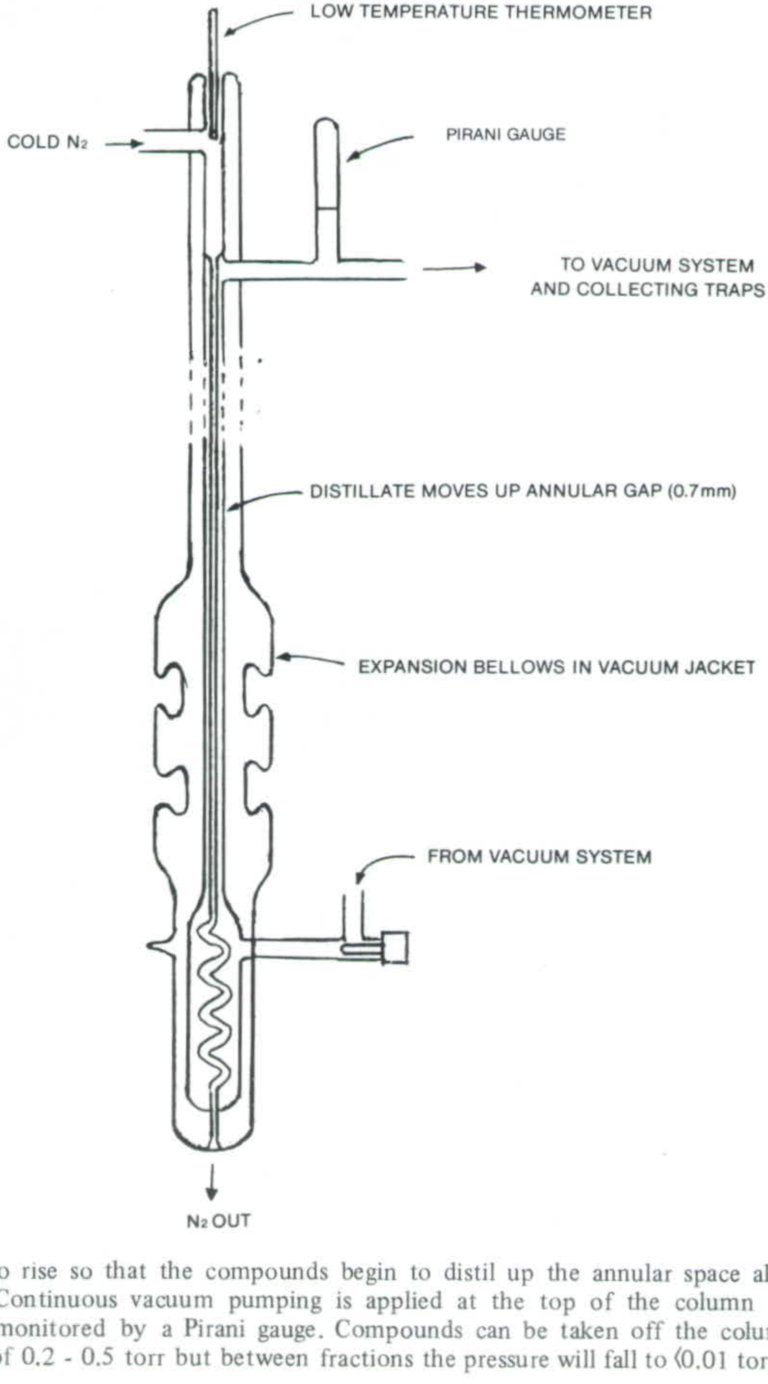
a column at low pressure than at atmospheric pressure. This means that a greater length of column is required for each theoretical plate and the efficiency (or the throughput) goes down. Second, the mean free path of gas molecules increases as the pressure decreases, from 7 x 10^{-6}cm at atm. to about 5 x 10^{-3}cm at 1 torr or 50cm at 10^{-4} torr. At pressures down to about 1 torr, the mean free path increase makes less difference to the efficiency of distillation than the vapour velocity effect, but at 10^{-6} torr and below the mean free path is so great that there is effectively no liquid/vapour equilibrium. Liquids evaporate at a rate proportional to their vapour pressures and to $1/\sqrt{M}$, where M is the molecular weight, but no fractionation – like liquid/vapour interaction is possible.

In practice, most laboratory distillation apparatus can be used from 1 atm. to about 40 torr without difficulty although the efficiency becomes a problem. In the region 1 - 10 pressure drop across many packed columns becomes a problem. In the region 1 - 10 torr, it appears that spinning band columns with rotating stainless steel or Teflon bands, offer the highest efficiencies, but annular tube columns are also good.

We quite commonly need to carry out distillations in the pressure range 0.01 -1 torr on ½ - 2g samples of compounds with boiling points less than 100°C. These are generally unstable and air-sensitive so the distillation column is an integral part of a vacuum system for handling volatile compounds. The form of the column and the associated apparatus is shown in Fig. 2. The column consists of two concentric tubes, 8mm o.d. and 9.5mm i.d. respectively, surrounded by a vacuum jacket. Cold nitrogen gas, from boiling liquid nitrogen, is blown down the inner tube. Depending on the rate of nitrogen flow and its initial temperature, a variable temperature gradient can be established down the column. Initially, the column is made very cold to allow the sample to be distilled to be condensed in the chamber at the bottom end on the expansion spiral in the inner, N_2 carrying tube. The stopcock at the bottom of the column is then closed and the column temperature is

Fig. 2

AN EFFICIENT LOW TEMPERATURE VACUUM DISTILLATION COLUMN



allowed to rise so that the compounds begin to distil up the annular space along the column. Continuous vacuum pumping is applied at the top of the column and the pressure monitored by a Pirani gauge. Compounds can be taken off the column at a pressure of 0.2 - 0.5 torr but between fractions the pressure will fall to $<$0.01 torr. in our work, the samples are collected in liquid nitrogen cooled traps. The columns can be used for analytical distillation on mixtures of unknown complexity - then distillation has to be slow. A throughput of up to 2 g/hr. can be achieved with good efficiency on known mixtures, with quantitive recovery of all components. Compounds boiling above about 140°C tend to move too slowly on the column for it to be useful. However, if the thermal stability of compounds allowed, it would certainly be possible to blow warm air up the column to work above room temperature with less volatile compounds.

Fig. 3a

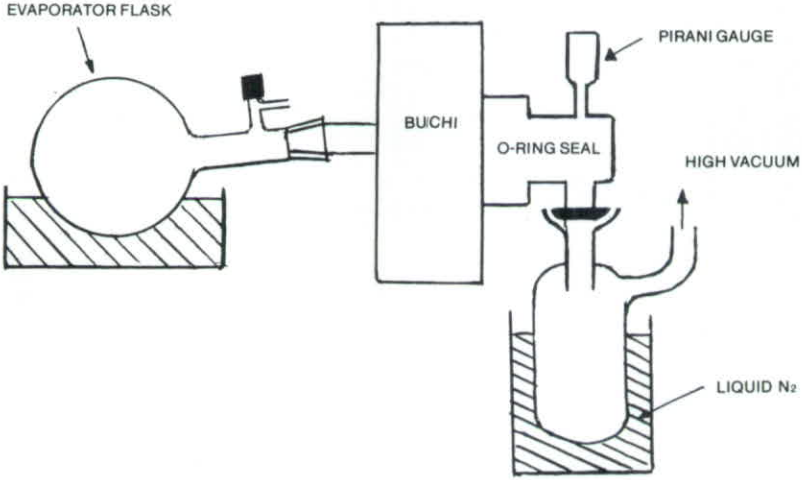
HIGH VACUUM SEAL FOR BUCHI R OR RE ROTARY EVAPORATOR

One of the common problems of laboratory vacuum distillations is leakage at ground glass joints and stopcocks through tracking in the grease. It is often impractical to replace all the greased cone-and-socket joints by O-ring joints or by sealed sections, but it is certainly worth considering replacement of greased stopcocks and some joints at the receiver end of distillation apparatus by greaseless O-ring parts. This becomes of increasing importance as lower pressures are used.

We prepare very delicate and air-sensitive organo-metallic compounds by condensing metal atoms into cooled solutions of ligands in high boiling solvents. We then have the problem of distilling the solvent and excess ligand away from the organo-metallic product without decomposing it. Our solvents have boiling points in the range 160°C to 300°C. The most convenient way of removing solvents boiling up to about 240°C is to use a Buchi rotary evaporator modified for high vacuum work. The modification we prefer is to replace the normal gasket seal with a double O-ring seal in a brass housing, as shown in Fig. 3. The space between the O-rings must be kept wet with a good vacuum lubricant – any diffusion pump oil can be used but Santovac 5 is the best. The O-rings seal on to a regular Buchi glass vapour tube which has been shortened; most of these tubes are well made but they need checking for roundness. The vapour coming from the flask is

Fig. 3B

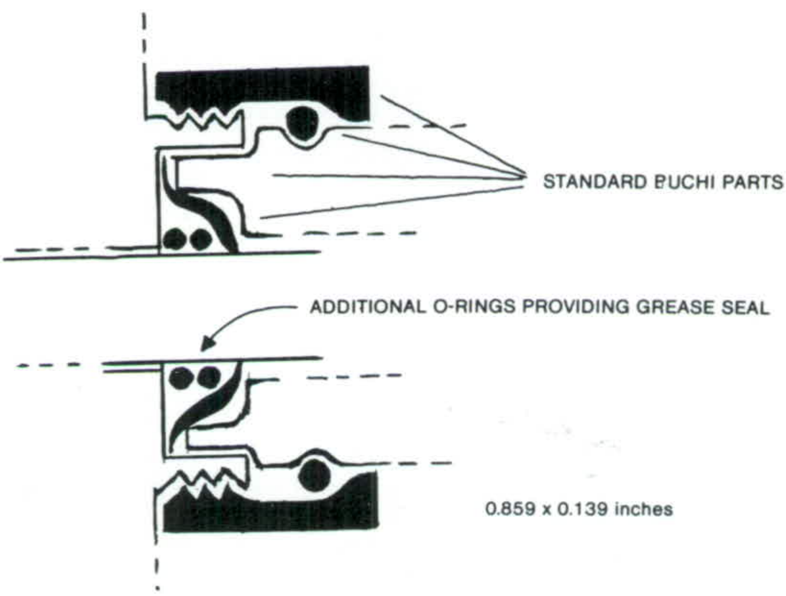
DISTILLATION UNDER GOOD VACUUM USING A MODIFIED BUCHI EVAPORATION



condensed directly into a liquid nitrogen cooled trap and this is attached to a diffusion pumped system. With no solvents present, a pressure of around 5 x 10^{-5} torr can be reached in the evaporation flask. With this system, it is possible to pump off 150 cm^3/hr. of diglyme (b.pt. 162°C) with the flask rotating in a bath at 40°C or 30 cm^3/ hr of methylnaphthalene (b.pt. 242°C) with the flask rotating in a bath at 50°C. The Buchi rotor unit and vacuum seal tend to run warm so that condensation of the solvent in the tube is minimal. When the product in the flask has been pumped dry, the flask is filled with nitrogen through the stopcock at its neck and removed from the evaporator.

Fig. 4

IMPROVING THE SEALING OF BUCHI GASKETS



I have done some experiments on the regular Buchi gasket seal under high vacuum conditions. If a new seal is kept lubricated it works as well as an O-ring. Lubricant grease, ideally Apiezon L, can be kept around the seal by slipping two additional O-rings on to the vapour tube before the gasket is put on, as shown in Fig. 4. A regular Buchi condenser unit can then be attached but, for the best vacuum, it is important that the vapour is pumped through a liquid nitrogen cooled trap, i.e. the Buchi condenser is only used in lieu of a special piece to conduct vapour from the vapour tube into the nitrogen cooled trap. In order to keep the gasket lubricated, the vapour tube must be nearly horizontal so that grease cannot drain away completely from the seal.

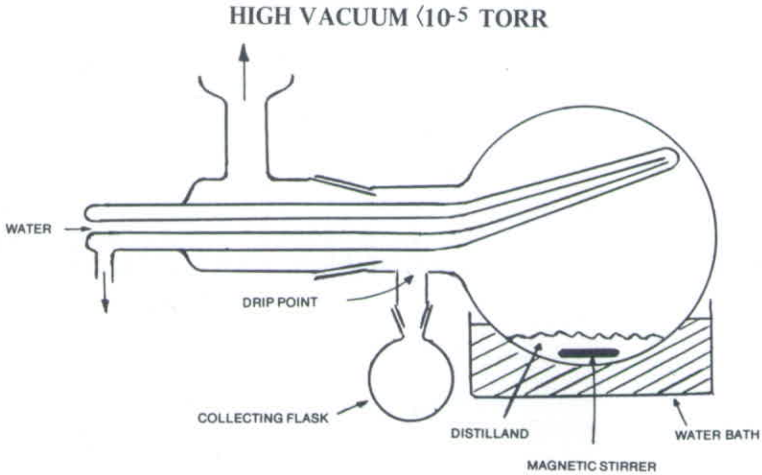


Fig. 5

SIMPLE APPARATUS FOR MOLECULAR DISTILLATION

For removal of very high boiling solvents, the rotary system is too slow because the vapour has to pass up a relatively narrow vapour tube. It is necessary to use true "molecular distillation" with a short, direct path from the surface of the liquid to the condenser. There are many published designs of molecular stills ranging from pot stills to falling film stills in which the liquid to be distilled flows down a heated tube and the vapour formed is collected on a concentric condenser. Background vacuum must be 10^{-4} torr or better for maximum efficiency.

We use a simple molecular still, based on a cold-finger in a flask, as shown in Fig. 5. This is by no means an optimised system, but it enables us to distill solvents boiling up to 300°C, away from involatile products in the flask in which we have carried out a reactin. Sometimes we pump off the bulk of a more volatile solvent using the high vacuum rotary system, then insert the water cooled finger for removal of the less volatile solvent. Water cooling can be used satisfactorily in the latter case because the vapour pressure of the liquids removed is often ca. 10^{-4} torr at 10°C and good vacuum can be maintained.

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Jim Panczner
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MANUFACTURING METHODS AND VARIETIES OF FUSED SILICA

This paper draws heavily on previous publications and various other inputs from Dr. G. Hetherington, Mr. P. Browell, Mr. John Winterburn, and others associated with TSL Thermal Syndicate, England.

It is a brief overview of past and present manufacturing methods utilizing different raw materials and producing a variety of end products having somewhat different characteristics.

All of the finished material to be discussed is properly called "Fused Silica", despite the fact that traditionally the transparent varieties have been called "Fused Quartz", and the translucent and opaque varieties have been called "Fused Silica". The earlier nomenclature arose from the fact that the transparent varieties were generally produced by fusing small pieces of clear quartz crystal while the translucent varieties were produced by fusing high purity silica sand; and because of the nature of the crystals and the ease with which interstitial gases could be removed from either of these materials, the end product was either transparent or translucent. In any case, the product is Fused Silica and should be called, "Transparent Fused Silica", "Translucent Fused Silica", Transparent Synthetic Fused Silica", etc.

You may have noted that we have already mentioned three starting materials including, by inference, chemical starting materials from which the synthetic varieties are made.

The manufacturing processes can be based on flame fusion or electrical fusion. Fusion can also be done in a "plasma" flame. Fusion can take place at atmospheric pressure, under vacuum, or in the presence of specific gases. Therefore, depending on the method of fusion, the raw material, and other conditions; several types of fused silica may be produced.

These are: transparent, translucent, transparent synthetic, water free synthetic, sand surface opaque, etc.

Opaque or translucent fused silica is produced by fusing high purity "quartz" sand. There are deposits of sands of sufficient purity for fusing in several places in the U.S., but the principal source is the Ottawa Beds in central Illinois. Sand from these deposits, contains 99.9%+ SiO_2 after washing.

Our company uses a process developed in the early 1900's by Dr. F. Bottomley wherein a graphite resistor is surrounded by high purity silica sand. Heat from the resistor fuses the sand outward and a hollow boule is formed. Excess sand in the furnace body acts as a thermal insulator. When a sufficient weight is formed, the boule is removed from the furnace and is blown into metal or graphite molds. The surface of the boule material which was next to the hot electrode is highly glazed. The exterior surface is rough and generally sandy becuase of unfused or partly fused sand which clings to the glassy part. Because the fusion takes place at atmospheric pressure and because of interstitial gases in the sand, the glassy portions contain myriad fine bubbles.

The combination of bubbles and sand surface gives the finished product a milky, opaque appearance; and so items made by this method are usually called, "Opaque Sand Surface Fused Silica". This method is used to produce tubing and pipes as well as trays, tanks, crucibles, and retorts.

While in the plastic state, which incidentally lasts about a minute after the boule is removed from the furnace, the silica can be rolled into plate by means of a rolling mill. Rolled plate of this kind has a sand surface, but this can be ground off if necessary.

Opaque fused silica articles can also be made by centrifugal molding processes to produce tubes or closed end containers. Either resistance heaters or electric arcs are used for fusion.

Relatively large articles can be produced by the centrifugal process; for example, bell jars, 1 meter diameter x 2½ meters long and with wall thicknesses on the order of ½" to ¾".

Tubing can be produced by several processes. The simplest one uses a heated pot, a die, and a mandrel.

Crystal or sand is fed in at the top and tubing is withdrawn from the bottom as material is fused in the pot. This process is generally known as the "Hanlein" process after its inventor, and is commonly used to produce low quality tubing generally containing surface striae, internal air lines, and bubbles. Transparent and translucent tubing can be produced by this process, or modifications of it, depending on the starting material.

A common method of producing better quality transparent tubing is to prepare a high quality cylindrical billet by a centrifugal molding process or by fusing in a vacuum chamber or both. This billet is then redrawn by suitable equipment to the desired tubing size. Some manufacturing processes redraw the billet in a horizontal lathe; others use vertical redraw machines.

Naturally occurring raw material for transparent fused silcia can come from several sources. Some years ago the principle source was in Brazil, but other sources have been developed in Madagascar, Angola, United States, and Canada.

Quartz crystals can be very small or very large.

In the less-developed countries mining, cleaning, and grading is done by hand.

Quartz crystal used for fusing has relatively good purity. The principal impurity is alumina. Impurity shown is in parts per million.

An alternate source for starting material for transparent fused silica is byproduct crystal from feldspar mines in North Carolina.

Synthetic fused silica can be produced by burning silicon tetrachloride in an oxy-hydrogen flame.

The vapor phase silicon dioxide produced in the burning process deposits on the hot end of the boule which is simultaneously rotated and withdrawn in order to produce a rod shaped ingot of transparent synthetic fused silica. Other processes based on this principle produce discs or pancake shapes rather than rods.

Recent developments in the fiber optics industry have produced fused silica from soot. The soot is the result of the conversion of silicon tetrachloride or other silicon based chemicals. After the formation on the inside of a tube or on the end of a rod, the soot is sintered and then fused to a solid. In this process, minute quantities of dopants can be added to alter optical properties.

The materials produced by the various fusion methods could be classified into 4 types. That is: electrically fused quartz crystal will produce infrared grades. Flame fused crystal will produce ordinary transparent grades; vapor phase hydrolysis of silicon tetrachloride will produce "wet" synthetic or oxidation of silicon tetrachloride using a plasma flame will produce "dry" snythetic. These comments apply to transparent materials. The opaque materials are usually fused electrically, but except for the infrared transmitting properties required in tubing for electric radiant heaters, the transmission properties are generally not of interest.

Starting materials which are fused in an oxy-hydrogen flame have high water content picked up from the combustion products; but on the other hand have slightly lower impurity contents than electrically fused material because the impurities are volatilized during the flame fusion process. Because of the lower impurity content, the transmission in the ultra violet is generally better than in electrically fused varieties. On the other hand, the high water content blocks infrared transmission, principally at 2.7 microns. Conversely, electrically fused materials will have good transmission in the infrared, but generally not quite as good transmission in the UV.

Synthetic materials produced by burning silicon tetrachloride in an oxygen-hydrogen flame resulting in silicon dioxide, hydrochloric acid, and water have a high water content; and therefore, high absorption in the infrared. The water content in "wet" synthetic material may be as much as 0.1 weight percent. An exception to this is the synthetic material produced in any oxygen plasma. This type of material has exceptionally good transmission at both ends of the spectrum because the starting material is generally very pure silicon tetrachloride, and the water content present in ordinary synthetic fused silica is replaced by chlorine.

Other optical properties change with method of manufacture. The electrically fused material will generally show high granularity; the flame fused material will show some granularity, but will be an improvement over electrically fused. The synthetic materials will show practically no granularity and are excellent materials for high quality optical applications.

One of the effects of varying water contents resulting from different manufacturing processing is to alter the vicosities and, therefore, the softening points, annealing points and strain points of the materials. Of course, in additon to water content, other impurity content also has the same effect.

The annealing point for electrically fused transparent silica is about 110°C higher than for high water content synthetic fused silica. The strain point is about 120°C higher.

A typical annealing cycle for transparent fused silica raises the temperature to 1050°C over about 4½ hours, holds at that temperature for about ½ hour and then gradually cools to room temperature.

Fused silica tends to devitrify at elevated temperatures, and this normally begins at about 1000°C. It can be accelerated by surface impurities, for instance; finger prints or by internal impurities, for instance; pieces of furnace refractory, etc.

The effects of the devitrification are not noticeable at elevated temperatures.

If the fused silica is maintained above about 300°C, the effects of devitrification are not noticeable. It is only on cooling through 275°C that the crystalline structure changes and devitrification becomes evident.

As is mentioned earlier, transmission properties of fused silica can be altered by adding impurities; for instance, addition of small amounts of impurities can block ultra violet so that, for instance, UV lamps can be produced which do not generate ozone.

This has been a review of some of the methods of manufacture of various types of fused silica and a brief look at the effect of those methods on the physical properties of the end products. For most of us, producing fused silica is a difficult process requiring ultra pure raw material, high energy input and considerable care in manufacture.

For certain people from more advanced cultures, it's easy!

Michael H. Robinson
Thermal American Fused Quartz Company
Montville, New Jersey

This paper was given at the 29th Symposium in Newport Beach, CA.

AWARDS COMMITTEE

This is the last request for award nominations before the March 15th deadline.

We are still looking for nominations for both the J. Allen Alexander, and the Helmut Drechsel Awards.

If you the members think there should be a change in the procedure we use for awards, why not let me know. These are your awards, and this is your society, so use your right to say what you feel should be done.

David Chandler
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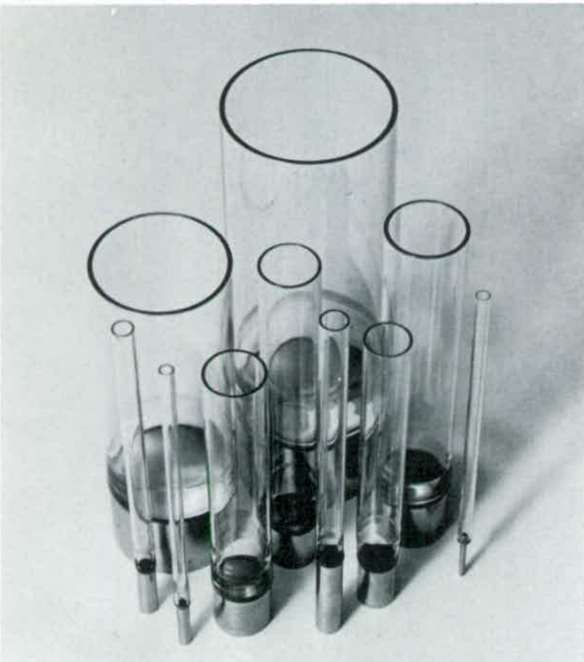
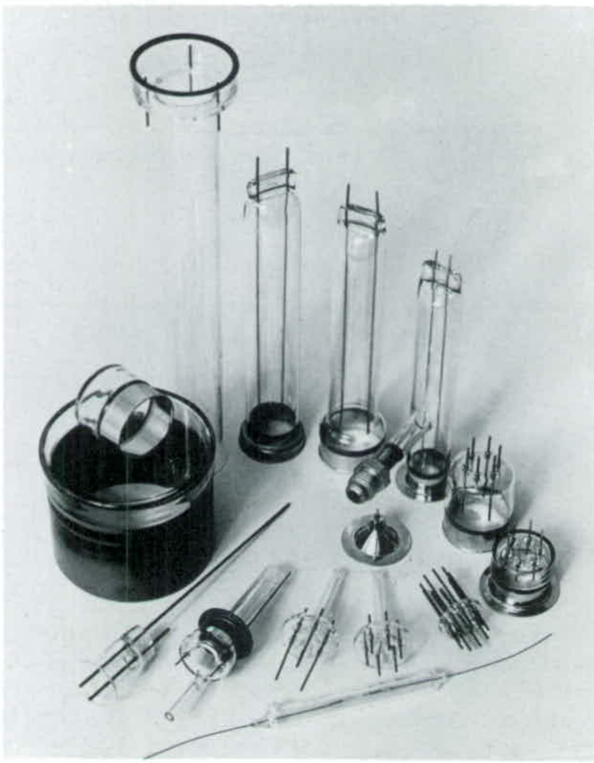
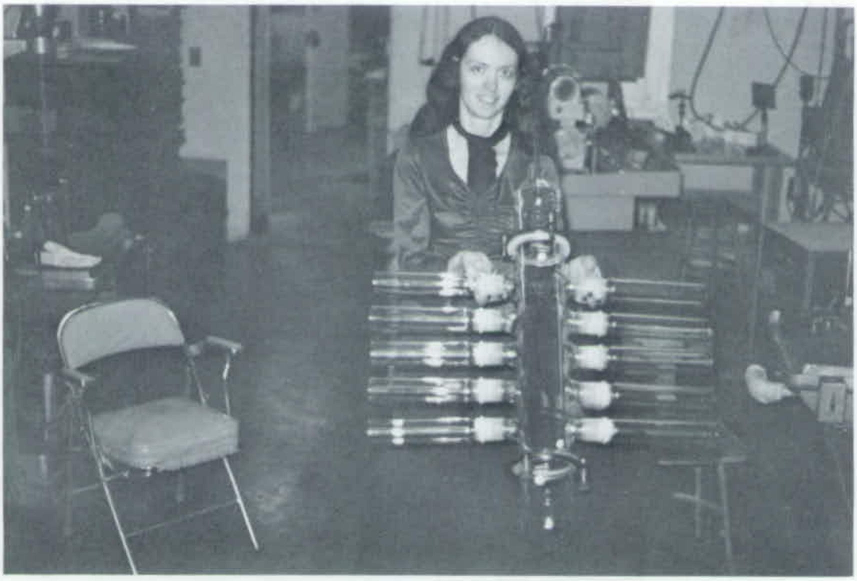
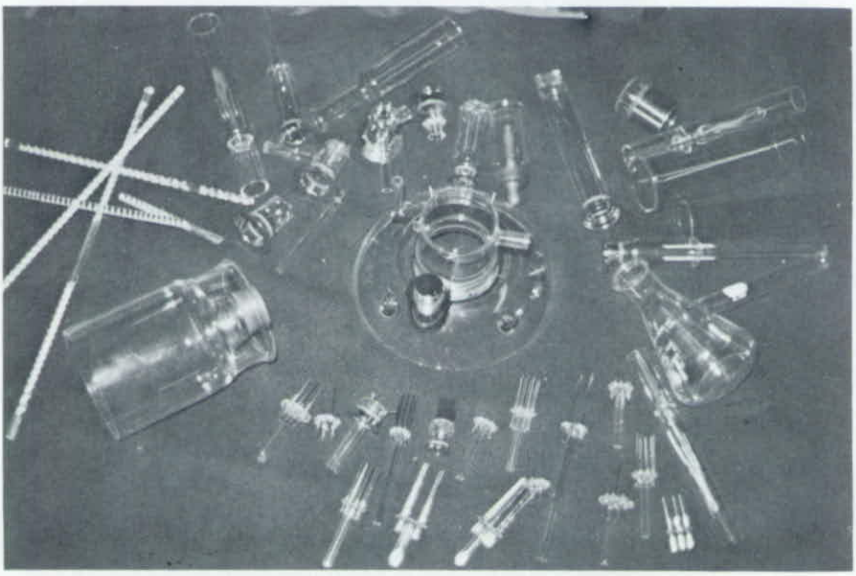
HELP!! Last issue (November, 1984) we were looking for a Portugese translator. Well, here we are again, not only still looking for a translator of Portugese but also someone who can translate Russian. We need these for our Reference & Abstracts column in our Society's Journal FUSION. If you have the language ability and would care to donate some of your valuable talents and time to the A.S.G.S., please contact either the Home Office or: Earl R. Nagle, 18 Sky View Drive, Cohoes, NY 12047.

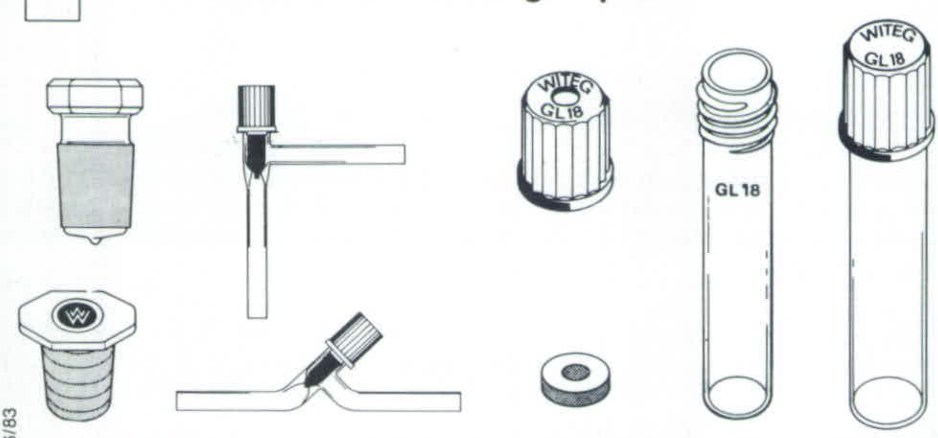
Earl Nagle,
Chairman











6/83

Board of Directors Meeting

November, 1984
Toronto, Canada

MOTIONS

President Wilbur Mateyka called the meeting to order at 8:12 A.M., November 9, 1984 at the Toronto Westin Hotel, Toronto, Canada.

Roll Call was taken. There were 17 board members present and 3 absent. Ted Bolan, Mr. and Mrs. Frederick Leslie, and Ottmar Safferling were present as guests. A quorum was present.

The Secretary read the minutes and a motion by Fred Kennedy and seconded by David Chandler to accept the minutes as read.

MOTION PASSED

A motion was asked for by President Mateyka to accept the June, 1984 minutes of past President Don Lillie after they had been read. Motion by Owen Kingsbury, Seconded by Don Moody.

MOTION PASSED

The Treasurer's report was given by David Daenzer and a motion by Larry Novak, seconded by Don Moody to accept the report.

MOTION PASSED

A motion was made by Owen Kingsbury to rescind the motion of selling our eight video tapes of A.S.G.S. Technical Films which had been passed last June. Because of certain legal problems the board felt the A.S.G.S. shouldn't be in the film business. However they would still be available for loan. Interested parties who are non-members or living outside the United States or Canada must pay in advance the cost of shipping, handling and insurance. This was seconded by Fred Kennedy.

MOTION PASSED

A motion by David Chandler to establish a Memorial Award was seconded by Larry Harmon. The Board is responsible to present guidelines for said award at the June, 1985 BOD meeting.

MOTION PASSED

Rudy Schlott motioned to have the service contract for Beverly Panczner for the time period between August 1, 1985 to July 31, 1986, be increased to 15,600.00. This would be paid at a rate of 1,300.00 per month. Seconded by Owen Kinsbury.

MOTION PASSED

The issue regarding Symposium Seminar fees was brought up. An increase of $10.00 was motioned for by David Chandler and seconded by Richard Ryan. The rates will be $65.00 for members and $85.00 for non-members. This is for the 1985 Symposium and figured in U.S. dollars.

MOTION PASSED

A motion was proposed by Rudy Schlott to reimburse the Symposium Seminars Chairman for travel expenses and 2 nights hotel costs. Seconded by Larry Harmon. This would enable the chairman to be present at the Seminars to complete the final coordination of programs.

MOTION PASSED

A motion was made by Larry Harmon and seconded by Larry Novak to adjourn the meeting.

MOTION PASSED

President Mateyka called the meeting to order at 8:18 A.M., November 10, 1984 at the Toronto Westin Hotel, in Toronto, Canada.

Roll call was taken, There were 17 board members present and 3 absent. Ted Bolan and Ottmar Safferling were present as guests. There was a quorum.

A motion made by Don Moody to set the exhibit booth rate for the 31st Symposium in 1986. The booth price will be $535.00 for each booth. This was seconded by Larry Novak.

MOTION PASSED

A motion by Rudy Schlott nominating Richard Ryan to be the 1987 Symposium Chairman in Boston, MA. Seconded by Fred Kennedy.

MOTION PASSED

Don Moody motioned to accept the Delaware Valley Section as host for the 33rd A.S.G.S. Symposium in 1988. Seconded by Rudy Schlott.

MOTION PASSED

Robert Ponton made a motion that allowable transportation expenses to the November Board of Directors meeting be reimbursed at the actual travel expenses. For air transportation between home and meeting city be figured at the minimal available air fare between those two cities. For ground transportation, it would be figured at 20 cents per mile not to excees the minimal air fare available. This was seconded by Richard Ryan.

MOTION PASSED

A motion by Rudy Schlott and seconded by Joe Luisi to allow reduced rates of guest passes to special interest groups for attendance into the A.S.G.S. Symposiums was passed. An example of a special interest group might be "students of the art of Scientific Glassblowing." The procedure for obtaining the special rates is as follows:

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.

MOTION PASSED

A motion by Owen Kingsbury to set the 1985, 30th Symposium Registration fees and seconded by Don Moody are as follows:

MEMBER ADVANCED REGISTRATION	$50.00
MEMBER DESK REGISTRATION	$65.00
NON-MEMBER ADVANCED REGISTRATION	$80.00
NON-MEMBER DESK RESGISTRATION	$95.00
DAY CARD	$40.00
EXHIBITS	NO CHARGE

MOTION PASSED

David Daenzer moved that the executive board (president, president-elect, treasurer, assistant treasurer, secretary, executive secretary) be directed to increase the bonding limit for officers and home office manager to adequately protect the society's assets. That the money for this increase be taken from the gain of the 28th Symposium. Seconded by Don Moody.

MOTION PASSED

David Daenzer moved that any check or withdrawal in excess of $1,000.00 from any A.S.G.S. account with Ohio Citizens Bank be countersigned and that any check or withdrawal from the A.S.G.S. account with E.F. Hutton be countersigned. In either of the above cases any two of the following signatures shall be sufficient. Treasurer, President, Secretary. Seconded by Larry Novak.

MOTION PASSED

David Daenzer moved that the gain of $10,485.52 from the 28th symposium be made available to the A.S.G.S. General Account for the use to cover the rebonding of our officers and that any funds remaining after rebonding be designated for society reserves. Seconded by Robert Ponton.

MOTION PASSED

Motion by David Daenzer the Treasurer in communication with the executive secretary and the 30th symposium chairman establish a checking and/or savings account in Canadian funds with a Canadian bank for the purpose of receiving and disbursing Canadian funds of the 30th Symposium. Location and timing of account set-up is to be determined jointly by the above. Countersignatures are required for disbursements or withdrawals in excess of $750.00. Eligible signatures are: Treasurer, President, and Secretary. Seconded by Owen Kingsbury.

MOTION PASSED

Larry Harmon made a motion for those Board members exercising the option to stay longer to save money by getting super savers from the air lines be reimbursed one extra day per diem of $50.00 to help cover hotel expenses for the November, 1984 BOD meeting only. Seconded by Owen Kingsbury.

MOTION PASSED

Larry Novak made a motion to adjourn the meeting. Seconded by Owen Kingsbury.

MOTION PASSED

Respectfully submitted,
Joseph Gregar, secretary

SAFETY AND HAZARDS REPORT

It is evident that the last word on silicosis and silica fumes has yet to be said. In general, silicosis is associated with crystalline dusts of the quartz/crystal forms crystobalite and tridymite, such as are encountered by workers on sandstone, granite, sandblasting, foundry work, grinding and polishing trades. The fume from incandescent silica is said to be of amorphous particles, and is not the crystalline form associated with the disease. My conversations with industrial supervisors in plants where much silica glass is worked reveal that they have little or no problem with silicosis, and periodic X-rays of chests show nothing. However, I have noted that such plants have efficient ventilation systems, and fumes of silica are removed as formed. Work has been done with laboratory animals exposed to silica fume, and some transient fibrotic lung reactions have been caused, but only when 30 to 50 times the fume concentration usually found in manufacturing operations was applied.

These are my findings, and there may well be disagreement with them when all the facts are in. Meanwhile, it seems reasonable to provide the silica worker with as efficient a ventilation system as can be had, preferably one he can adjust to prevent drafts which would interfere with his work. A figure of 1700 to 2000 cubic feet of air per minute removed from over the immediate work area has been mentioned. My suggestion is to seek further information from some of the following sources listed.

Concerning eye hazards, #6 or #8 welders goggles are generally used for silica (the #8 probably best). There is a tendency for cataract formation from the blinding light evolved, so strict precautions along this line should be followed, with light reflections from the sides being kept out as well.

American Conference of Governmental Industrial Hygienists, 1014 Broadway, Cincinnati, Ohio, 45202.

American Industrial Hygiene Asscsociation, 14125 Prevost Street, Detroit, Michigan, 48227.

National Safety Council, 425 North Michigan Avenue, Chicago, Illinois, 60611.

Manufacturing Chemists Association, Inc., 1825 Connecticut Ave., Washington, D. C. 20009.

Accident Prevention Manual for Industrial Operations, 3rd ed., 1955, National Safety Council, Chicago. A very large, complete book.

Dangerous Properties of Industrial Materials, Sax, N.I., 1963, Reinhold, N.Y., 1343 pages.

Bureau of Mines Bulletins.

U.S. Public Health Service, Pub. Health Rep.

Journal of Industrial Hygiene and Toxicology.

SAFETY TOPIC

SILICOSIS AND THE GLASSWORKING PROFESSION

An ancient ghost that haunts the worker in glass or other silicate industries deserves to be examined in the light of such information as is available. This is **silicosis**, a disabling, fibrotic disease of the lungs. It is indicated by a dry cough, with dryness and irritation in the throat, and a nodular pattern shown on chest X-rays which may develop into large masses in the lungs as a result of fibrous fluid formation (1). Since the respiratory efficiency becomes impaired there may also be blueness, clubbing of the fingers, and an increased red blood cell count (1).

Silicosis is but one of a family of disabling diseases resulting from the inhalation of irritating substances into the lungs. These include beryllium dust, cadmium dust, mica dust, smelter fumes, iron dust, asbestos dust (1). Other trouble-making inhaled materials are cryolite dust (containing flourine), pyrolusite (containing manganese), both of which eventually cause systemic poisoning (2), chromate dusts (causing lung cancer), and hydrofluoric acid fumes (causing acute laryngitis and loss of voice). The list could be extended to great length, and is compounded by the possibility of secondary chronic infections, (e.g. a silicosis patient who develops tuberculosis has a hard time (1)). Breathing an excessive amount of any dust or active chemical may be harmful.

Silicosis is found most frequently in occupations such as mining, sandblasting, foundry work, quarrying and finishing building stone, grinding and polishing trades (1). It is produced by inhaling a quantity of silica dust over a period of time. Depending upon the dust concentration and the susceptibility of the individual, from two to forty years exposure may be required (3). However, we all inhale silica dust from the atmosphere over a complete lifetime, usually without ill effect. Hence, there must be a threshold value which, if exceeded, can cause silicosis. As a working approximation arbitrary values have been set up by private and governmental bodies. One widely accepted value is that of five million particles of free silica per cubic foot of air as sampled by a Greenberg-Smith iminger and counted by light field (3). As fibrotic tissue cannot be removed from the lungs silicosis is incurable (3) and can develop further even after cessation of exposure (4).

Most of the history of silicosis comes from records of workers exposed to mineral dusts. Many cases have been caused by sandstone, quartz crystals, and granite (which has 20% to 40% quartz crystals). It is thought that the crystalline quartz forms CRYSTOBALITE, and to a lesser extent TRIDYMITE, are the prime causes of silicosis (2). Minerals in which silica is combined as silicates do not cause silicosis proper (2), however they may cause related diseases as in the case of asbestos and perhaps mica. Minerals like the limestone which do not contain silica do not seem to cause dust hazard (2). Other minerals are toxic in their own right and should not be inhaled, such as ores of lead, arsenic and manganese. The ore face in uranium and other mines is kept wetted down to lay the dust.

Apparently silicosis is caused by crystalline quartz fragments of five microns or less in diameter, and "toxicity increases sharply with silica dusts below three microns in size" (6). Larger particles are seemingly not a consideration, and since the weight increases as the cube of the radius they usually settle to the floor rather than drift about. While dust filters may have high efficiencies it is unfortunate that the 1% or so that gets through will contain mostly the particle size under five microns. Proper humidity content of the air in a workshop is of great importance in producing comfort in the respiratory tract, and in flocculating particles so that they settle to the floor. Some glassblowing shops have humidifiers which emit a fine steam jet into the air, with good effect. In others complete air conditioning give optimum comfort and safety. Still others depend upon ventilation by exhaust removal of the air from the top of the room, or through a hood or flexible duct over the immediate work area.

The forms of silica to which the glassblower is exposed are the amorphous fume volatilized off the surface of incandescent silica, and the dust resulting when glass bits fall to the floor, are tramped into dust and scuffed into the air. Silica fume has not been established as a cause of silicosis, and is not the crystalline form associated with the disease. Tests in which laboratory animals have been exposed to the fume from silica have shown transient fibrotic lung reaction after raising concentration to between 30 to 50 times the amount found in the air samples near the manufacturing operations of a large company. The lung reactions thus introduced tended to disappear after exposure, unlike true silicosis (4) (5). Suffice it to say that silica fumes are decidedly unpleasant to the eyes and respiratory tract, and hence justify their removal by adequate ventilation. Anhydrous silica can hardly be beneficial to the mucous membranes.

Broken glass tramped into dust and inhaled lacks the crystalline form known to cause silicosis, yet it can be abrasive and cause damage to the mucous membranes in the same way as silicon carbide. Proper housekeeping in the glassblowing shop, and proper disposal of glass scraps together with good ventilation should assure the continued good health of all employed there.

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4. *Fusion*, August, 1960, page 31.
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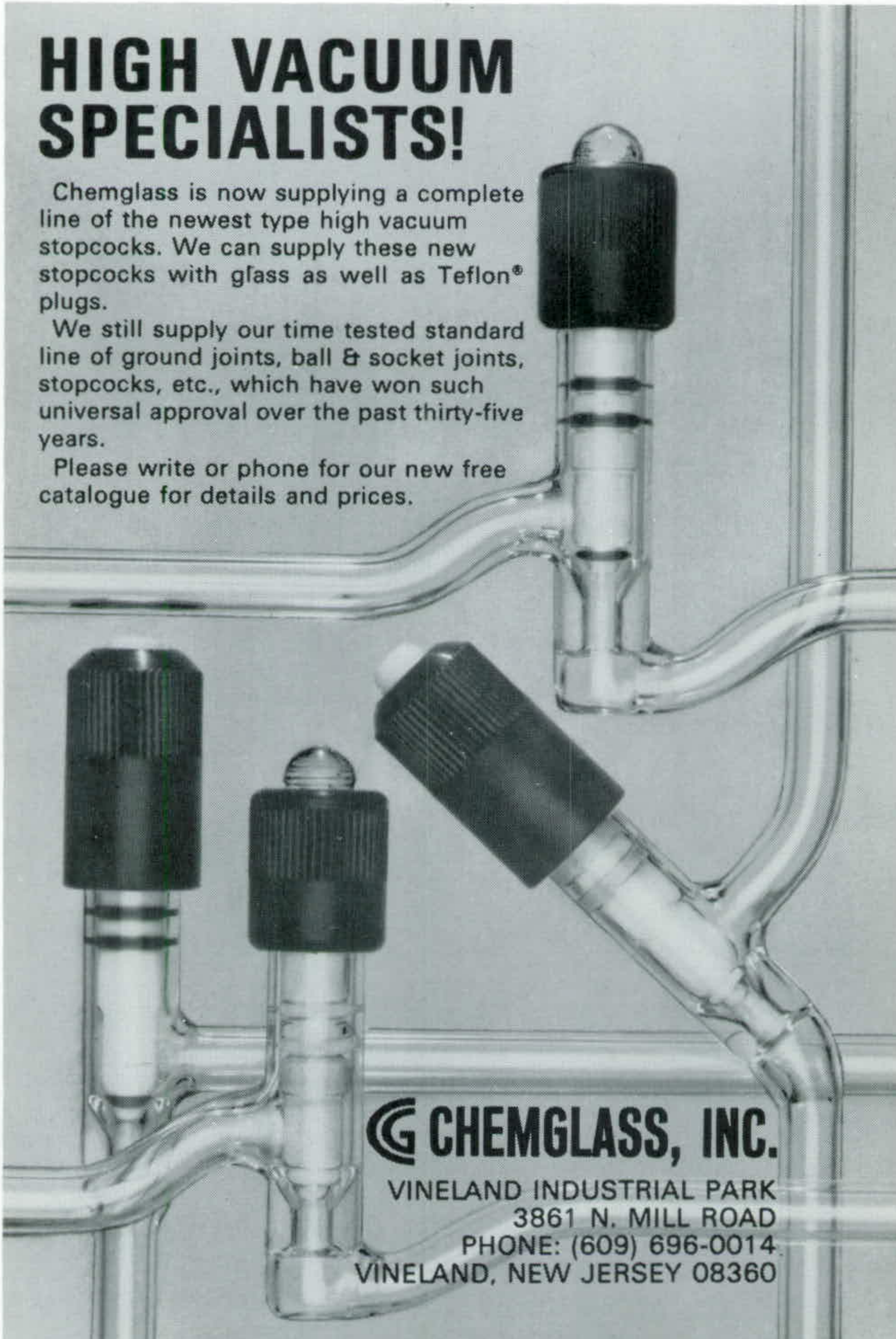
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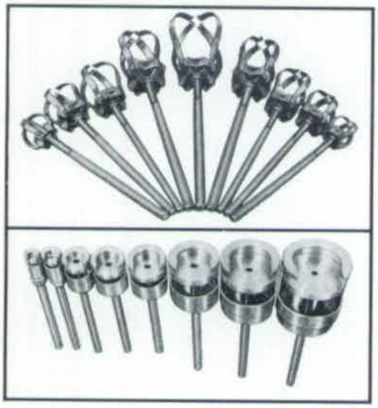

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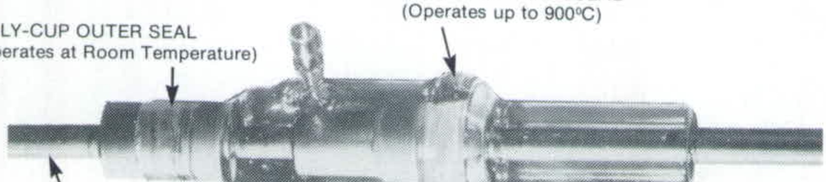

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