

British Society of
Scientific
Glassblowers



Journal

Vol. 13
JULY 1975
No. 3

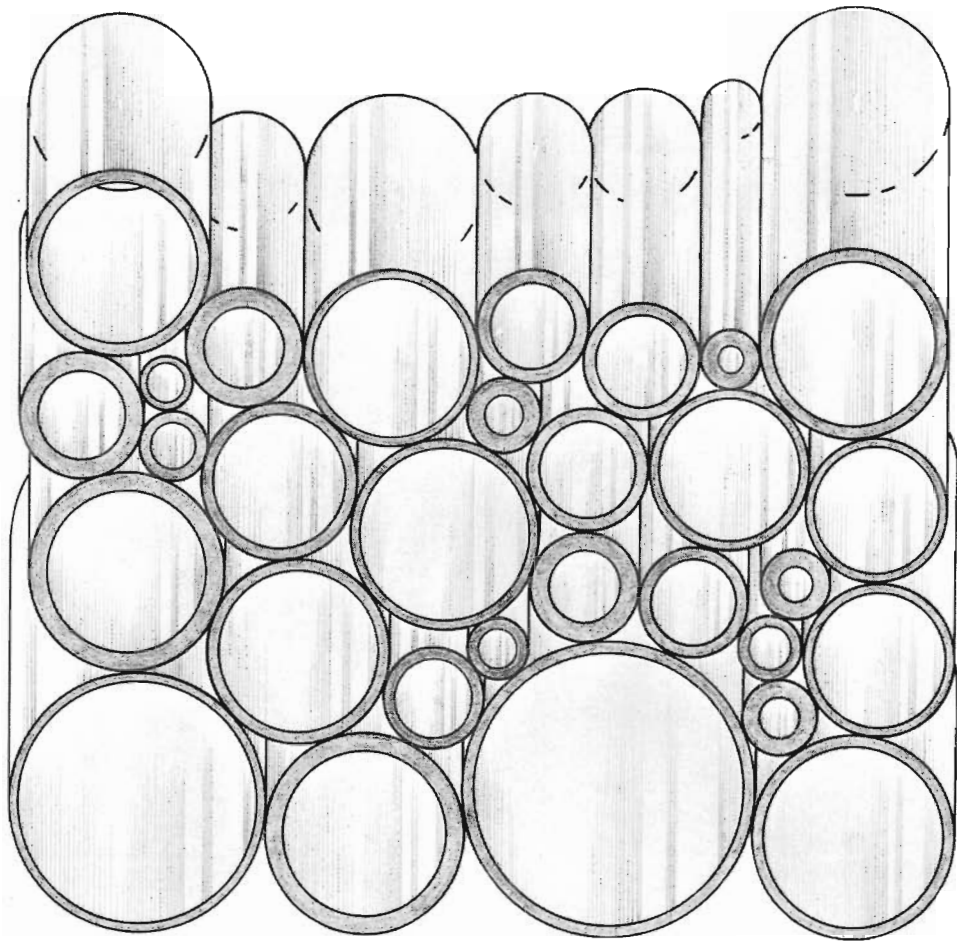


HEATHWAY
cuts your problems

HEATHWAY MACHINERY CO LTD

UXBRIDGE ROAD, HILLINGDON, MIDDLESEX

Tel. Uxbridge 36345



**Difficulties in finding Borosilicate tubing?
We've the best collection of
tubes on record
4mm-250mm O.D.**

Popular favourites galore—and plenty of less familiar numbers. In practically any bore. Practically any wall thickness. They're all in the Sovirel repertoire, made entirely of the finest quality borosilicate glass. Send your request today ...

VA Howe & Company Limited
88 Peterborough Road London SW6

Tel: 01-736 8262 & 736 8394
Telex: 262110
Cables: Labgear London



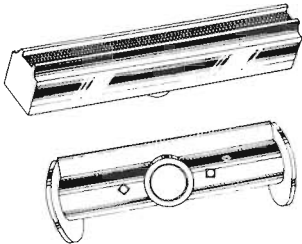
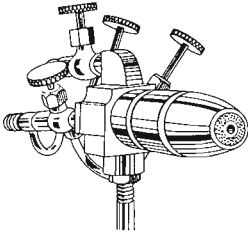
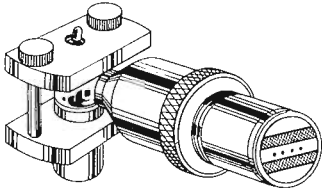
SVL

CRYOGENIC EQUIPMENT

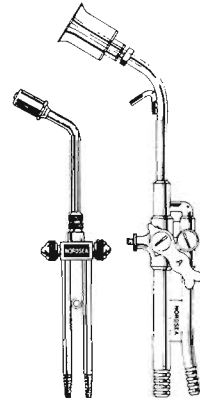
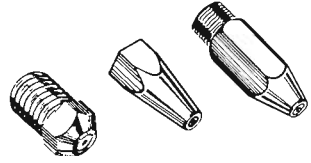


**a wide range available ex stock
send for latest catalogue to make
your choice**

PLEASE WRITE OR PHONE 01 808 0736/9
A. D. WOOD (LONDON) LTD
SERVICE HOUSE, 1 LANSDOWNE RD.
TOTTENHAM, LONDON N.17



N O R D S E A

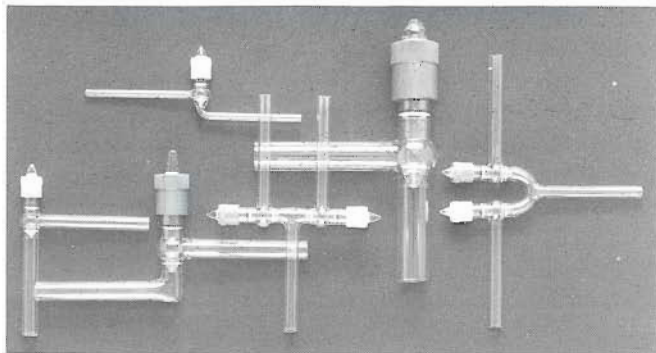


Conversions, Technical and Engineering Services, Burners, Valves,
Control Equipment, Governors

Nordsea Gas Appliance Co Ltd, 42 Hyde Road, Denton, Lancs, England

Telephone: 061-336 9311

GREASE FREE INTERCHANGEABLE HIGH VACUUM STOPCOCKS



THE 'O' RING TAP*

The best results come from a grease free system.
The 'O' Ring Tap never needs lubrication.

Never jams.

Never needs adjusting.

Never wears out, 'O' rings are easily replaced.

Never lets the key blow out.

High vacuum 10^{-6} torr.

High Pressure 150 lbs. Sq.inch.

Temperature range -60°C. to $+100^{\circ}\text{C.}$

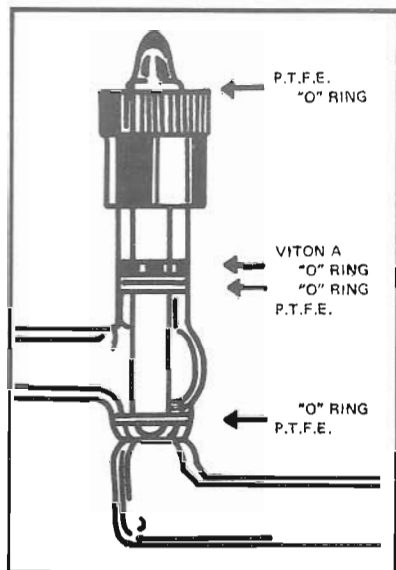
P.T.F.E. and glass only in flow path.

Chemically inert for all general purpose uses.

1mm to 25mm bore sizes, T.Bore and double oblique equivalents available.

Why settle for less than the best when the 'O' Ring Tap, gives all these advantages, at comparable cost, with old fashioned ground greased stopcocks, prices start at £2.20 each. Less at 100 rate.

Also available wide range of 'O' ring grease free joints.



* British Patent No. 1253205

Details from sole manufacturers

J. YOUNG (SCIENTIFIC GLASSWARE) LTD.
11, Colville Road, Acton, London W3 8BS.

Please mention B.S.S.G. when replying.

British Society of Scientific Glassblowers

Founded 1960

President: Mr. STAFFORD SCHOLES

Vol. 13 JULY 1975 No. 3

EDITORIAL STAFF

R.E. Garrard, F.G. Porter. Journal of the B.S.S.G. School of Chemistry, University of Bristol.



YOU CAN RING US
24 HOURS A DAY
WE'VE INSTALLED A
ROBOPHONE

HON. SEC.
WINKFIELD ROW 3639

CONTENTS

How English Crystal has Developed	53
A Method of Cutting Holes, Discs or Glass Washers of any size or thickness with one tool	57
Symposium 75	—
Glass Animals	60
Safety Topic	62
News From	63

OFFICERS OF THE SOCIETY

Chairman: R.J.W. Harvey, 73 Long Lane, Hillingdon, Middlesex. *Hon. Treasurer:* R.G. Adnitt, 26 Home Close, Harlow, Essex. *Hon. Secretary:* R. Mason, 53A Kennel Ride, Ascot, Berkshire.

BOARD OF EXAMINERS

Chairman: K. Holden, School of Molecular and Bio Science, University, Warwick.

Hon. Secretary: N.H. Collins, 8 Holden Terrace, Waterloo, Liverpool 22.

Competitions Secretary: Mr. R.G. Eustance, 42a Boroughbridge Road, Knaresborough, Yorkshire.

Distribution: Mr. R. Mason, 53A Kennel Ride, Ascot, Berks.

Advertising Manager: Mr. C.H. Glover, "Saraphil", Highfield Lane, Cox Green, Maidenhead, Berks.

OVERSEAS MEMBERS AND VISITORS

The British Society of Scientific Glassblowers extend a warm welcome to visitors to the United Kingdom and will be pleased to assist in arranging visits to industrial and other establishments, if this is desired.

It is necessary that early notice is given to the Hon. Secretary giving: time and date and place of arrival, address whilst in the United Kingdom, length of stay.

The Journal is published quarterly by the B.S.S.G. and is available free to members and at £1.00 per copy (or £4.00 per annum, airmail extra charge) to non-members. A limited number of back copies are available. Copyright B.S.S.G. and Contributors 1975.

Printed in Gt. Britain by Mergewise, Ascot.

HOW ENGLISH CRYSTAL HAS DEVELOPED

by W.E.C. STUART

The original discovery of glass is as unknown as that of the pot or the flint arrowhead.

Pottery is certainly older than glass and the early pots were unglazed. When certain minerals were applied to the surface before firing, a glazed and therefore watertight vessel resulted. Potters must have experimented with many a glaze and no doubt found it sometimes ran down the pot and formed small lumps. From this glass beads may have been evolved.

A more likely beginning is that it was a spin-off from the art of metallurgy. Various ores were treated in clay crucibles and sometimes one had silica, alumina and alkali in the right proportions to form a glass and investigators of ancient metallurgical processes have actually formed coloured glass in the bottom of their crucibles. It would be natural for the early metallurgists to seek to reproduce this exciting new material and so develop the separate art of glassmaking. When?

If this last theory is correct then glass must date back to the Bronze Age, but for some thousands of years glass was produced in small solid pieces, such as beads, or at least that is all that has remained. It was not until the desire for hollow vessels led to the so-called "sand core process" that there seemed to be much development in the craft rather than the technology of glassmaking.

The "sand-core" process consisted of taking a metal rod and covering it with a mixture of sand, clay and finely chopped vegetable matter, warming it up, then covering it with molten glass and adding what decorations one required. When the whole was cooled the metal rod was withdrawn and the clay mixture picked out.

Hollow vessels, small but well-shaped and decorated, were made by this process and were obviously highly prized for we find them amongst the tomb treasures in the Eastern Mediterranean area. Glass was probably almost as precious as pearls and lapis-lazuli.

Throughout the centuries the techniques changed slowly — some pieces appear to have been shaped out of a solid block, but it is more likely that it had been found that glass could be pressed into shape but that this left the surface very rough. Therefore, the surface was smoothed over with grindstones and polished. Simple forms of cutting and engraving appeared and the objects were clearly made for the wealthy; glass was not an everyday commodity.

It was not until about 100 B.C. that someone got the idea that molten glass could be gathered on the end of a metal pipe and blown into a hollow vessel.

Blown glass meant that large hollow vessels of great variety and thickness could be made quickly and cheaply. To cover a glass gathering with a glass of another colour and another and another was easy for the craftsmen, though it must have been puzzling to them that sometimes — no matter how slowly and carefully they cooled their products — the glass cracked. Indeed, the problem of annealing and matching expansions has only been properly understood in recent times. Trial and error was the order of the day for the glassmakers two thousand years ago. One can stand in wonder at the Portland Vase and the Lycurgus Cup — not only at the superb skill

and patience of the craftsman who carved through the coloured layers to form figures of delicate beauty or bold images, but one wonders how many blanks were made which cracked as soon as the cutting tools penetrated the first layer and upset the pent-up tensions.

What about the glass industry in Britain? Probably beads were made in Scotland in the Bronze Age. No trace of hollow vessels of the core type have been found, but the climate of these isles is not ideal for preserving glass for a few thousand years.

There is fair evidence of glassmaking during the Roman occupation. Was it introduced from Rome, or was it an indigenous craft revived by them? Or were all the glass articles found here imported from Rome and the traces of furnaces that have been found in Norfolk and Lancashire those of pottery glaze makers or metallurgists? We cannot be absolutely sure.

During the Dark Ages glassmakers made windows for ecclesiastical buildings. Were they English, or were they foreign craftsmen imported to execute a particular commission? It can be seen that one must have a liberal supply of question marks and a very open mind when writing of this period. But — by the thirteenth century — clear evidence begins to show through.

In the reign of Henry III one Laurence Vitrearius bought 20 acres of land in Chiddingfold — near Guildford — and presumably built glass furnaces, for he supplied glass for Westminster Abbey in 1226 and one William de Verir, who worked about 1240, is thought to be his son.

We know a good deal about the glassmaking in the Surrey and Sussex Weald — chiefly because some of the local historians have been interested in glass and because that part of the world has not been overwhelmed by modern factories and houses.

Perhaps the greatest of all the known glassmakers of the fourteenth century was John Schutterre — also of the Chiddingfold district — who had his furnace at Shillinglee, leased John Alemayne's and also set up a furnace at Strudwick Wood. When he died in 1379 his son was too young to run the glasshouse so his widow, Joan, engaged a Staffordshire glassmaker, John Glazewryth — to manage the Strudwick glasshouse.

The remains of a glass furnace were found in 1966 at Bagot's Park, near Abbot's Bromley, and was examined by D.W. Crossley of the University of Sheffield. This, one of 14 in the area, was tested by the magnetic dating method and was found to have been working about 1535. It was used for making window glass.

In the meantime there had been some very important developments in the Weald.

Glassmaking was evidently still in the hands of local families for we read in John Peytowe's will in 1536 of his leaving his glassmaking tools to his two sons.

In the middle of the sixteenth century a new figure appeared — John Carre, formerly of Amsterdam. He formed a partnership with Chevalier, Briet and Appel and began to make and market glass in London at the Crutched Friars and in the Weald at Fernhold.

In 1567 he obtained a licence to manufacture "glass for glazing such as is made in France, Burgundy and Lorraine." The next year he brought over Thomas and Balthazar Hennezel and John Chevalier from Lorraine to make window glass and with them two "tercieurs" (furnacemen) and two gatherers. It is interesting to note that the furnacemen in the Stourbridge district are — to this day — called "teasers".

The Hennezels were shortly joined by the de Tysacs and de Thietrys to help them with the production of window glass and the de Bigots and the Houx to make vessels. Carre also brought over Venetians to make vessels. Lutere and Vacmom Verzelini worked for him at the Crutched Friars glasshouse and the latter took over when Carre died on 25th May, 1572.

Between 1584 and 1604 the Henseys, Tysacks and Bigoes (note the Anglicised names) were at Eccleshall in Staffordshire. The remains of one of their furnaces was found and excavated by Pape in 1932. He found remains of bottles and drinking vessels. A recent examination of the crucibles shows a marked similarity to the Stourbridge pot clay – very different from the pot clay in use at Bagot's Park half a century before.

There is a record of a lease for "getting and digging fireclay" in Stourbridge in 1566 and a lease of 1618 mentions "glasshouse pot clay".

The wood-fired furnaces consumed vast quantities of timber. Remember that in the thirteenth century Laurence Vitrearius needed 20 acres before he set up his furnace.

Efforts were being made with coal firing and Sir Edward Zouche was granted a patent by James I in 1610 for melting glass by coal, although it was claimed by Lord Dudley in 1624 that this had been preceded by his glassmakers working at Green Lodge near Greensforge in Staffordshire – a few miles from Stourbridge.

At this point in glassmaking history we find the Lorrainers in the Stourbridge district, for John, the son of Paul and Bridget Tyzack, was christened at Kingswinford in 1612.

That year a twentyone year licence was granted to Sir Robert Mansell – Treasurer of the Navy – for glass made in coal fired furnaces and the final nail in the wooden coffin was driven home when, in 1615, James I issued a Royal Proclamation which forbade the further use of "timber or wood or any fewell made of timber or wood" in the glass furnaces.

A new era of English glassmaking began. The new fuel meant changes in furnace design – higher temperatures and, above all, better pots. Not the old open ones but covered pots to exclude the dirty sulphurous gases and dust from the coal flames.

So far glass – whether for windows or vessels – was of a simple soda-lime/silica composition – the alkali from burning bracken or seaweed. Lime was an impurity but perhaps deliberately added. The silica from silica sands. These materials were far from pure. Sometimes considerable quantities of alumina were introduced from the sand or the alkali and whilst this improved the durability of the glass it made it more difficult to melt. So the glass was of variable quality and both British and foreign glass left a lot to be desired.

Early in the seventeenth century the Worshipful Company of Glass Sellers was formed. Their main object seemed to be to protect the public (and themselves) from pedlars selling glass of poor quality and to encourage the British glassmakers to improve their quality. They were formed in 1635 but their Charter was not implemented until 25th July, 1664. This was duly enrolled by the Court and Aldermen of the City of London and the Glass Sellers held their first Court on 6th December, 1664, at the George Tavern in Ivy Lane, London.

The GlassSellers had their own furnaces at the Savoy and in Henley-on-Thames and they were clearly concerned about the quality of the glass they made and also that which was imported.

At this point in history a development occurred which was almost as significant in glassmaking as the discovery some seven hundred years before that glass could be blown.

George Ravenscroft was the second eldest son of James Ravenscroft of Fould Park, Middlesex. The two eldest sons were sent to the English College at Douai to be educated. George, having finished two years in philosophy, embarked on a four year theological course but abandoned it after two years. He became a merchant living partly in London and partly in Venice. He married into the Gascoine family who were interested in science and astronomy. This was the man the Glass Sellers invited to work at their Savoy factory to try to improve the quality of their glass. He clearly had known something of glassmaking in Venice and he brought a Venetian glassmaker – Vincenzo – to work with him at the Savoy.

By 1674 he had made some progress and on 5th September of that year the Glass Sellers Company granted him a patent for "the making of a sort of fine Chrystaline Glasses in resemblance of Rock crystal for beer, wine and other uses." Whether this was the true "glass of lead" no one knows. Certainly it was far from perfect for he was troubled for some years with crizzling which seemed to indicate that his silica and lead content was too low and his alkali too high. However, he overcame the problem at last with a composition of 50% Silica, 33% Lead Oxide and 17% Potash – which is almost the full English lead crystal made to this day. Here was a glass easy to melt with a long working range and of a brilliance and resonance hitherto unknown. It also had a greatly different refractive index and colour dispersion and eventually made possible the compound lens free from chromatic and spherical aberration.

By the end of the seventeenth century English lead crystal was world famous. Its physical properties made it ideal for the glass cutter and engraver and English blanks were exported to Continental decorators.

We remember that Paul Tysack had a son christened at Kingswinford in 1612. He had probably come from Eccleshall where he had heard of the experiments being made with coal firing and knew of coal and pot clay being available in the Stourbridge district. Just when he arrived we do not know, but certainly by 1618 he owned a piece of land called Colemans with coal and clay lying beneath it.

One may be sure that, by the beginning of the 18th century, lead crystal was made in Stourbridge with commercial success.

Later in the 18th century George Ensell became the dominant figure in Stourbridge, particularly in association with Bradley in the Wordsley glasshouses.

In 1787 Richard Bradley built the Red House glasshouse and about 1810 the White House.

In 1827 Frederick Stuart entered the glass industry and – after working first at the Red House for Philip Pargeter and then at the Albert Works with two partners – took over the Red House in which his sixth generation of descendants are actively working.

Gradually the bottle making went to the more industrial areas to be mechanically produced and Stourbridge became the centre of the handmade crystal industry. The number of firms fluctuated but it is now in the hands of the five firms who form the Stourbridge Crystal Glass Manufacturers Association. The five are Stevens & Williams, Stourbridge Glass Company, Stuart & Sons, Webb Corbett and Thomas Webb. These firms also own factories in Scotland, Staffordshire and South Wales.

This paper was presented at the Symposium 1974, held at Lancaster University. Grateful acknowledgement is made to the author.

A METHOD OF CUTTING HOLES, DISCS, OR GLASS WASHERS OF ANY SIZE OR THICKNESS WITH ONE TOOL

L.R. PRESLEY

Ministry of Defence, Procurement Executive
Services Electronics Research Laboratory
Baldock, Herts SG7 6NG

We had a requirement for a small number of glass discs, approximately 4 inches in diameter and 1 inch thick. Rather than go to the expense of having a drill made for the particular diameter required, we have investigated the use of a Trepanning tool. This tool has proved so successful that it is now an essential part of our equipment and we are sure there is a future for this tool in most Glass Shops. Any size hole or disc can be cut in any thickness of glass with the one tool. Glass up to 1 inch in thickness has been cut with no trouble.

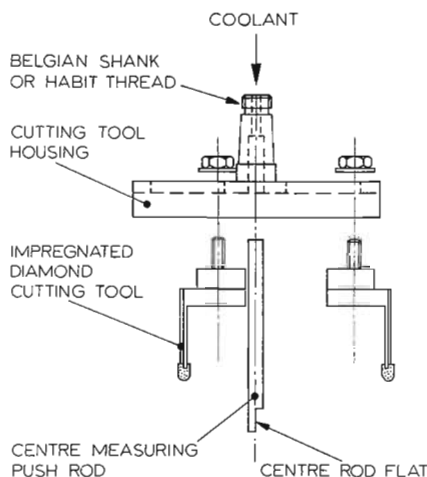


Fig. 1

The tool is shown in Figure 1. The radius to be described is measured from the centre rod flat to the nearest point of the impregnated diamond tool. (It is our intention to experiment with a $\frac{1}{4}$ inch diamond-impregnated rod, as the cutting edge can then be turned when worn.) The centre rod is then withdrawn to allow coolant liquid to pass down onto the plate, centrifuge out to the cutting tool and into the groove during cutting. A cutting speed of 700 rpm is ideal. The plates are waxed down in the usual way and must be firmly clamped to the drill bed.

Figures 2 and 3 show the tool in use. In Figure 2 a glass disc is being cut, while in Figure 3 two cutters are being used to form an annulus. Finally, Figure 4 shows the disc and annulus produced.

© Controller, HMSO, London 1975.

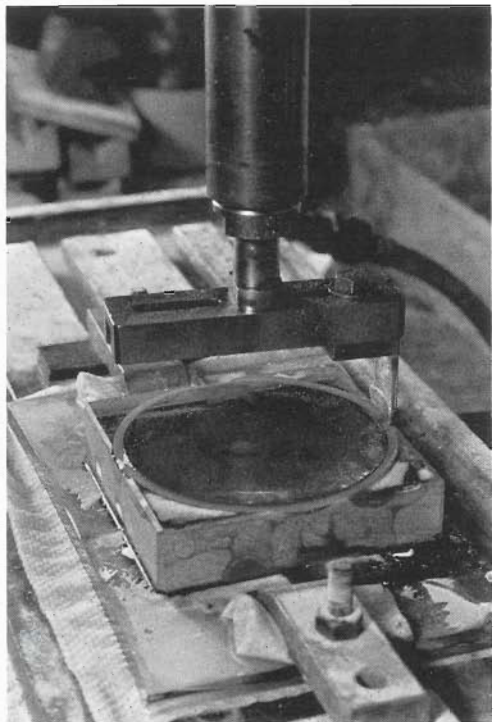


Fig. 2

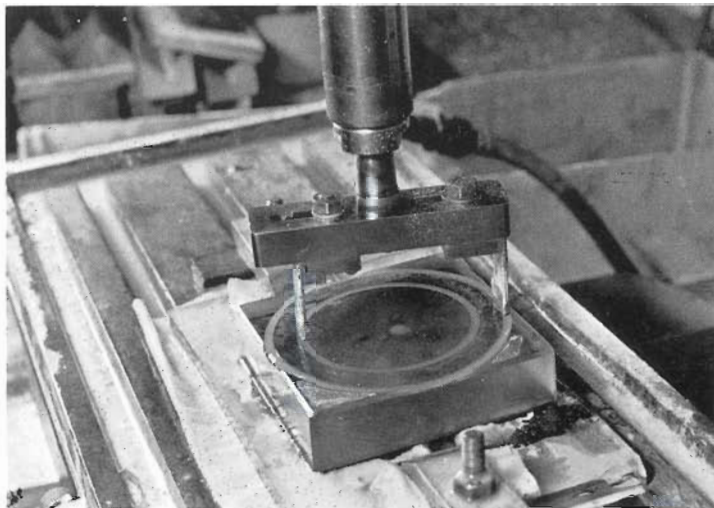


Fig. 3

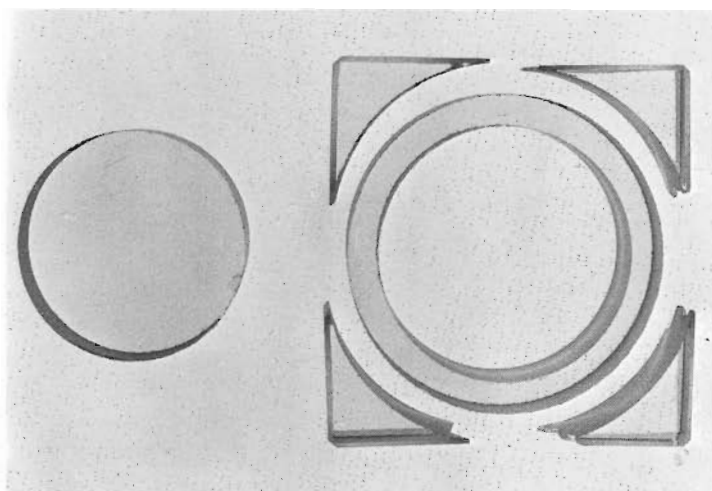


Fig. 4

EDITORIAL

We have received a letter from Mr Presley telling us that he retired in April 1975 . . . he would like to say how much he has enjoyed his glassworking career and wishes the BSSG every success for the years ahead.

He would be very pleased to hear from any of his old friends, many made since 1931 when he first commenced glassblowing under the instruction of the late Tom Wingent.

We in turn would like to wish Mr. Presley a very happy retirement, and we are sure all members of the BSSG will wish to be associated with this thought.

GLASSBLOWERS WANTED FOR NEW ZEALAND.

Contact: Mr. R. Snell
Glassblowing Services Ltd.
8, Morgan Street
Newmarket
Auckland
New Zealand

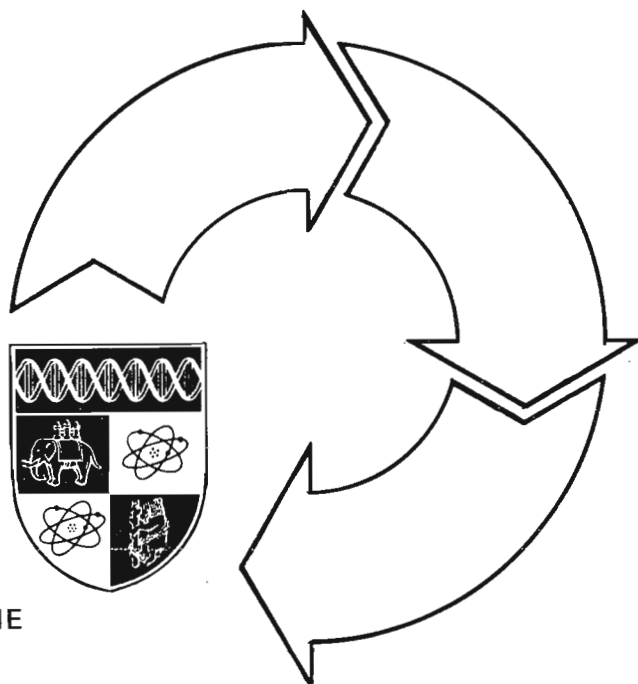
**For fuller information
in the first instance
contact:**

Mr. S. Fussey
59, Whitedown Road
Tadley
Nr. Basingstoke
Hants.

SYMPOSIUM 75

SEPTEMBER
11·12·13

UNIVERSITY
OF
WARWICK



PROVISIONAL PROGRAMME

The Midland Symposium "75" Committee extends a welcome to members and guests.
The following exhibitors will be pleased to see old and new friends at their stands.

Exhibitor	Stand No.	Exhibitor	Stand No.
Chance Brothers Ltd.	12	L. Richoux Co. (London) Ltd.	2
Edwards High Vacuum	11	Thermal Syndicate Ltd.	7&8
W.G. Flaig & Sons Ltd.	9	T.W. Wingent (Glassblowing Tools) Ltd.	10
R.C. Heard, Scientific & Industrial Glassblowers	5	A.D. Wood (London) Ltd.	14
Heathway Machinery Co. Ltd.	16	W. Young (Fused Silica)	15
Heraeus Quartz Fused Products Ltd.	19	General Engineering Co. Ltd. Vacuum Products Division	3
Jencons (Scientific) Ltd.	17	Nordsea Gas Appliance Co. Ltd.	18
R.W. Jennings & Co. Ltd.	6		
James A. Jobling & Co. Ltd.	1		
Midland Scientific Glassblowing	20		
R.B. Radley & Co. Ltd.	13		

Keith Holden Symposium Secretary

School of Molecular and Bio Science, University of Warwick, Coventry.

PROGRAMME

THURSDAY 11th SEPTEMBER	FRIDAY 12th SEPTEMBER	SATURDAY 13th SEPTEMBER
10.00 a.m. Registration Open	8 — 9 a.m. Breakfast	8 — 9 a.m. Breakfast
12 — 1.30 Buffet Lunch	9.00 Exhibition Open	9.00 Exhibition Open
1.45 Exhibition Open	10.00 "Advances in glass ceramics" Dr. P. W. McMillan, University of Warwick.	9.30 A.G.M.
2.30 Opening Address Mr. R. J. Harvey, Chairman B.S.S.G.	11.00 Coffee	11.00 Coffee
2.45 "A review of the manufacture, dimensional control and appli- cation of precision bore tubing" Dr. R. E. Bastick, formerly Research and Development Manager, Chance Brothers Ltd.	11.30 "Painting and engraving on glass" demonstration. Mr. R. J. Harvey, E.M.I. Electronics Ltd.	"High performance chromatog- raphy" Mr. G. P. Helliwell, James A. Jobling.
3.45 Tea	12.30 Lunch	Lunch
4.15 "Demonstration of mechanized glass manipulation." Courtesy of: Herbert Arnold, Kurt Loewinger, assisted by Mr. Thomas L. Richoux Co. (London) Ltd.	2.30 "Sintered filters" demonstration. Mr. K. Pike, University of Sussex.	2.00 "Glass transfer sealing tape" Mrs. Kitty Ettre, Vitta Corpor- ation, U.S.A.
5.30 High Tea	3.30 Afternoon Tea	2.15 Exhibition Closes
7.30 Reception, Food & Wine. Courtesy of: James A. Jobling Laboratory Division, Mr. L. Morrell, Divisional Manufacturing Manager.	4.00 "Design and fabrication of glass process plant apparatus" Mr. D. Curtis, James A. Jobling, Process Plant Division.	3.15 "Principles and nature of explosives" demonstration. Dr. R. B. Cundall, University of Nottingham.
	7.00 Annual Dinner Presentation of Awards. After Dinner Speaker — Mr. A. Dygert, Managing Director, James A. Jobling Laboratory Division	4.15 Closing Address Mr. Stafford-Scholes, President, B.S.S.G.
	10.00 Music by "Vintage Six"	
	10.30 Smoking Concert	

Special visit to Stuart Crystal

A visit for the ladies, to Stourbridge has been arranged for Friday 12th September, leaving at 1 p.m. Spare seats will be made available for members upon request.

The success of the Symposium depends upon you, so,
DON'T DELAY, BOOK TO-DAY.

"GLASS ANIMALS"

R. C. HEARD

To the man in the street glass animals are curiosities. To his wife they are a thing of beauty. To my colleagues in the profession they are disdainfully known as "bimmanies". However they are seen, they can be a very primitive shabby piece of work or a very advanced art form. With the aid of these very beautiful colours; which very few other materials can excel, one can make some of the most extraordinary glassware to grace the world of art. For many years stained glass windows have depicted some of the highest forms of artwork in glass, equally the working of simple coloured rods of glass can lead to some most beautiful pieces of glassware. Glass animals in their heyday were known to the Victorians in the form of dolls house furniture or the more elaborate galleons; with their intricate arrangement of glass rigging, to the even more famous birds of paradise with tails of spun glass fibres.

The manufacture of glass animals is best carried out in either coloured soda glass or coloured lead glass; although it must be admitted that this is not the easiest of glasses in which to make these little figures.

"Pyrex", has the advantage that it can be very

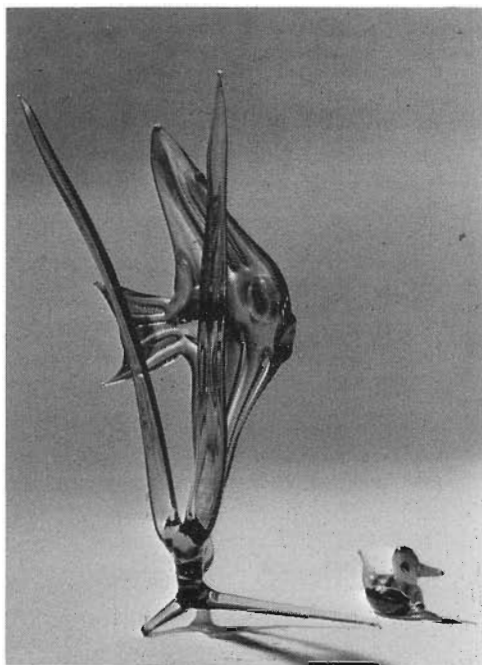


Fig. 1

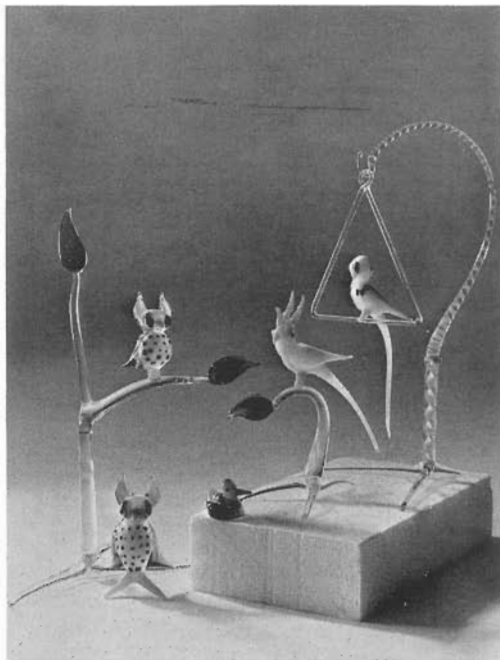
*"Pyrex" Brand Name
J. A. Jobling Co. Ltd.*

tolerant, not requiring annealing between each of the intricate stages. It has the very considerable drawback of being entirely colourless. Once one has mastered the working of soda and lead glasses; with the aid of an oxy-gas burner, one will never again make use of Pyrex except for the very intricate pieces requiring the most exact detail. Soda glasses; particularly the potash glasses, lend themselves best to colouring to an exceptionally high degree of brilliance. Colours due to the presence of potash in the glass make for a glass with a shorter working range, compensated by the greater brilliance of colour.



Fig. 3

Fig. 2



Some of the photographs shown (unfortunately in black and white) will give some indication of the intricacy which can be achieved in working these soda glasses and it is well worth the glass-blowers time to study at some length the anatomical details of all the animal and insect forms, in order to achieve as lifelike a representation as he is capable of making. Although the caricatures of some creatures can be entertaining and artistic, it is without doubt the more precise forms and their closeness to anatomical detail which render this amazing material so very worthwhile working. One has only to examine the work of the famous Blaske brothers in Harvard Museum of Botany and Zoology to see one of the worlds most outstanding examples of the type of work which can be carried out with this simple glass.

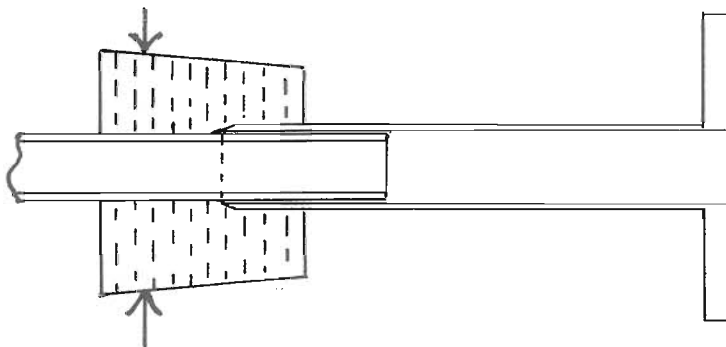
LETTER FROM Mr. I.C.P. SMITH

SAFETY

I was very interested to see the article in the July issue of this Journal, by F. Wainwright on Safety in respect of the insertion of glass tubes into rubber bungs, so I wonder if I may add a note on a safe method of extracting glass tubes from rubber bungs. This is an old dodge, but it may not be sufficiently well known.

Assume that you have a glass tube that has become seized in a rubber bung, or it is one that lacks a convenient grip, and moreover it is not desirable to lose either the glass part or the bung. Select a cork-borer that is a near sliding fit over the tube end, then, having lubricated, perform the action of boring between the glass and the rubber, as shown in the figure, gripping the bung firmly about the position of the arrows, and not touching the glass with the hand. When the borer reaches the far end, the glass is taken out.

For inserting a delicate tube into a rubber bung the opposite procedure may be performed. Select a cork-borer as before, and force this just through the hole in the bung, insert the glass tube to its required position, then lightly steadying it to start with, but holding only the bung firmly, carefully remove the borer in the usual manner. Lubrication is again very necessary, but a lick serves most purposes.



NEWS FROM

SOUTHERN SECTION

"Cryogenics" by Mr. Warwick, a Design Engineer from Oxford Instruments.

Southern Section Meeting at Queen Elizabeth College, Kensington on 12th February, 1975 at 7.45 p.m.

The lecture by Mr. Allan Strand of Hirst Research Centre, G.E.C./A.E.I., Wembley, has been deferred to a later date.

"Cryogenics" by Mr. Warwick, a Design Engineer from Oxford Instruments.

The meeting was held at Queen Elizabeth College on March 12th and commenced at 7.45 p.m. There were just three members present for this worthy and very interestingly presented subject. Indeed, the field of Cryogenics is exceedingly vast and very complex, as we found out!

The development of Cryogenics (liquid gases) was initially and primarily broadened because of military and strategic reasons, as well as for the development of space technology, i.e. rocket propulsion, life support systems etc. However, there are many other specific uses, e.g. the cooling of high powered equipment, freeze drying, physical chemistry researches and studies, work in nuclear physics and associated technology.

With the development of super-conductors (niobium titanium wire) for the manufacture of very powerful magnets, effective coolants and dewar chambers had to be designed as well as special developments of the magnets themselves in order to keep them cool and stable. Providing they were kept cool and suitably energised they would work using little, or no extra energy. Niobium tin conductors were found to be less reliable and are now discontinued, except in special cases. The magnets and their cooling devices are used in equipment such as N.M.R. Bubble Chambers and high energy experimental equipment etc. The largest dewar they make is up to 4ft bore and is made of stainless steel.

TYNE WEAR

The section met in the J.A. Jobling social club on January 21st for the A.G.M. The following were elected:

J. Scott	—	Chairman
S. Short	—	Treasurer
K. Metcalf	—	Secretary
R. Anderson	—	Vice Chairman & B/E Rep.
L. Butler	—	B/E Rep.
G. Fowle	—	Council Rep.

Other committee members are: R. Brown, H. Forster and L.A. Burns.

The 15 members attending then enjoyed a social evening.

On February 17th, a film night was held at the Newcastle University employees club, 15 members enjoyed an assortment of glass orientated films.

Then on 10th March the section visited Mullard T.V. Tube factory at Belmont Durham. Firstly we were met by Messrs. Stephen Grant and Stephen Hammond, Senior physicists at the factory and were taken to No. 1 conference room, here we saw a film on the assembly of a colour T.V. tube and the manufacture of the parts. We were all issued with white overalls and safety spectacles. The factory itself is on one floor, and all departments branch off causeway down the centre of the factory. The first department we visited was the mask making dept., where a sheet of mild steel with 450,000 holes of .0020" dia. was heated in a lehr with a reducing atmosphere, then shaped on a mould by a hydraulic ram. The mask was then welded onto a frame and retaining springs were attached. The next dept. was the first stage for the cone. The cone was cleaned and (aquadag) applied to the inside. The next stage was the screen which was coated with red, green and blue phosphor dots, applied separately in the order of green, blue then red. The coatings were mixed, under sodium lights as they are photosensitive, then they were tested for viscosity and specific gravity. Each coating was applied to the screen evenly by a centrifuge and heated by an infra red lamp. The mask was fitted and each coating was sprayed with electrons from its corresponding cathode gun. A fourth coating was applied after the phosphor, this was an aluminium film to reflect all light emitted by the phosphor. The mask was fitted to the locating pins in the screen and the screen was adhered to the cone by means of a glass fit and heat treatment in a lehr. Next, the gun was fitted. The gun was inserted into the tube and was heated firstly by radiant burners then natural gas burners with needle sharp jets to seal in the gun and cut off excess glass. The tube was then evacuated and sealed. The tube was tested for gun alignment and screen colour. Tubes are graded for export and home markets, the home market being further graded into 'A' quality at approx. £100 per tube, and 'B' quality at approx. £12 per tube. (Most replacement tubes used by hire T.V. firms being grade 'B'!)

The 15 members attending enjoyed a very pleasant and interesting evening and our thanks are due to Messrs. Grant & Hammond for their effort on our behalf.

K. Metcalf (Sec.)

WESTERN SECTION

Western section . . . meeting on the 28th April, 1975.
Medical School, University of Bristol.

Our speaker for the evening was Mr. Palmer, branch manager of Messrs. Flemmings, a local subsidiary of The British American Optical Co., and his subject was "Some aspects of spectacle making".

Giving a brief historical survey of the spectacle development and use up until modern times, we were given to understand that spectacles, as such, originated in the 13th century and indeed there was a French Guild in 1429 there was no equivalent British Guild until 1649 when a charter was granted by Charles the First. In these early days there was a ten year apprenticeship system of training (as different to today, where there is no formal training used). In these early times the work was all done by hand . . .

It was not until 1671 that any sort of machinery was introduced into the craft and this quite primitive by present standards.

The first opticians examinations were introduced in 1898 and in 1904 sight testing was introduced, by the 1920's the early prescription houses had been established and by this time the work was practically all mechanised, and has progressed so until the present time. The industry being now almost completely machine dependent. This was not surprising when some of the statistics were given . . . for some 24 million people in this country wear glasses and today there are between six and seven million sight tests given every year. Approximately six and a half million pairs of glasses are supplied per year although apparently there was a distinct drop in this number when prescription charges were made.

There are somewhere around six to eight thousand workers in the spectacle making industry and it is surprising, as previously mentioned that there is little formal training in the industry . . . the learning being achieved on the job, as it were, the more experienced showing the newcomer the techniques which are then carried out and experience gained in them.

The main glass used in the making of the majority of spectacle lenses is a crown glass, although some flint glass is utilised on occasion as required by the prescription . . . especially in the case of bifocal lenses. In the main, Mr. Palmer dealt with the manufacture and theory of the spherical lens, explaining the system of strength determination and that the power of the lens is determined by the radius of curvature of the lens surfaces . . . with one diopter lens focussing a beam of light to a point, one metre from the lens front surface. He also explained the factors involved in the producing of a specifically required strength of lens and explained that the number of blanks of glass, many partially finished that are stocked to enable the quite rapid completion of any given prescription. Blanks in different stages of completion were handed around and the meeting carried on in the way of a general discussion. It became very obvious that the industry though mechanically dependant, still, however, had vast knowledge requirements in all spheres of lens manufacture to prescription.

Naturally many questions brought out the mechanical details of the trade, dealing with the grinding, smoothing and polishing sequences. Particularly interesting was the information about the low melting point metal which is now used for blocking lenses on, whilst they are being worked, this being so much cleaner and easier in every way to the more orthodox means.

Some description was given of the preparation of more complicated lenses such as the "Toric" lens, which has different curvatures at right angles to each other on the same surface. These lenses being used to combat astigmatism. As such interest was shown in the subject Mr. Palmer offered to come back in the future to give talks on different lenses and more detailed information on certain aspects of the industry for, as he pointed out, it had been necessary for him to do first of all a summary of the subject, which he felt he had now completed.

Our sincere thanks must go to Mr. Palmer and his company for their co-operation with us, and we hope to take Mr. Palmer's offer of further lectures into account for future meetings of the section.

EDITORIAL

We feel sure that there must be many other activities involving our members in the various sections around the country. It would be of interest to all members if these activities were put on record.

Please contribute your reports to The Society Journal.

JAPAN

The first session in the 1975–1976 term of the Japanese Society of Scientific Glassblowing was held on 27th February at “Kinro Fukushi Kaikan” in downtown Tokyo.

The session was opened at 10:00 a.m. with President’s address and two lectures were given by guest speakers on the following subject:

“Soldering of glass and metal by means of the ultrasonics”

Mr. Koji Nomaki, Asahi Glass Co., Ltd.

Mr. Yoshiji Saoyama, Ultrasonic Service Corp.

“Properties of synthetical fused quartz”

Mr. Hideo Ohshima, Japan Electro-Metals Co., Ltd.

The soldering of glass and metal is one of the recently developed sealing techniques for electronics applications. It is also applicable for housing industries. For instance, metal door knobs are easily soldered onto heavy glass doors.

The synthetical fused quartz is made from SiCl_4 , used widely for Si transistor industries, as a subsidiary product. Its high quality is most suitable for optical transmission purposes. One of the drawbacks of it at present, however, is the high cost.

Following the lectures, the annual business meeting of the society was held and a brief report of the 1973–1974 term was made by Coe Gotoh, vice-president. Mr. Hiroshi Shimizu, chairman of the by-laws committee, and Mr. Yoshihiro Tadano, chairman of the election committee, made report on their activities.

Eleven directors for the 1975–1976 term were introduced by Chairman of the Election Committee. The newly elected directors are Mr. Natori of Toshiba Electric Co., Ltd., and Mr. Kimura of Japan Atomic Energy Research Institute. Managing directors for the term are as follow:

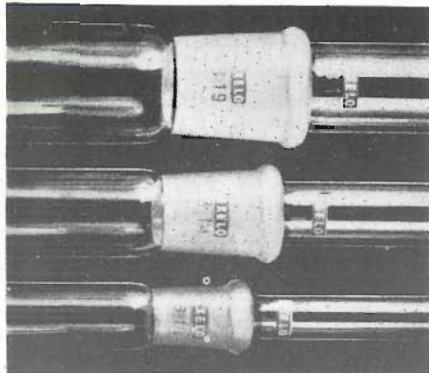
Kaichi Harada,	President
Coe Gotoh,	Vice-President
Masami Ikariya,	Chairman, General Managing Committee
Sakae Kusano,	Chairman, Planning Committee
Yoshio Kaga,	Chairman, Editorial Committee
Yoshihiro Tadano,	Chairman, Election Committee.

As the final program of the session, films on the application of vacuum techniques and low temperature were shown.

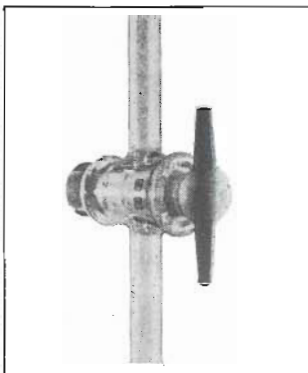
The lectures and the films were received very well by 96 attendants. The final remark was made by Dr. Takeo Iida, a counsellor of the society and adjourned at 4:30 p.m.

Reporter
COE GOTOH

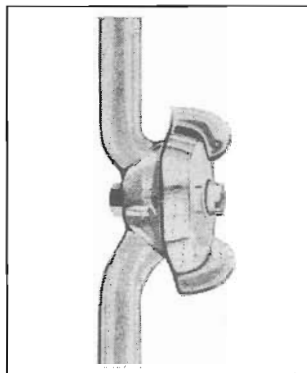
EXELO QUALITY COMPONENTS



INTERCHANGEABLE GROUND JOINTS - RANGE INCLUDES ALL SIZES & TYPES B.5 - B.55



STOPCOCKS WITH INTERCHANGEABLE P.T.F.E. KEYS 2-8 mm



FLAT, ALL-GLASS INTERCHANGEABLE STOPCOCKS, 2-10 mm

EXELO

W. G. FLAIG & SONS LTD

EXELO WORKS MARGATE ROAD
BROADSTAIRS KENT
TEL: THANET 61365/6 & 62913

Catterson-Smith

makers of

electric kilns, furnaces, lehrs

for over 50 years

have moved from Wembley and are now at

Woodrolfe Road, Tollesbury, Nr. Maldon, Essex CM9 8SJ.

Telephone: Tollesbury (062 186) 342

Cables: Leckiln Maldon

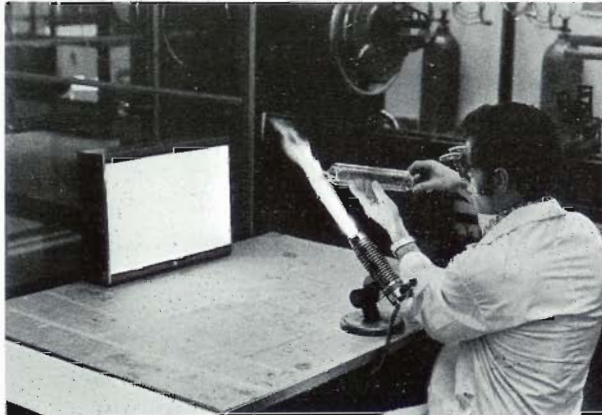


Our experience in the design and use of natural gas or hydrogen and oxygen burners using the jet-mix principle, (non pre-mix of fuel and oxidant) and the ancillary proportioning valve controls extends over 39 years. These products have worldwide acceptance as standards of the industry.

For complete data and prices, write for our burner and control valve catalogue. We would like to help you in your switch over to natural gas.

LITTON ENGINEERING LABORATORIES
P.O. BOX 669
CARSON CITY, NEVADA 89701, U.S.A.

Polariscope shows the strain



Heathway Machine Sales

R. G. Adnitt (Scientific Glassblowers) Ltd.

*Scientific
Industrial and
Experimental
Glassware*

Postal and Reg. Office:

**26 Home Close
Harlow · Essex**

Works:

**The Steps
Parsonage Farm
Forest Hall Road
Stansted · Essex**

Tel:

**Harlow 39695
(24hr answering service)**

**FLAT
BOROSILICATE
GLASS**

We can supply you squares, rectangles, circular discs etc. from our Pyrex-type glass sheets.

Standard Thicknesses

3 – 4 mm
3.6 – 4.2 mm

Please write or phone for details to:

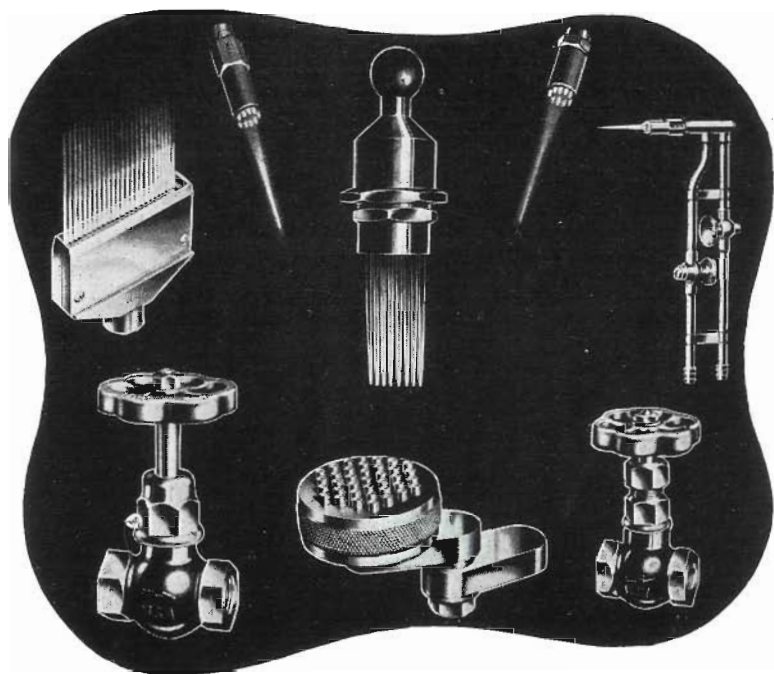
PRIMARC (Jigs and Lamps) Ltd.,
Busgrove Lane, Stoke Row,
Henley-on-Thames, Oxon.
Checkendon (0491) 681323

HERAEUS QUARTZ FUSED PRODUCTS LTD

Have immediate vacancies for skilled and semi-skilled quartz glassblowers at their new factory situated in Oyster Lane, Byfleet, Weybridge, Surrey.

Excellent working conditions. Realistic rates of pay. Factory very convenient to Southern Region, Railway Station on main line from Waterloo to Woking. Applications in the first instance should be directed to the Works Manager.

Heraeus Quartz Fused Products Ltd, Unit 3, 120 Oyster Lane,
Byfleet, Weybridge, Surrey, KT14 7LE.,
Telephone: Byfleet 49315
Telex: 928497



SENSITIVE NEEDLE VALVES

For Gas, Air, Oxygen and Steam, etc

GAS, AIR & OXYGEN BURNERS

For Radio Valve and Electric Lamp Manufacture
Scientific Glassblowing, etc

HIGH PRESSURE BURNERS, INJECTORS, ETC

For Mechanised Brazing, Silver Soldering and
other Heating Operations

W. S. A. ENGINEERING CO. LTD

5-9 HATTON WALL, LONDON, E.C.1

Telephone: 01-405 6175

Telegrams: Wilbranda, Smith, London

DURAN[®] Tubing Capillary Rod



Proof against corrosion. Resistant to great mechanical and thermal stress.
Smooth, non-porous surface. No effect on sensitive substances.

A PRODUCT OF SCHOTT-RUHRGLAS GmbH.

DURAN is a borosilicate glass, being classified as a chemically highly resistant glass with the lowest possible coefficient of expansion.

It is particularly noted for its high resistance to acids and hydrolytic durability, and may be fused strain-free to borosilicate glasses of the same type.

DURAN can be considered as an industrial glass of universal application and is processed both manually and mechanically into laboratory apparatus and other articles which are subject to great chemical, thermal and mechanical stress.

DURAN tubing is available up to an outside diameter of 315 mm.

Sole Distributors and Stockists in the U.K.:

GLASS WHOLESALE SUPPLIES LTD., 566, Cable Street,
LONDON, E 1, 9 EZ. Telephone 01-790 6401