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Scientific Glassblowers Journal

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of the
British Society of Scientific Glassblowers

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SCIENTIFIC GLASSBLOWING **LAMPWORKING TECHNOLOGY**

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From 1st January 1971

British Society of Scientific Glassblowers

Founded 1960

President LUCY F. OLDFIELD B.Sc., Ph.D., D.I.C., F.S.G.T.

Hon. Secretary: R. Mason, 53A Kennel Ride, Ascot, Berks.

Journal of the B.S.S.G.
School of Chemistry,
University of Bristol.

Vol. 9 Sept. 1971 No. 3

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New Series of Articles

JOBLING CUP . . . PRIZEWINNER 1968

Wherever possible the Journal will publish articles composed by British Society of Scientific Glassblowers prizewinners.

The aim will be to provide background information on the item of glassware that achieved success in any of the Society's competitions.

This first article is a good example of the sort of thing intended, and we are grateful to Mr. M. Lock for his co-operation in producing this first article of the series.

★ ★ ★ ★

Construction of a Two-stage Mercury Diffusion Pump

Nowadays many glassworkshops leave the manufacture of the glass diffusion pump to the commercial concerns, who produce a variety of types as standard items. This paper describes step by step, a novel method of constructing a popular type of two-stage mercury diffusion pump, shown in *Fig.* 1, which is singularly lacking in the need for jigs, copper wire and packing, but to avoid 'showing grandmother how to suck eggs' the more basic operations have been glossed over.

Using 46 mm o.d. thin walled tubing, a 1:7 taper is tooled over a 400 mm length; a similar taper is then formed on 56 mm o.d. tubing which is then flared as in *Fig.* 2, so that the flare is a good fit in the main body tubing. The Dewar seal is then made and while hot the water lead added and coiled around the Dewar seal (as can be seen in *Fig.* 1).

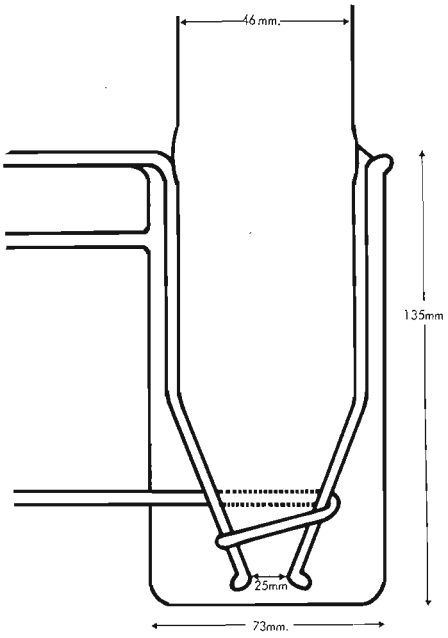


Fig. 1

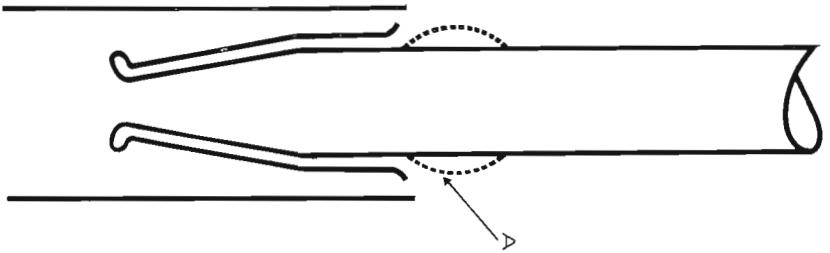


Fig. 2

The 73 mm o.d. main body tubing and the construction so far, are mounted in the lathe as shown in *Fig.* 2. The overhang is most important, and should not be less than 20 mm. A temporary seal is made at *A* and after allowing this to cool slightly, an olive is formed in the 46 mm o.d. tubing (as shown by dotted lines), then the 20 mm overhang is tooled onto this olive and the seal well run in. When this seal has solidified sufficiently to support the work, the first seal made at *A* can be finished off. It will be seen that each seal supports the other during the process of manufacture.

Whilst the construction is still hot, the water outlet and backing lines are sealed into place, the main body domed, and the water inlet seal made and finished off.

Little need be said about the jets, other than that the dimensions are fairly critical if the correct boiler pressure and consequent performance of the pump are to be attained.

The best method of fitting the jets to the body is to select a piece of tubing which is a sliding fit into the 46 mm o.d. tubing and centrally to mount the jets in this tube, which in turn is mounted in the pump, the centring thus being automatic.

Having sealed in the jet assembly and the mercury return tube all that remains to be made and attached is the boiler.

The boiler can be simply fabricated by doming and flattening a piece of 77 mm o.d. tube; a thick, heavy lens of glass is built up and then 'sucked' back to form the shape required.

To sum up – this construction utilises the lathe to the fullest extent, and with a little experience such a pump could be made in one day; of course this time could be cut considerably by quantity production methods.

M. Lock,
Glassblower in charge,
Bath University of Technology.

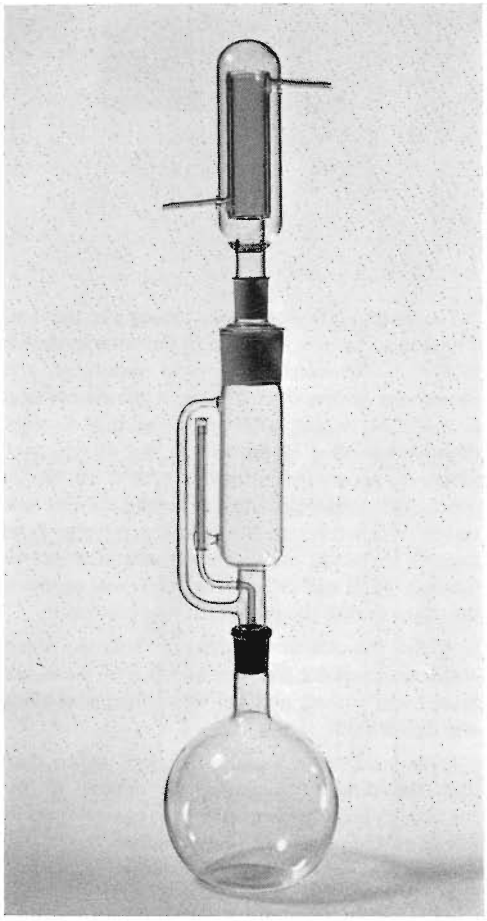
Thermal Syndicate Winner 1970

Mr. IAN SHARMAN, an apprentice in the Glass Engineering Department of the Engineering Division at the GEC Hirst Research Centre, East Lane, Wembley, has received the 1970 Thermal Syndicate Award presented annually to the student member of the British Society of Scientific Glassblowers who, in the opinion of the judges, submits the best piece of scientific apparatus fabricated mainly in vitreous silica glass: the Student Member is required to have less than five years experience of the trade.

Mr. Sharman, who lives in Hemel Hempstead, joined the GEC Hirst Research Centre three years ago. He obtained three 'O' levels at school and has since obtained Part I of the Technical Craft Practice (electrical) City & Guilds Certificate.

The apparatus submitted by Mr. Sharman was a Soxhlet apparatus used for cleaning semi-conductor components.

Mr. Sharman received his award in person on the 11th September at the Symposium of the British Society of Scientific Glassblowers held at the University of Surrey, Guildford.



THE ABRASIVE WHEELS REGULATIONS, 1971

Safety organisations and the Factory Inspectorate have, for a long time, been very aware of the dangers involved in the use of abrasive wheels for cutting and grinding operations, and after intensive study of the problems, the Abrasive Wheels Regulations were laid before Parliament on April 9th, 1970, and finally came into operation on April 2nd, 1971.

The Regulations are designed to protect the operator from accident by ensuring that his machine is adequately guarded and properly maintained. A wheel can explode violently if it is damaged, not fitted correctly, or run at the wrong speed, with very painful results for the man who has his nose to the grindstone!

With the exception of metal wheels, no abrasive wheel must be used unless it is clearly marked with its maximum operating speed, or in the case of small wheels (less than 55mm. in diameter) a notice permanently fixed near the machine bearing the required information. This speed must not be exceeded, except to compensate for the reduced diameter of a worn wheel.

Every wheel must be correctly mounted and maintained by a person trained in accordance with the Schedule to the Regulations, who is competent to carry out that duty and has been officially appointed to do so. Every such appointment must be made by a signed and dated entry in a special register with a copy of the entry, or certificate, being given to the person appointed. No other person is to be allowed to change the wheels or adjust any part of the machinery.

A guard must be fitted to every wheel and must be kept in position whilst the wheel is in motion, although an exception may be made where this is impracticable due to the type of work being done, and this part of the act is not applicable where glass is being ground. The guard must be of a design effectively to contain every part of the wheel in the event of a fracture, and enclose the whole of the wheel except the part which has to be exposed for any work being done.

All practical steps must be taken to ensure that the wheel is suitable for the work for which it is to be used, and no machine may be used which does not have an efficient and conveniently placed on/off switch. Where a rest is used for supporting the work, it must be of robust construction and properly secured as close to the wheel as possible.

An approved notice, stating the dangers arising from the use of abrasive wheels, and the precautions to be taken, must be permanently displayed in every room where grinding and cutting with abrasive wheels takes place.

Floors surrounding every fixed machine must be maintained in good and even condition, kept clear of loose material, and prevented from becoming slippery.

Every person must make full and proper use of guards and protection flanges, and report any defect to the manager or other appropriate person.

The Schedule to the Regulations lays down a training programme for the people who are to be authorised to maintain the machines and wheels, covering both the theory and practice of grinding and also stating that they must be instructed in the requirements of the Regulations. Training Advisory Leaflets for the Abrasive Wheels Regulations 1970 are published by the Department of Employment and Productivity, H.M. Factory Inspectorate, and deal with the subject to some depth.

In the eyes of some glassblowers, who have the odd grinding wheel tucked in the corner of their workshops, this may all seem somewhat complicated and unnecessary, but in my view the Regulations are very sensible and deal with a difficult problem in a reasonable manner.

JOHN MARTIN

A Bright Idea

submitted by — R. C. PERKINS,
Long Ashton Research Station,
University of Bristol.

Internal cutting with diamond rollers

Working with double ended ground joints produces a problem when cutting with a diamond. The rim or edge of the joint makes cutting unpredictable, owing to the work rotating unevenly, i.e. a cut not meeting correctly, forming a spiral effect.

To counteract this uneven turning I slide a glass sleeve, of any diameter over the outside of the work (see diagram).

This works simply and effectively, a true diamond cut is possible with joint sizes from B19 upwards.

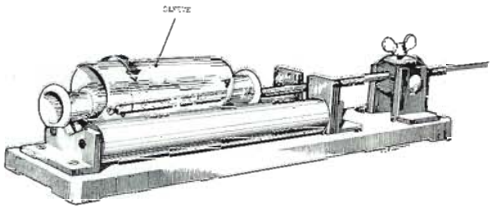


Illustration by MR. E. G. R. CHENOWETH

PROPOSED ONE WEEK SYMPOSIUM

To be held at Monkwearmouth Technical College of Further Education

May 22nd – 26th, 1972. (Commencing early afternoon on Monday, Closing mid-day Friday)
Lectures will be given on the following subjects:–

Glass Raw Materials, Sources, Quality Control, Colourizing and Decolourizing.
Annealing, Lehrs, Stress and Strain in Glass.
Fused Silica – Production and Use.
Grinding and Optical Polishing.
Ceramic Enamels and Transfers.
Health Hazards and Safety Precations.

Works Visits in support of these Lectures will be made to:–

Messrs. James A. Jobling & Co. Ltd.,
Sunderland.
Messrs. Thermal Syndicate Ltd.,
Wallsend, Northumberland.

It is anticipated that the Symposium Fee will be £10.

The Board of Examiners has for some time accepted the view that a form of Annual Summer School would be the most practical way of providing a series of lectures on the many aspects of glass relevant to the Scientific Glass Blower. The success of this project, now that we have the co-operation of an establishment so equipped and ideally situated, is dependent on the support given by our members – 20 would make a viable course. This symposium is open to all members, will those who are interested please write to:

The Secretary of the Board of Examiners,
N. H. Collins,
Department of Electrical Engineering,
University of Liverpool,
P.O. Box 147,
Liverpool, L69 3BX.

SCIENTIFIC GLASSBLOWING AT ISLEWORTH POLYTECHNIC
SESSION 1971–1972

Classes are arranged to suit the needs of local industry and of individual students. The courses include a Glass Technicians' Course, which is intended to cater for apprentices and trainees. Students on this course may sit examinations including the City and Guilds of London Glass Manufacturing and Processing, Parts 1 and 2, the British Society of Scientific Glassblowers' "Elementary" and "Stage 1" and the Isleworth Polytechnic "Glass Technicians' Certificate".

Practical scientific glassblowing courses are run in conjunction with the British Society of Scientific Glassblowers, who co-operate in drawing up the Syllabus and set, and mark, the examination papers.

A glass technology course is provided and Dr. Lucy Oldfield of G.E.C. Limited, a distinguished glass technologist, advises on the syllabus and is herself a visiting lecturer.

Recently a number of artists have become fascinated by the prospect of working in glass and have attended classes. Some of their art work, completed at the College, has been exhibited.

A full-time course in scientific glassblowing which may include a special subject of the students' own choice, will commence in September, 1971.

FULL-TIME GLASS COURSE FOR TECHNICIANS

This is a one year full-time course designed primarily for college and university laboratory technicians who aim at a competent standard in designing, making and repairing scientific glassware.

The course is essentially one of practical training in manual skills, with understanding of the nature of the materials used and the purposes of the apparatus produced.

About half the course time is devoted to scientific glassblowing and to glass technology. Students will also study techniques relevant to their work in one or more of the following fields:–

Physics, chemistry, biology, mechanical engineering, electrical engineering, electronics, vacuum technique, instrument technology, photography.

Successful completion of the course will lead to the award of a College Diploma.

There will be opportunities to take other examinations such as:–

British Society of Scientific Glassblowers:
Elementary examination.

British Society of Scientific Glassblowers:
Stage One examination.

City & Guilds Glass Technicians' Certificate (C. & G. 362): Part I.

City & Guilds Glass Technicians' Certificate (C. & G. 362): Part II.

City and Guilds examinations in other optional subjects.

GLASS TECHNICIANS' COURSE

A two year part-time day and evening course intended to assist the apprentice or trainees glassblower to acquire a background knowledge and practical skill expected of a good craftsman.

The course leads to the award of the Isleworth Polytechnic Glass Technicians' Certificate, and the British Society of Scientific Glassblowers' Stage I Glassblowing Certificate.

GLASS MANUFACTURE AND PROCESSING

A part-time day and evening course providing a background for all engaged in the glass industry. The course leads to the City and Guilds Examination (No. 362) in Glass Manufacture and Processing, Parts I and II.

GLASS TECHNOLOGY

An introductory course to the technology of glass, mainly for those in the industry who would like some technical knowledge of the material they handle.

SCIENTIFIC GLASSBLOWING

Classes of practical instruction in scientific glassblowing suitable for teachers, scientists and laboratory technicians. Individual instruction is given, and the classes are suitable for both beginners and those who already have some skill.

Enrolment—7th, 8th, 9th September at London Road.

Further details may be obtained from the Head of Department of Science and Electrical Engineering, St. John's Road, Isleworth, Middlesex.

ABSTRACTS

Edited by

S. D. FUSSEY

GLASS TECHNIQUES

Ceramic-metal sealing with solder glass.
H. Kukral, N. Müller and W. Ottenberger, *Jour. Phys.*, E, 4, 1, 65, Jan. 1971.
Method of making Al_2O_3 to Kovar or similar metal alloy seals suitable for insulating supports for use in ultrahigh vacuum. Bakeable to 450°C and having high tensile strength, these seals are easy to make with either flame or furnace heating. A change of solder glass and higher sealing temperature, makes vacuum tight seals possible. S.D.F.

MISCELLANEOUS APPARATUS

A small sample furnace for quick and accurate operation at successive temperatures.
B. J. Bowles, *Jour. Phys.*, E, 4, 2, 142, Feb. 1971.
A silica tube and wide-bore stopcock, together with entrance port, inert gas inlet and outlet and copper hearth with external heating provide an elegant, easily constructed furnace for rapidly heating small samples to temperatures with a precision of 1–2°C. S.D.F.

A sensitive liquid-level gauge and micromanometer.
Y. Tzur, *Jour. Phys.*, E, 4, 1, 74, Jan. 1971.
A sensitive liquid-level gauge capable of detecting a level change of 0.01 mm of water. Basically a glass vessel suspended from a leaf spring and connected to an open vessel in which the level is to be measured. Use of a closed vessel enables the device to function as a micromanometer. S.D.F.

A flow-through gas adsorption balance.
P. E. Nicholls & J. W. Carter, *Jour. Sci. Instr.*, 3, 489, July 1970.
A hollow pyrex balance beam has been designed which will measure adsorption of gases or vapours on granular solids under flow conditions. Full details of construction. D.A.H.

A fused silica microbalance for the study of vacuum deposition process.
S. Fujiwara & H. Terajima, *Jour. Sci. Instr.*, 3, 695, Sept. 1970.
A torsion microbalance having a sensitivity of 1.37×10^{-7} mm^{-1} and a weight capacity of 60 mg. Has also been used for gas adsorption purposes. Drwgs. and constructional details. D.A.H.

A reliable antimony generator for photocathode processing of image tubes.
S. D. Fussey, T. D. Rodwell & R. J. Rout, *Jour. Phys.*, E, 3, 11, 926, Nov. 1970.
A reliable method is described whereby electrical power can be supplied to antimony generators as used in the processing of image tube photocathodes. Diagrams. S.D.F.

An apparatus for washing NMR tubes.
N. W. Jacobson, *Jour. Chem. Educ.*, 47, 7, 507, July 1970.
A central tube with eight vertical sidearms over which the NMR tubes are draped enables solvents to be flushed through by a displacement and syphoning action. F.G.P.

A simple versatile weighing tube for reactive liquids.
W. L. Smith, *Jour. Chem. Educ.*, 47, 5, 391, May 1970.
For use with chemicals which react with grease, air or moisture, this device utilises a teflon valve and swagelock seals to hold sample tube. F.G.P.

MISCELLANEOUS TECHNIQUES

Technique for attaching a vacuum tight window to a curved surface.
Evelyn F. Kitter & Conrad F. Kochler, Jr., *Rev. Sci. Instr.*, 42, 2, 264, Feb. 1971.
A technique using a water tight plastic bag to hold a window in place under water during curing time of epoxy resin. T.D.R.

Revised design and fabrication improve infra red detector and reduce cost.
W. Elsholz, *Fusion*, 18, 1, 9, Feb. 1971.
Description and manufacturing details of an infra-red detector. Includes method of sealing silicon window directly to 7740 glass. S.D.F.

A flexible mounting for making silver chloride seals.
Ying- Chech Chiu, *Rev. Sci. Instr.*, 41, 5, 639, May 1970.
A flexible mounting device to aid making silver chloride Seals requiring no special pre-sealing surface treatment. Effective for sealing irregularly shaped surfaces. S.D.F.

SAFETY

Safety topics.
W. R. Eberhart, *Fusion*, 18, 1, 16, Feb. 1971.
A short report on safety relative to the use of gas in glass-blowing shops. Includes account of a personally experienced accident caused by a propane leak filling an annealing oven with gas. S.D.F.

VACUUM

Magnetically operated rotating shutters for vacuum systems.
M. P. Hill & P. E. Madden, *Jour. Phys.*, E, 4, 2, 138, Feb. 1971.
Description of three shutters for protecting viewing windows from deposits. Two of the shutters utilise rotatable cylinders with cutaways, the third design moves the shutter with a winding system. Low parking space requirements make these shutters particularly useful in large diameter equipment. S.D.F.

MISCELLANEOUS

Teaching aids.
W. R. Barnard, *Jour. Chem. Educ.*, 47, 4, 319, April 1970.
Article deals with production of films for teaching. Information on the photography of glassware, backgrounds, etc.
F.G.P.

Papers read at the Fifteenth Symposium of the American Scientific Glassblowers Society and subsequently published in the Proceedings, 1970.
Light scattering from solids using gas laser sources.
James H. Parker, Jr.
What the glass artisan means to the chemist and his work . .
An appreciation by a working chemist.
Walthew Barnes.
Glass and the science of space age infrared technology
W. Harold Small, Jr.
Glass electrodes.
Dr. Normand C. Hebert.
Fibre optics.
Fritz O. Kahl.
A high pressure short pulse uv lamp.
David Blessing.
Temperature effects of glass properties.
Oscar H. Grauer.
Adjustable glass mount for optics.
Edwin E. Eckberg.
A method of centrifugal glasstooling of various flanges and shapes using a carbon roller.
shapes using a carbon roller.
Gerrit de Wilde.
Sealing quartz parts with glass transfer tape.
Kitty Ettre.
Famous names in glass apparatus.
J. Lees.
A silver chloride seal.
W. W. Campell.
The scientific glassblower- past, present and future.
William H. Tozer.
Dielectric strength of solder glass.
H. Eugene Powell.
Glass tubing manufacturing.
W. Thomas Moore.
The construction and modification of glass distillation columns.
S. E. Knisely.

1972 SYMPOSIUM

This is being organised
by the North Eastern Section
and it will be held at

SCARBOROUGH

at the **Grand Hotel**

21st Sept. to **24th Sept.**

BACK-NUMBERS OF THE JOURNAL

We have had a number of orders for March 1968 issue of the Journal which we have been unable to supply as there are none remaining in stock. If any members have spare copies of this Journal, we would be very pleased to receive them.

RESULTS OF B.S.S.G. EXAMINATIONS HELD AT ISLEWORTH POLYTECHNIC
May 1971

ELEMENTARY EXAMINATION

David Webster	PASS
Richard Dietrich	PASS
Keith Newman	CREDIT
George Walker	PASS
Peter Rix	CREDIT
Manmohan Matharoo	DISTINCTION
Eric Collie	PASS
Raymond Ferry	DISTINCTION
Philip Sutton	DISTINCTION
Terence Howe	PASS
Joseph Coker	PASS
Nicholas Carter	PASS
Charles Gazzard	PASS
Victor Gilbert	PASS
Karol Bauman	PASS
Peter Heath	PASS
Sukhdev Sanghera	PASS
Victor Hedger	PASS

STAGE ONE EXAMINATION

Raymond Ferry	CREDIT
Manmohan Matharoo	CREDIT
Philip Sutton	PASS
William Howell	PASS
Richard Valentine	CREDIT
Michael Reynolds	CREDIT
Domel Grewal	CREDIT
Paul Kirk	CREDIT
Martyn Field	CREDIT

How about this for enthusiasm!!

Technician Geoffrey Leung travelled from Hong Kong to the United Kingdom to spend part of his holiday attending a British Society of Scientific Glassblowers' glassblowing course at the Isleworth Polytechnic under the tuition of Eric White.

Mr. Leung was visiting Europe and felt that a formal course in glassblowing would help him tackle the growing demand for special glass apparatus and repairs to existing equipment at his college.

Although his college gave him additional leave to make the trip to Britain, he had to finance the visit himself (a reminder of the days when a glassblower paid to learn the art).

Mr. Leung achieved a distinction in his examination for the B.S.S.G. Elementary glassblowing course.

NEWS FROM

GERMANY

A report has been received of the activities of a German society, and has been sent for translation.

SCOTLAND

A meeting was held on Sunday, 9th May, at Stirling University, and a lecture was given on conversion to Natural Gas by the Scottish Industrial Development officer, Mr. Robertson. Mr. Robertson gave an interesting talk and slide show on the technical problems of burner design imposed by Natural Gas. After the lecture he answered many questions on this contraversial subject. Members were especially interested in the prevention of the toxic effect of Nitrous oxide. Mr. Robertson emphasised the importance of ventilation and this raised the question of the gas board assisting with the cost of modifying workshops to meet the standard of ventilation required by the Gas Board. Mr. Robertson was non committal on whether or not the Scottish Gas Board would assist in the cost of ventilation, but assured the members they would meet the cost of burner conversion. It was a most useful disscussion and Mr. Robertson invited members to the Gas Board's new Research Centre at Coatbridge, where they could try out Natural Gas burners prior to conversion in their own workshops.

We extend our thanks to Mr. Robertson.

The date of the next meeting 17th October.

T. YOUNG

EAST ANGLIA

A committee meeting was held on 11th May 1971, at the Wagon and Horses Hotel, Saffron Waldon. Members present were Messrs. E. Evans, L. Wellstead, R. Adnitt, S. Holmes, R. Weiss, M. Lewis, R. B. Radley, R. Smith and R. Pryke. The meeting discussed future programme for the section, and matters for discussion by the Section for the next Council meeting.

NORTH WEST

The Annual General Meeting of the North West Section was held on Tuesday, 18th May, at the training centre of Messrs. Crossfields Ltd., Warrington. The decision to hold the meeting at this time was taken at the last A.G.M. in November when it was decided that it would be better if officers were elected in May when they would have all Summer to organise the section's activities starting in September. Their names could also go before the A.G.M. of the Society in September.

The newly elected officers are:–

Chairman:	Mr. J. Stockton.
Secretary:	Mr. G. Stuart.
Treasurer:	Mr. C. Blackburn.
Councillor:	Mr. Van de Bosport.
Rep. to Council:	Mr. Halliwell.
Examiners:	Mr. N. Collins and Mr. Halliwell.

Best wishes and thanks were given to Mr. L. Elson, the retiring Chairman, who had given many years of sterling service to the Section.

P. LE PINNET

THE WEST

The unusual fall of heavy snow in the West country last April, did not prevent Horst Baumbach from coming to Bristol to offer us some of his knowledge on Silica glass working.

Mr. Baumbach of Messrs Quartz Fused Products Ltd. has worked with Silica for many years, and is well known within the Society for his excellent demonstrations on the subject.

He started by showing some of the blowpipes he uses. For small seals he had examples of converted hand lamps for use on the bench. He prefers to use the 'Wispa jet' type of lamp which is very quiet even when producing enough heat to work 25m.m. rod. He also had some examples of very large burners, banks of which are used on automatic lathes to work silica cylinders of 800m.m. diameter. The heat created by these burners must be incredible.

When at work Mr. Baumbach prefers to use dark lens spectacles with a clear top half, and side pieces incorporated in their frame. These spectacles let in air round the eyes, as opposed to conventional silica goggles that give an almost airtight fit around the top part of the face.

Because of the intense heat produced when working silica, Mr. Baumbach has pyrex shields set up on many of the benches at his works. Efficient air extraction, which enables ample changes of air and helps to keep the workshop cool, is essential. He brought with him quite a few examples of silica apparatus; condensers and dewar columns, etc. and remarked on the improved quality of quartz tubing compared to the material he was using back in the 1950's, when a silica tube had a greatly varying diameter and wall thickness. It was also necessary to spend a great deal of time removing impurities from the tubes.

Mr. Baumbach then showed a film, that he had made for the B.S.S.G. The film began by showing the cleaning of the silica tubes. Small silica tubes are cleaned by dipping them into Hydroflouric Acid, washing them with distilled water, and finally drying with hot air. Grease from the hands will very easily burn into the silica when being worked, so for carrying the glass around Synthetic or linen gloves were worn. The film, which was in colour, showed many silica hot working operations including lathe work, tube enlarging, flask manufacture, condenser construction, and a very impressive demonstration of coil winding, at the bench without the use of a mandrel. There are two types of silica used for laboratory apparatus. The most widely used, and the most expensive, is the transparent quartz. Translucent quartz is used extensively where clarity is not essential. In the manufacture of silica work at the bench, "handles" are usually of the translucent type because it is a cheaper material.

Mr. Baumbach then gave a demonstration, making a 'U' bend from transparent silica tube. To keep a bend in the same plane, it is sometimes necessary to use the bench top as a flattener, and Mr. Baumbach recommends using $\frac{1}{2}''$ thick "Syndanyo" board as a bench covering material. The thermal qualities are much the same as asbestos, but "Syndanyo" leaves no dusty impurities on the glass to cause trouble when reheating.

This was a highly interesting and entertaining lecture, and an evening thoroughly enjoyed by all present.

For the May meeting, the Western Section were fortunate enough to acquire the services of Mr. Kevin Tindall, Superintendent of the Physics department of Bristol University, to give a lecture on glass photography.

As anyone can imagine, glass is a very difficult subject to photograph. Its physical make-up, especially its transparency, can pose many problems for the photographer who wishes to show the depth and definition on his photograph. Being very sensitive to light change and background, a glass object may be photographed many times before satisfactory results can be obtained.

Mr. Tindall stated the fact that the quality of glass and photography had risen hand in hand over the years, simply because better quality glass, gives better quality lenses, and better quality lenses produce finer photographs.

Mr. Tindall confined his lecture to techniques that would be used in the laboratory to get the best photographs of glassware. In most laboratories one can usually get light sources from spotlights, and the white light from an 'X'-ray viewer can be used as a satisfactory background medium.

Every glass object presents its own photographic problems. Mr. Tindall stressed the importance of providing a background that is sympathetic to the subject. Illuminated objects standing on, or against, sheet glass often produced unwanted reflections in the glass. If the camera angle is chosen carefully the reflections can be reduced, and sometimes removed entirely, by using a polaroid filter on the camera lens.

The quality of the camera plays a very important role in the production of photographs of glass objects. Mr. Tindall had with him two movie films, both showing the making of a Spherical Dewar. The old film showed making the Dewar on the bench. Because the film was black and white, the flame from the cannon burner was white, tending to obscure the work being filmed. The old film did however, reveal some of Mr. J. Burrow's excellent glassblowing techniques. The more recent film, taken with a modern camera and in colour, showed a lot more detail of work through the flame, while the same type of dewar was being made but this time on the lathe. Mr. Tindall had also gone to the trouble of taking some slides that showed quite clearly the importance of background light, and position of camera. The same objects taken with different backgrounds and at different angles made a drastic difference to the appearance of the photograph, so much so, that with certain types of background the glass object took on a camouflaged appearance.

Members of the Section asked many questions at the conclusion of the lecture and all present were unanimous in their praise for the excellent way Mr. Tindall had presented his Paper.

R. BATCHEN

THE SOUTH

In April a "Jobling Evening" was held in the pleasant surroundings of the Bloomsbury Centre Hotel, with a bar running conveniently along one side. Most of the sixty members made use of the bar before sitting down, drink in hand, to listen to an extremely interesting talk.

Mr. Clark first gave a line-up on the sales side of Pyrex packs, asking if we had any complaints or suggestions relating to packaging. "Rotoflo" screw thread was discussed after a member of the audience had asked why a metric thread had not been used, as in the Sovirel fitting. The answer to this was that this was one of the drawbacks of being first in the field, the Rotoflo thread had been taken from the standard British bottle thread. Marketing problems hold little interest for the majority of glassblowers but most people like to know why they cannot always have their specific requirements met, and that was the economic point made in this talk.

The next speaker was Mr. Thomson who is in charge of a department researching into new glasses and, from the glassblower's point of view, this was the real meat of the evening. Mr. Thomson has only been connected with glass since 1961, not an over long time, and it might account for his obvious enthusiasm which was quickly communicated to his audience.

With the aid of slides showing the structure of glass in some detail we were told how the random network of glass compared with crystalline, according to Zachariasen. The silicon-oxygen tetrahedron unit was shown on the screen in diagram form and various types of glass were described. Mr. Thomson's main interest appeared to be in glass-ceramics and he told us how the Russians had made a coal shute using a glass-ceramic incorporating waste slag. After some years of use the material showed no signs of wear even on its edges which, in the crudely made shute, protruded and were subject to more abrasive effect. Yet the cement between the glass-ceramic tiles was well eroded.

In the world of glass technology Mr. Thomson rated the Russians as leading the field, with the Czechoslovakians running in second place.

From Italy comes the news of a titanium-silica glass with nil expansion, but when asked if samples are obtainable the answer was in the negative. Ovshanski's controllable conducting glass was referred to, but it does not seem that we shall be seeing anything of it just yet because of difficulties in manufacture.

R. J. W. HARVEY

NORTH EAST

Mr. Garbutt, of Messrs. F. York and Partners, gave an interesting talk to members of the North East Section at a meeting held at the University of York on May 13th.

The subject was Diamond Tools, and Mr. Garbutt began by explaining that there are two types of diamond, natural and synthetic, which possess different properties. Although diamond drills and saw blades have a high initial cost they are very economical because of their resistance to wear, and this must be borne in mind when assessing methods of machining glass.

Saw blades fall into three classes, the continuous rim type, B type and C type. B type have narrow slots in their rim and C type wide slots. Factors influencing the life of saw blades are the number of diamonds in the cutting surface, the correct application of coolant, and the correct speed for the size of blade. The table below gives the Speeds for Various Sizes of blade.

Diameter of blade (inches)	R.P.M.
16	1200
14	1400
12	1300–1600
10	1500–1900
8	1900–2400
4	2500–3200

Mr. Garbutt then went on to talk about diamond impregnated core drills, stressing that it was extremely important that a precision drilling machine was used, and not one that the engineering shop had discarded as being of no further use.

Once again it is important that adequate cooling is provided if one wants to get maximum use out of a drill. The following table gives correct drilling speeds:–

Diameter (m.m.)	R.P.M.
2–5	8000–6000
6–10	6000–4500
11–20	4500–3000
21–40	3000–1500

It should be possible to drill through 3–4 centimetres of material per minute.

After being shown two films on the industrial uses of diamond products, members moved to the Glass Shop where Mr. Garbutt had arranged an excellent display of his firm's products and glass, minerals, and ceramics that had been machined by diamond tools.

The section would like to thank Mr. Garbutt for giving us the lecture and display which proved to be of interest to all present.

RICHARD HALL

THAMES VALLEY

4th February 1971, at C.E.G.B. Marchwood Laboratories.

For some time we have looked forward to a talk on Precision Bore Tubing, and this evening we had first-hand information from Mr. H. G. Flood, the inventor of the "down - draw - over - a - carbon - mandrel" method of achieving previously unknown accuracy.

Apparently, it all started with a request for hexagonal bottles for culture growing, an essential being an even wall thickness. First attempts were by forcing a mandrel into the heated glass tubing and then followed the hand pulling of tubing over a carbon former. This led to the now well-known technique of pulling the glass downwards over a carbon mandrel, together with many improvements in mandrel design.

With many types of glass, most sections appear possible using this process, which with a few modifications may also be applied to silica. Having described the major points of this quite fascinating technique, Mr. Flood then gave us a considerable number of hints and tips relative to making and operating the equipment, and this rounded off a very practicable and enjoyable lecture.

4th March 1971, at C.E.G.B. Marchwood Laboratories.

Section A.G.M. followed by a "workshop session".

It was gratifying to hear our Chairman sum up his report by saying that he was very pleased with the way things were going in the Thames Valley Section. He stated that at the present time he had no worries or troubles, as section functions were of high quality and well attended. These words were echoed by the Secretary and the Treasurer, who additionally stated that our finances are in good health.

At this stage I must report the whole section's thanks to Messrs. T. W. Wingent Ltd. and Messrs. Quartz Fused Products Ltd. for financial assistance on a number of occasions.

Next came the election of section officers with the following results:–

Chairman:	J. MacDonald.
Secretary:	A. Gardner.
Treasurer:	F. Morse.
Councillor:	R. Brown.
Representative:	A. Gardner.
Reporter:	S. D. Fussey.
Archivist:	S. D. Fussey.

At this stage of the meeting congratulations were offered to Horst Baumbach on the birth of a son, Michael. We also heard that the British Coal Utilisation Research Association is closing its Leatherhead establishment in June, which will mean that one of our members, Ron Brown, will be looking for a new post. We all wish you good fortune Ron.

After coffee our workshop session began by Mr. I. C. P. Smith giving a full description of calculating and making precision glass floats. There is more in this than meets the eye and I.C.P.S. certainly opened our eyes to some simple yet fascinating techniques. Alf Gardner followed with a demonstration of his method of making tubular mullite to glass seals. A similar process may be applied to other ceramic to glass seals.

Some members had brought gear and literature for a table display of torches, tools and techniques. It's great to poke around other craftsmens' ideas and gadgets.

Finally, our evening ended with a film "Solder Glass Technique".

1st April 1971, at Reading University.

Due to illness our scheduled lecturer was unable to be with us but our good friend I. C. P. Smith stepped into the breach and gave a talk on Flow-meters, particularly that of his recent invention. Once again, I.C.P.S. has designed and produced a simple yet elegant device capable of accurately measuring a very small rate of flow. Thus it can be used to measure the leak rate of things such as stopcocks, ground joints, bottle caps, tins, plastic capped phials, etc. Operation time is quite short even for very small rates of flow, making its use economic in many industries.

6th May 1971, at C.E.G.B. Marchwood Laboratories.

One of our own members, Fred Morse, gave us a talk on multiple molybdenum foil seals for use in high pressure gas arc lamps. His description, blackboard sketches and samples made it plain that these seals are not simple to make, and many operations and material conditions appear quite critical. Nevertheless, these seals have been produced commercially for many years with very little change in design or manufacturing techniques.

After a discussion on some Council matters, we then saw three films. "Glass, Its Form and Colour", "To Be Precise" and "Grinding A Giant Telescope Mirror". All interesting films well worth the viewing.

This was the last meeting of the season and Thames Valley members would like to thank their committee for having devised such an interesting and varied programme.

S. D. Fussey

Should the Society Ties be made non-inflamable?

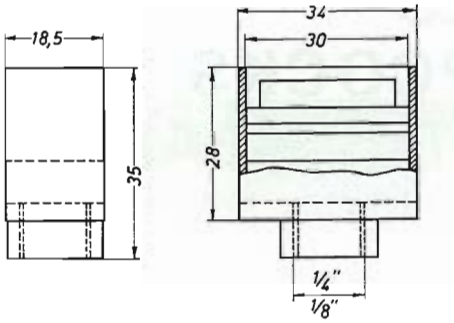
Society Ties £1.05p.

Thames Valley Section have collected a total weight of 28lb. of postage stamps, and the proceeds of their sale will be donated to charity.

★ ★

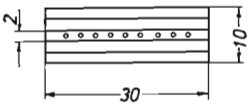
Any member who would like to join in this scheme should send their stamps, British or foreign, old or new, mounted or otherwise, to Mr. Stanley D. Fussey, 59 Whitedown Road, Tadley, Basingstoke, Hants.

★ ★



Ab. 28, 29 and 30

28



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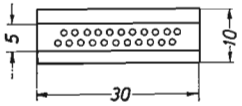

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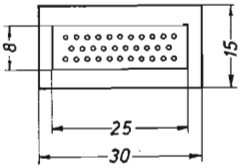

Burners for Propane Gas

These burners have been recently developed to deal with the numerous conversions to natural gas and propane gas. The unfavourable properties of natural and propane gas as regards the flame ignition speed, which lead to flame breaking even after only a small addition of air, made it necessary to develop a burner with a large stabilizing flame in comparison to the burner bore. The rectangular burners Nos. 28 – 30 give an excellent flame fed with propane gas and air without additional oxygen.

These burners can be fitted without further connection alterations to a machine which is being converted from domestic gas to propane. The machine can then be fed with propane gas.

The installation of an expensive pre-mixing battery is not required when using these burners.

Burners for Natural Gas

Burner No. 28 gives an excellent flame with natural gas and air only. We recommend these burners to be fitted as pre-heating burners when using natural gas. The flame of burners No. 29 and 30 does not break when using natural gas, but an excellent flame core can be formed with the addition of a little oxygen. When using natural gas it is advisable to fit a mixing nozzle as illustrated on page 14 to each burner.