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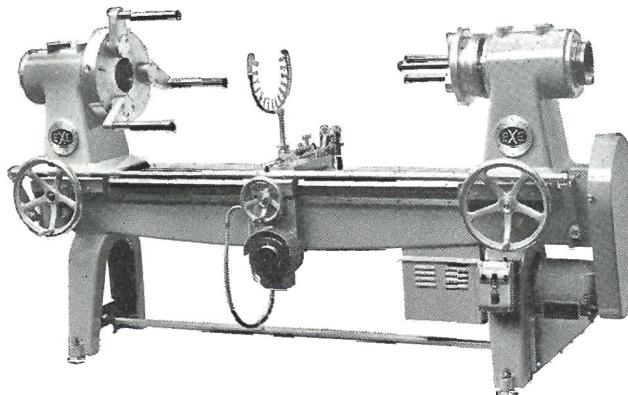


Scientific Journal Glassblowers

Vol. 8
DECEMBER 1970
No. 4

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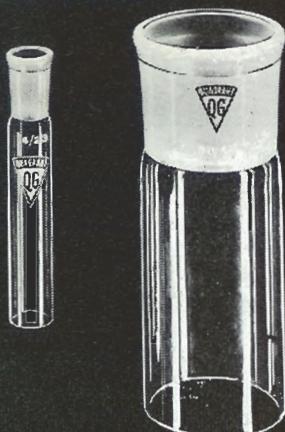
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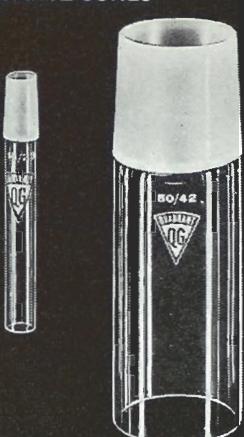
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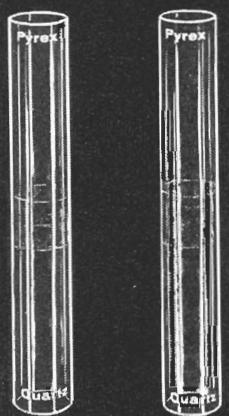
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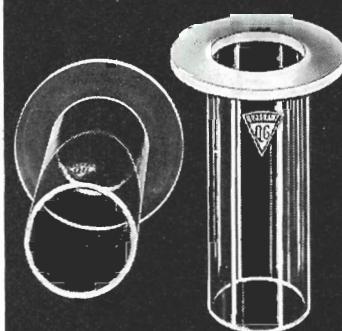
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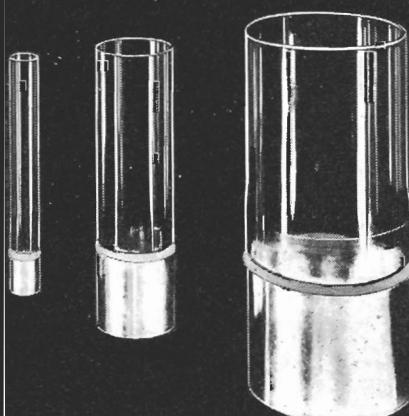
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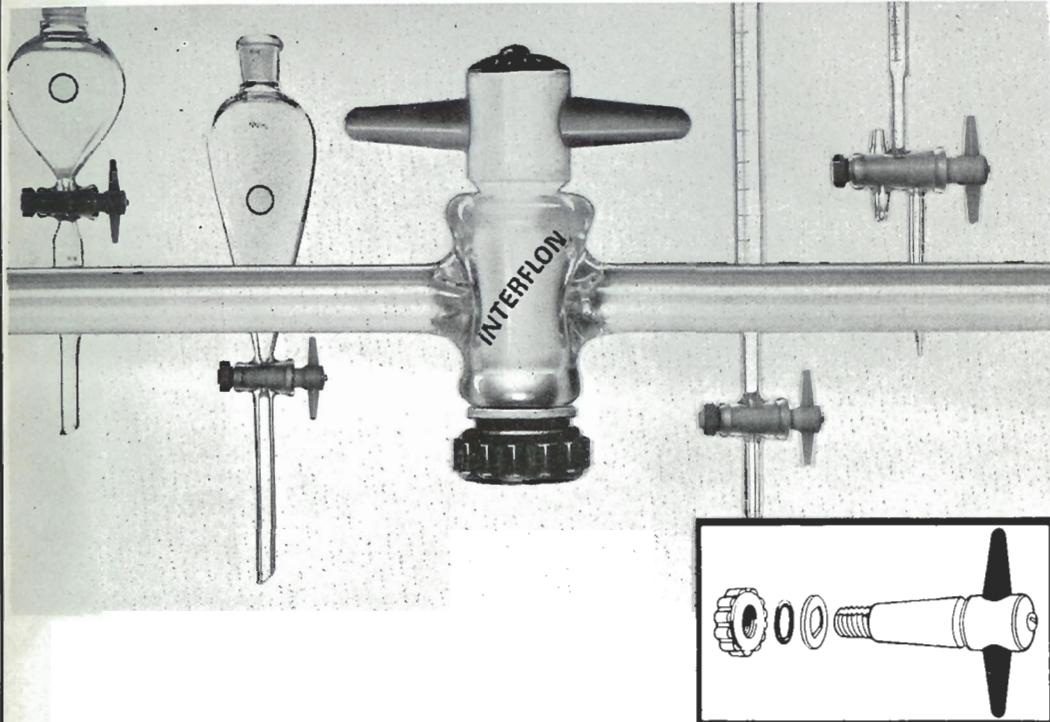


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Founded 1960

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EDITORIAL STAFF

J. MARTIN

R. E. GARRARD

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

F. G. PORTER

CONTENTS

Vol. 8 No. 4 December 1970

	page		page
President of B.S.S.G.	47	Society treasurer	63
President's message	49	Construction of a Helium Dewar	64
Secretary's annual report	50	News from Japan	68
Thames Valley Award	52	„ „ South	69
Symposium 1970	53	„ „ Midlands and Scotland	70
Chairman Board of Examiners	58	„ „ Thames Valley and East	
Churchill Fellowship	59	„ „ Anglia	71
I. C. P. Smith Esq.	60	„ „ North East	72
J. H. Burrow Esq.	61	„ „ West	73

Distribution Mrs. J. Martin,
Manager 55 Edward Road
 Clevedon,
 Somerset.

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Manager "Saraphil", Highfield Lane,
 Cox Green,
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LUCY F. OLDFIELD
President of the Society

LUCY F. OLDFIELD.

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

Lucy F. Oldfield studied Chemistry for her B.Sc. at Bedford College for Women, Regent's Park, London, and Electro-chemistry at the Royal College of Science, Imperial College, London, for her Ph.D.

She joined the Glass Group at the G.E.C. Research Laboratories (now the Hirst Research Centre), Wembley, in 1951, working first on volatilization of fluorides from molten television glasses, under R. W. Douglas (now Professor of Glass Technology at Sheffield University). Later she worked under Dr. J. H. Partridge, author of the textbook, 'Glass-to-metal Seals', until his death in 1956. She is now joint leader of the Glass Group.

Her first success was the development of a borosilicate sealing glass (now called B53*), which could resist severe tropical conditions under a d.c. potential in which standard glasses failed in a few hours. She specialized in sealing glasses, compatibility of glasses and reasons for failure of complex seals, including the effects of extended high-vacuum baking, and is now an international authority on borosilicate glasses and on quality of glass.

Early in her career Dr. Oldfield joined the Society of Glass Technology, and served on its Physical Properties Committee. She was Chairman of the Society's London Section in 1960-1, and after serving on several other committees and on the Council she is now Vice-president of the Society. The London Section awarded her the Gerald Redston Prize in 1967.

She is Chairman of the Committee on the Quality of Glass, under the auspices of the International Commission on Glass, and a member of a B.S.I. committee for Laboratory Glassware.

Her activities in technical education began in 1961 when she was invited to run a series of 10 two-hour lectures on Glass Technology, at Reading Technical College, for glassblowers and glass workers at A.W.R.E. Aldermaston and A.E.A. Harwell. This course, which was similar in content to that for H.N.D. in Applied Chemistry (Glass Technology) at St. Helens, showed that glassblowers were quite capable of absorbing scientific and technical knowledge, and its students formed a nucleus of the British Society of Scientific Glassblowers, particularly of the Southern Section when it was formed soon afterwards.

In 1966 Dr. Oldfield was invited by Isleworth Polytechnic to plan a course on Glass Technology for a proposed College Certificate, and she has since taught students at Isleworth for this and the City & Guilds Certificate for which the syllabus was finalized in the same year. Many of the active younger members of the Society have followed this course at Isleworth.

A number of Dr. Oldfield's lectures to the Society on specialized topics, including glass-ceramics, have appeared in the Journal.

On the lighter side of life Dr. Oldfield has always been interested in sport, travel, music, gardening and birds. Her spare time nowadays is mostly spent in horse-riding, which she has enjoyed in countries as far afield as Hungary, Morocco and Spain. Even at this pastime she cannot escape office: she has been Chairman of the London Riding Clubs and is at present Chairman of the Competitions Committee. The parallel is completed by her organizing training of London riders during the winter at the Royal Mews, Buckingham Palace.

PRESIDENT'S MESSAGE

Firstly, I must thank all members for the great honour which they accorded me in making me their first President of the Society. I appreciated this honour most particularly at the recent Symposium dinner at the University of Surrey. I shall endeavour to help the Society in every way in promoting its aims, membership and status in modern industrial and university society. I shall gladly give advice on the more scientific aspects of glass and associated problems.

Then I must thank all last year's officers and members of the main and area committees for their hard work in providing a successful programme of meetings and events. The organisers of the Annual Symposium need to be specially mentioned for their activities. Congratulations to the newly elected officers and members of committees. It is now up to all members to give enthusiastic support to the new programmes.

Congratulations too, to the Annual Prizewinners and runners-up, those younger members who have shown that a very high level of professional craftsmanship may still be maintained despite the demands of modern society.

The aims of the Society include increased membership, the maintenance of and the improvement in professional standards and status, particularly of individual members. One rewarding area for recruitment should prove to be the "under 25's". It is up to present members to show these people the considerable advantages in belonging to our Society. A few additional items in the programme especially designed for them may be required but the support of younger members is necessary to ensure the continuity of a lively Society.

In conclusion I wish all members the very best in the coming year.

SECRETARY'S ANNUAL REPORT 1970

Your Council have met on four occasions since the last A.G.M. and I shall be giving reports on the main topics under separate headings in a few moments, but generally things have gone fairly well in the past year. We have a new P.R.O. Mr. Graham Berger; he is involved at the moment in compiling a history of the Society, which we hope he will soon have ready for publication, and we also hope that some of this information will be used for a new brochure to introduce the Society to prospective members.

Council have been in close contact with the Gas Board and the Gas Council on the question of Natural Gas, and the conversions, and up to this date we are still investigating the problems and different types of burners etc., that are acceptable. The Gas Council have proved most helpful in this matter, and have kept us well informed of their meetings etc.

The Society have now purchased a duplicator, and thereby hope to be able to give a better service to sections and members by getting out information more quickly.

Council have undertaken to attempt to form a better link or bond with other Glass societies throughout the world, and have already established a good bond with the Japanese Scientific Glassblowing Circle – but I shall give a fuller report of this later. At the moment the P.R.O. is involved in writing to the American Society, and it is hoped that his letter will be the start of a new link here.

The other points I shall now give under their own headings:—

1. Membership

Council have tried in their 10th year to increase the membership, and this has risen a little, particularly in the Overseas section.

2. Board of Examiners Report

The Board of Examiners have met on four occasions during the year, twice at the university of Aston, and twice at the Y.M.C.A. Birmingham, The attendances were 8, 12, 10 and 8 out of a

membership of 14. The Scottish section has now elected two members to the board.

A syllabus "Lathe Glassblowing Stage One Course" has been finalised and printed.

The examination procedures have been revised in the light of experience. Expanded syllabuses are at present being rewritten with a view to publication. A more detailed procedure sheet has been drawn up regarding submission of these for Fellowship. These will be available shortly after the A.G.M.

Summary of the examinations held during the year:

Eight examinations held at the following establishments:—

Isleworth Polytechnic, London
Bristol Technical College, Bristol
Mabel Fletcher Technical College,
Liverpool

Bristol University, Bristol

Introduction to Elementary
Glassblowing.....29 candidates
Scientific Glassblowing Stage
One.....10 candidates
Lathe Glassblowing Stage One 1 candidate
Passes – 20; Credits – 17; Distinctions – 3

The pass figures could be misleading in so far as students are advised by their tutors whether to sit the examination or re-sit the course.

The Board has introduced a certificate endorsement procedure for candidates who pass with credit or distinction. Mr. Robertshaw has very kindly organised this aspect of the examination work. The small group from the North Eastern section produce very well written and attractively endorsed certificates.

The standard of work submitted in this year's competitions was very high, resulting in the award of 10 Society certificates of Merit.

The second part of the Thermal Award – a "one week's apprenticeship" has been awarded for 1969. The Student member found the week at Wallsend to be most enjoyable and very instructive.

3. Journal

John Burrow retired this year as editor, and Council wish to thank him for his efforts and success with the Journal.

Mr. Garrard has now taken over this task, and Council are proud to have a person as active to take over from Mr. Burrow. Council also wish to say that they feel fortunate to have found not only Mr. Garrard, but also his team of helpers, who are extremely capable, and very keen to ensure that the Journal is a success in the future.

I have recently had several letters from members (and some non-members) saying that they have found the Journal to be extremely interesting, and I am sure that under this new editorial staff this will continue to be the case.

4. Library

Stan Fussey continues in his good work in running the library service and has issued the following report:

The library continues to flourish, even if only in a small way. Book loans amount to an average of £2 per year, which is quite reasonable considering the small number of books that are available on glassblowing and closely allied subjects. The trend of borrowing seems to be towards the highly decorative and practical books, the highly technical literature being drawn only occasionally. A considerable increase in the book borrowing is envisaged once members begin to apply for the higher awards of the Society.

Meanwhile, the library continues to be in regular receipt of journals such as:—

- Glass
- Laboratory Equipment Digest
- Glas-und-Instrumenten Technik (German)
- Journal of the American Scientific Glassblowers Society
- Proceedings of the Symposia of the American Scientific Glassblowers Society
- Bulletin of the Institute of Technology
- News of the News (from the Glass Manufacturers Federation)
- Solutions

5. Symposium

Last year's Symposium proved to be a success, and Council wishes this year's Symposium Committee success with this one.

6. Symposium Sub-Committee

This is newly formed, under the Chairmanship of the new P.R.O. Mr. Berger, and the idea behind this committee is to try to plan ahead the Annual Symposiums. At present work is going on for the 1971 symposium, and a venue for the 1972 and 1973 symposiums is being sought.

7. Sections

Some sections are not as active as Council would like, and to make these sections more active really requires more support from all of its members. Council appreciates that in some of these sections members are spread over a very wide area, but still feels that with a little more effort, they could become more active.

The Southern section are to be congratulated on the presentation of their News Letter — their secretary Mr. Harvey certainly keeps members well informed in this way. Some of the other Sections might well adopt this method of keeping their members in touch.

The Thames Valley section have introduced their award for the first time this year. The Scottish Section are to be praised, under the leadership of Mr. Tom Young, for their efforts to become more active, and Council wishes them success for the coming year.

8. Japanese Scientific Glassblowing Circle

Mr. Kinoshita and Mr. Endoh of this society visited this country in June. Mr. Price and Mr. Mason spent one day with them, when a visit had been arranged to the G.E.C. Research Labs. They had an enjoyable day there, and special thanks should go to Mr. Patrick. The evening was spent at Mr. Mason's home, and this proved to be a very rewarding evening as far as the two societies are concerned. Good relations have been established and already an exchange of books, journals, films etc. has taken place. We have been fortunate enough to have slides of the Japanese society to show at this Symposium, and I am sure that you will find them very interesting.

We were presented with a beautiful Japanese Tea Set, photographs of which I have to show you. Also Mr. Price, Mr. Patrick and I were presented with fans for our respective wives. I was also given a bench torch of the type that is made at the firm of Mr. Kinoshita, and I have just yesterday received a hand torch. If any member is interested

in these torches, I am very willing to arrange for them to try them. On show are the various books etc., that were given – unfortunately these are in Japanese, but the pictures should speak for themselves.

This covers the main points of Council for the year.

R. Mason

A query has been received from an overseas member asking for ideas on the following problem.

“a simple method of making a short length of rod, about 1 inch, to be exactly 3/16” diameter to fit into a Teflon block with a 3/16” hole, so that a semi-skilled worker can do a production run.”

Please would you send all answers to the Hon. Secretary.

Thames Valley Award

This handsome silver cup is to be awarded annually, to a member of the society who in the opinion of the Thames Valley members, has given outstanding time and effort to the society.

The nomination of candidates for this award can be made by any member of the Society, but it must be noted that Thames Valley members are not eligible for nomination.

The award is determined by a secret ballot of the Thames Valley members, and is made known at the time of presentation.



SYMPOSIUM — 1970



Organising Committee

The 10th Symposium of the B.S.S.G. was held appropriately enough on the 10th of September 1970 at one of Britain's newest Universities, that of Surrey.

The registration started on Thursday evening at 6.30 p.m. and while most of the members were having dinner the opportunity was taken of looking around the almost deserted exhibition stands in the Foyer or Entrance Hall of the Exhibition Building. Not over large, the Hall had an upper level balcony on which most stands were arranged, was adjacent to the Lecture Theatre on one side, Washrooms on the other, cloakrooms handy and tea room at one end. The atmosphere was immediately that of a friendly self-contained Unit where very little effort was needed to see all that was going on.

Most of the exhibitors were familiar faces who had previously displayed at earlier Symposiums. Mr. W. Young with his "unusual in quartz", Messrs Quadrant, A. D. Wood, British American Optical, Baumbach with quartz and German equipment, Day-Impex with their Dewars. R. W. Jennings, Heathway Machinery and Jencons each concentrating on Natural Gas burners and jets. A newcomer to exhibit on a Symposium stand was Messrs Laboratory Glassware Manufacturers Ltd., and they had some really fine glasswork on display. All in pyrex, as they do little silica work, the apparatus was cleanly worked and beautiful to handle. I still like to handle good glasswork whether it is in the form of a condensor or fragile drinking vessel, and each piece on this stand was very well made.

Messrs Richoux Ltd., were showing, for the first time in England, a machine for cracking-off tubing to set lengths. Based on the Rollmachine idea, which seems far more popular on the Continent than here, it consists of a double set of rollers on which the tubing is supported and rotated. A long tube with a head of tiny jets set at right angles is inserted into the tubing. Parallel to the roller rods is a support rod to hold accessories, cutter or marking tools. A simple enough idea, simple to manufacture and operate.

Messrs R. B. Radley had a fine show of well executed glassware and Messrs Nordsea Gas had a wide range of burners and jets especially for Natural Gas. Messrs Quickfit and Quartz, Thermal Syndicate, F. Yorke, Springfield and Joblings each had stands showing their well-known products.

By this time the Hall had filled, the exhibitors were being plied with questions and the various pieces of glass and equipment were being examined, appraised, praised and criticised.

We passed from the exhibition area into the adjoining theatre, where we were shown three colour films on glass. The first was a particular favourite of mine; a Dutch film called simply "Glas", in which glassblowers working at the glory hole, machines turning out bottles, and glassblowers sitting in their chairs rolling, flanging and shaping the molten metal were all working to a background of synchronised jazz music. The timing of the glassblowers movements, deft yet strong hands turning and swinging the blowing irons was a delight to watch. Of the two other films one incident stood out more than anything else. To demonstrate the strength of Pyroceram, an asbestos clad figure took from a large oven a cone made of this resilient material and proceeded to use it as a hammer to pound a six inch nail in a block of wood. On completion of this unusual exercise the figure in asbestos could not get rid of the cone quickly enough. Not surprising really because both gloves had by now been burnt through!

Following these films came Carlo Ponti's "Blow-up", and wine and cheese to finish the evening.

After the A.G.M. on Friday morning Professor M. B. Waldron, Head of Metallurgy Dept., welcomed the delegates to the University. Originally the Battersea Polytechnic, founded in 1894, the University received its Royal Charter in 1966 and even when moved to Guildford was still better known as the Poly. This move necessitated shifting several tons of equipment and about 2,000 students. No mean effort by the faculty. As the University had its origins in technology Professor Waldron expressed his hope that this association with glass technology through our Society would be a continuing one. He then introduced Dr. A. Everett of the Wellcome Foundation who read a paper on the Relationship between the Scientist and the Glassblower.

Laced with a lot of light humour, this talk let us see ourselves through the eyes of a Physical Chemist, very often critically but always with understanding. To demonstrate his own glassblowing abilities Dr. Everett showed slides of pieces of apparatus where, not trusting his own annealing, and being a man of caution, he had one part encased in a fire bucket, another with a danger sign above it and a third slide showed a sheet of Triplex shattered to smithereens in a wrecked laboratory. (This was the result of an organic peroxide explosion.) These were, Dr. Everett assured us, only possible because he had been able to watch Rex Garrard (our esteemed Journal Editor) glassblowing and had received from him much invaluable advice.

The main change in the glassblowers' function is, we were told, that we now usually work as a section under a scientist whereas previously we were a maintenance service. Close liaison with Stores was necessary in the ordering and stocking of ample supplies and it was suggested that the scientist should have more training in glassworking while on the other hand the glassblower should have a better scientific education so that the problems of each should be better understood, thus facilitating a quicker and more efficient answer to apparatus development etc. Dr. Everett obviously had a precise and discerning view of glassblowers' problems and although very often on the attack he also offered a great deal of advice and help.

After lunch W. R. Everard, Esq., of Messrs Morgan Ceramic Fibres Ltd., read a paper on Triton Insulation. This was aptly described by the chairman Mr. A. D. Wood as the candy floss end of the glass business. Apparently the discovery of ceramic fibres, as with so many useful discoveries, was accidental. A workman making refractory bricks in Georgia, U.S.A., sometime during 1940 was using a high pressure air hose on a pneumatic drill when it developed a leak. The bricks, made of china clay, were hot and fortuitously of the right temperature for the air pressure to form fibres off the brick. After fifteen years of semi-disbelief the firm of Messrs Babcock eventually produced ceramic fibres commercially. Now this new material is fast replacing furnace bricks and asbestos as an insulation material, and in the foreseeable future a great many new applications and related materials are envisaged.

At 3.30 came a lecture not from Mr. B. Dann as per programme but Mr. Johnson of the S.E. Gas Board. Entitled "Natural Gas and the Glassblower" we were in fact given a picture of the Gas Development Engineers' problems in switching a glass shop over to Natural Gas. Briefly reviewing the more recent history of the Gas Boards (and there are twelve of them), since Nationalisation there was very little growth in the industry until 1955 when interest centred around the usage of Natural Gas either mixed with Town Gas or piped direct. America and the Continent had used Natural Gas for many years as indeed had the N.E. Gas Board. There were even pockets to be found in the U.K., but the biggest impetus to the use of Natural Gas was the finding of large fields under the North Sea. In 1960 liquid Natural Gas had been imported into this country from Algeria and when Messrs B.P. made a strike in 1965, the Gas Council negotiated for it and brought it ashore. It was estimated that there was enough to treble the then existing consumption for twenty-five years. Conversion of the country's gas appliances was necessary, but, costly as this would be, the saving in the future would be immense. There would be a saving of foreign currency exchange to the value of £100 million. We would be less susceptible to foreign policy and as the gas was non toxic even the

country's suicide rate should drop. It was decided to go ahead using the gas in its existing form.

Mr. Johnson told of some of the unexpected side issues on conversion, such as the workshop in the cellar, the showman in Surrey whose heated pool contained alligators, the immigrants whose meter had to be in Irdu, and the tragic-comedy of the problem of green overalls and orange vans in a Scottish district.

The title of Mr. Johnson's paper could well have been 'The Gasman cometh' for when he had finished both he and his audience had a better appreciation of each others' problems.

In the evening, members and guests were welcomed to the dinner and dance by Mr. John Price, the Society Chairman, and Mr. A. D. Wood, the Symposium Chairman, after being announced by the toastmaster. After an aperitif Dr. Oldfield, Mr. I. C. P. Smith and Mr. John Burrow were escorted in to dinner by Mr. Price and Mr. Wood. On completion of the meal Mr. Wood proposed a toast to the Queen and then members sat back to smoke. The Society Chairman, Mr. John Price, then invested Dr. Oldfield as President of the Society. This was a very popular investiture as Dr. Oldfield has always been very closely associated with our Society and the technical education of its members. In our predominantly male society there could not have been a better choice than our worthy Lady President.

Mr. I. C. P. Smith and Mr. John Burrow were then invested as Honorary Members of the Society. Mr. MacDonald, Chairman of the Thames Valley Section presented a special award to Mr. John Burrow as the outstanding figure in British Glassblowing. This award was a large and attractive cup, the recipient being chosen by secret ballot.

The presentation of glassblowing awards to students were then made.

Mr. A. D. Wood presented the A. D. Wood cup to Mr. C. J. Gascoigne for the best piece of scientific glassware produced by a student with less than three years experience.

The J. Jobling Cup was presented to Mr. P. Le Pinnet for the best piece of glassware by a student with 3-5 years experience.



Installation of President

The Thermal Syndicate award for the best piece of apparatus fabricated primarily in silica was awarded to Mr. I. Sharman.

A visitor to the Symposium was Mr. Willem Tys, now residing in Australia, though born in Holland, who, when called upon to speak, told us that he had just been to the U.S.A. where he had been observing glassblowing techniques and equipment. Offering to pass on any information he might have, Mr. Tys thanked the Society for the opportunity of sitting in with us and being part of our company.

This dinner had an extremely convivial air that was not entirely due to the wine, rather I think it was the genial presence of our indomitable Chairman Mr. A. D. Wood who was never lost for a merry quip or witty rejoinder.

Saturday morning and a return to the Natural Gas problem. A panel consisting of Mr. D. Scott Wilson of the Gas Council, Mr. Ron Mason the Society Secretary, Mr. Alf Gardner R.A.E. Farnborough, Mr. Lilllicrap of the North Thames Gas Board and Mr. Johnson of the South Eastern Gas Board was chaired by Mr. John Patrick.

Members of Messrs Seafame Conversion Units were in the audience to assist in answering questions on Industrial conversion but as time was short were not called upon to do so.

Mr. Scott Wilson, a Scientific Information Officer, gave what he called a birds' eye view of the forming and finding of gas. He explained how high pressure and heat on vegetation trapped 350 mln. years ago, created gas underneath the earth with water and salt above with porous sandstone above that. This is where the gas is found. Not, as is the popular belief, in cavernous pockets but in the porous sandstone. Finding is by seismic and other apparatus and then sinking an exploratory well. Measurement of the capacity of the find is then estimated and a commercial rig replaces the mobile rig initially used. Undersea pipe lines are then laid to carry the high pressure gas to the mainland where the pressure of 3-400lb. is reduced and the obnoxious smell added. Pipelines on the mainland are laid to distribute the gas over the country. In 1960 a new process to produce gas from oil was switched to Natural Gas use. Imported liquid Natural Gas from Algeria was taken to Canvey Island and this became the experimental centre.

By 1964 a pipeline extended from Canvey Island to Leeds and this then fed eight of the twelve Gas Boards. This natural gas could have been converted to town gas but the cost of adapting existing machinery and building of new plant plus the advantages of the natural gas meant that it would be cheaper to convert the country's existing burners. This is estimated at £30-40 for every household in the U.K., and is £1 thou. 400mln. cheaper than if the gas had been converted to Town gas composition. By 1975 the saving is expected to be in the region of £100mln. a year.

The biggest problem for the glassblower in changing to Natural Gas is his burners. This is best resolved by choosing the best burner for the job *before* the conversion people put in an appearance. One can then be quite specific in stating what is required. Otherwise the jet or lamp provided will be of the type chosen by the conversion engineer who will not necessarily be aware of individual needs.

Mr. Horst Baumbach of Messrs Quartz Fused Products Ltd. next read his paper on Silica Working describing first the type of tools employed and the methods used. His use of a home-produced cine film helped the audience to follow bulb blowing, butting of tubing and spiral making.

After lunch Mr. John Burrow gave a talk on Miscellaneous Techniques. Wandering into the Lecture Theatre muttering "This must be the wrong one", we very nearly lost John, but on being assured he was in the correct Theatre he soon got into his stride. Referring to the silvering of Dewars he advised us that if we have a method that works we should stick to it and not change because we hear of a different formula. A 5% ammonia in distilled water rinse would, he informed us, assist in obtaining a good coating. Mr. Burrow had several hints to offer on lathe working to those who are not familiar with production methods.

The Japanese Glass Circle had sent over some colour slides and these were screened while Mr. John Price read the accompanying narration. General views of Tokyo with some interior shots of small glass-shops were shown with members of the Circle sometimes appearing in their lecture

theatre or meeting halls. Mr. Price should be congratulated on his gallant effort in tackling the Japanese language.

This brings us to the end of the 1970 Symposium. For me it was most notable for its friendly atmosphere, and if Mr. I. C. P. Smith will not object to me quoting from a letter of his, 'congratulations to Eric White and his associates on the general quality and good fellowship of the Symposium, and of course the unfailing courtesy of those concerned.'

*Symposium Reporter
R. Harvey*

SYMPPOSIUM 71

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**SEPTEMBER 1971
23rd 24th 25th**

BOARD OF EXAMINERS

STANLEY G. YORKE

Retiring Chairman

Stanley started glassblowing whilst a laboratory assistant in the Chemistry Dept. of the University of Bristol, under the tuition of John Burrow. After the war he approached the Bristol Technical College to establish glassblowing evening courses, which are now examined by the B.S.S.G.

In 1957 he joined Messrs Quickfit & Quartz as Glass Development Engineer. He joined the Midland Section of the B.S.S.G. and was Chairman of that Section from 1962 until 1964, when he became Chairman of the newly-formed Board of Examiners. In 1965 he represented the B.S.S.G. on the City and Guilds of London Institute to investigate education in the glass manufacture and processing Industries.



JAMES S. MacDONALD

New Chairman

James MacDonald started glassblowing whilst working as a laboratory assistant for a Chemical Engineering firm. After service with H.M. Forces, he went to G.T.C. Waddon, and from there moved to Rank Cintell Research Laboratories for 6 years. Later James moved to K.T.M. Battersea for 2 years, and then to 20th Century Electronics for 7 years. He joined U.K.A.E.A. Aldermaston to work in the Research Group, and after 3 years moved to C.E.G.B. Marchwood Engineering Laboratories for research on Valves and High Voltage Devices.

James joined B.S.S.G. in 1962, was Council Representative for Thames Valley Section; has been a member of Board of Examiners; since its formation member of symposium committee, and has been Chairman of Thames Valley Section for the last 3 years.

CHURCHILL FELLOW GLASSBLOWER VISITS WALLSEND FIRM



Mr. W. C. Tys, Senior Technical Officer at the Australian National University, spent a day at the works of Thermal Syndicate Ltd. as part of his world tour sponsored by the Winston Churchill Memorial Trust.

The first glassblower to win a Churchill Award, Mr. Tys is visiting Research Institutes, Universities and Manufacturing Plants in Britain, United States and Europe, to observe the latest techniques in scientific glassblowing and equipment.

At the Research School of Chemistry, Mr. Tys works with both glass and fused quartz and says there is an increasing interest in fused quartz

because it can withstand much higher temperatures than normal glass and also allows ultra-violet and infra-red radiation to pass through it. He found much to interest him at Messrs. Thermal Syndicate Ltd. who are one of the world's leading manufacturers of fused quartz and silica, and he saw many of the specialised high temperature techniques used in the production and processing of these materials.

A Dutchman by birth, Mr. Tys emigrated to Australia in 1951. The Churchill Fellowship is for fifteen weeks, which he is supplementing with three months long service leave which will enable him and his wife to renew acquaintances with family and friends in Holland.

Letters of thanks for hospitality extended to Mr. and Mrs. Tys have been sent, on behalf of the B.S.S.G., to the following companies, Messrs Thermal Syndicate Ltd., J. A. Jobling Ltd., Jencons Ltd., G.E.C. (Wembley and Heathway Machinery Ltd.)

BRITISH SOCIETY OF SCIENTIFIC GLASSBLOWERS

**INDEX
MARCH 1964
TO
DECEMBER 1967**

INDEX

- AIR GAUGE method for exploring small bores 3/16
ALUMINA thimbles, support in soxhlet apparatus 4/55
ANNEALING OVEN, making 2/53
ATTACHMENT for slow-running lathe 3/33
- BAKEABLE cut-off for H.V. 3/42
BORES, small, method for exploring 3/16
BORO silicate glass, grad lines on 1/43
BURETTES & PIPETTES, free-piston 1/41
BURNERS and flame technology. 1/27
 Oxy-gas turret premix. 2/22 2/56
 Turret-head, a warning 4/1
- CARBON & GRAPHITE in the glass industry 3/50
 the phys & Chem Properties of 4/5
CARBON lathe tools 1/32
CARBON Reamers, Handle for 2/20
CARIUS tubes – safety 4/18
CENTRIFUGING glass tubing 3/22 3/41
CHEMISTRY, glass in 3/15
CHROMATOGRAPHY troughs, cutting 2/43
CUT-OFF, bakeable, for H.V. 3/42
CUTTING chromatography troughs 2/43
 machine for refractories 1/32
- DESIGN of stopcocks 2/45
DEVELOPMENTS in U.H.V. 2/28
 of Scientific glassblowing in England 1/8
DEWARS, spherical, jig for 3/34
 strip silvering 2/10
- ELECTRICAL heating of glass, H.F. 1/24
EXTRACTOR, stopcock, 2/9
EYE TISSUES, the effect of radiation on 4/29
- FLAME TECHNOLOGY and burners 1/27
FLANGE HOLDER, simple 3/33
FREE-PISTON PIPETTES & Burettes 1/41

GLC Micro-sample syringe 2/21
GLASS, Boro-Silicate graduation lines on. 1/43
electrical heating of 1/24
grinding, modifying cutting m/c for 3/33
in Chemistry 3/15
Industry hazards in 2/40
magnetic valve 4/54
metal seals 4/8
micro leaks, making, 2/49
mullite seals 1/16
protection, shaping polystyrene for 1/16
Tube centrifuging 3/22 3/41
tungsten seals 1/15
GLASSBLOWING in Japan 2/19
scientific, development in England 1/8
GLASSES, sealing 2/3 2/14
some unusual 1/46
GLASSES – types & suppliers 4/15
GLASSMAKING at Stourbridge 3/31
GLASSWARE, graduating 4/10
grinding 3/38
GLASSWORKING history 4/19
lathes, use of 1/25
on Hot plate 2/55
GRADUATING glassware 4/10
GRADUATION lines on Borosilicate Glass 1/43
GRAPHITE & CARBON in the glass industry 3/50
the phys & Chem Props of 4/5
GRINDING glassware 3/38
glass, modification of cutting m/c for 3/33
GROOVING a 2" mullite tube 2/9

HANDLE for carbon reamers 2/20
HAZARDS in glass industry 2/40
HEATING of glass electrically 1/24
HEMPEL PIPETTE, new 1/44
H.F. electrical heating of glass 1/24
HIGH VACUUM Bakeable cut-off for 3/42
HISTORY of glassworking 4/19
HOLDER for flanges 3/33
HOT PLATE Glassworking 2/55

JAPAN, Scientific glassblowing in 2/19
JIG for spherical dewars 3/34
JOINTS & Stopcocks, releasing when seized 1/40

LAMP, mercury vapour 2/55
LASERS 4/52
LATHE, attachment for slow running 3/33
 glass working, use of 1/25
 tools, Carbon 1/32

MACHINE for cutting refractories 1/32
MAGNETIC valve, glass 4/54
MAKING an efficient annealing oven 2/53
 glass micro leaks 2/49
MANUFACTURE of glass/tungsten seals 1/15
MERCURY Vapour Lamp 2/55
METAL/Glass seals 4/8
MICRO-LEAKS, making in glass 2/49
MICRO-SAMPLE Syringe for GLC 2/21
MODIFICATION of cutting machine for glass grinding
 3/33
MULLITE/Glass seals 1/16
 properties of 1/28
 grooving 2/9

NEW HEMPEL pipette 1/44
NITROGEN DIOXIDE & Silica working 3/62
NITROUS FUMES in glassblowers workshops 4/47
NON RETURN VALVE FOR Vacuum pumps 1/53

OVEN, annealing, making 2/53
OXY-GAS PREMIX turret burners 2/22 2/56

PIPETTES & burettes, free piston 1/41
PIPETTE, Hempel, new 1/44
POLYSTYRENE, Shaping for glass protection 1/16
PRECAUTIONS for silvering solutions 1/45 2/22
PRE-MIX Oxy-gas turret burners 2/22 2/56
PROPERTIES of millite 1/28
 Carbon & Graphites, Physical & Chemical 4/5
PUMPS, Vacuum, non-return valve for 1/53
PYREX sinters, small diameter 2/54
 The structure, manufacture and use of 4/2

RADIATION and its effect on the eye tissues 4/29
REAMERS, carbon, Handle for 2/20
REFRACTORY tubes, Machine for cutting 1/32
RELEASED seized stopcocks & joints 1/40

APPLICATION FOR MEMBERSHIP

To the Hon. Secretary, B.S.S.G.

I wish to apply for membership of the Society and submit herewith particulars in support of my application. If elected I undertake to accept, and agree to abide by, the constitution and bye-laws of the Society. I enclose £..... (being £1.00 Entrance Fee and £..... Annual Subscription)

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(Please detail overleaf)

Published work, diplomas etc.

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Names of full members sponsoring application

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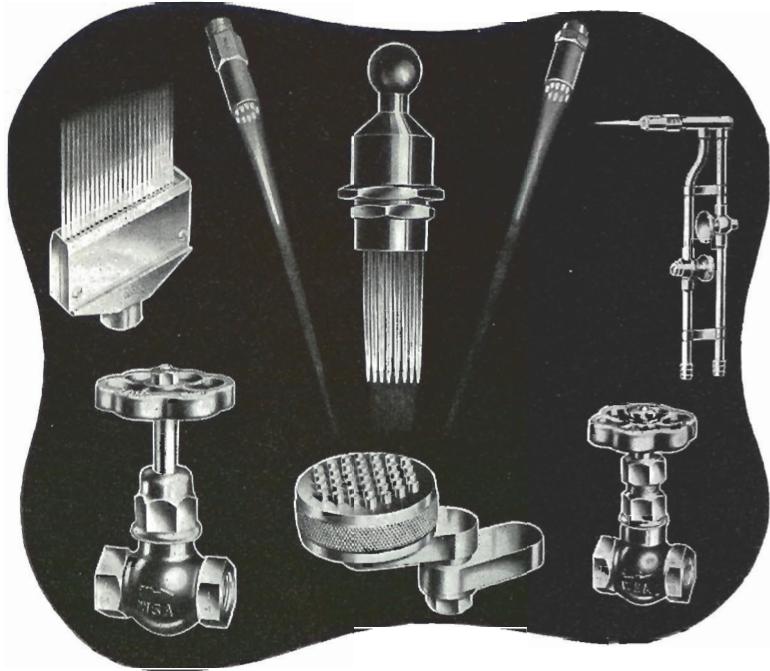
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SAFETY Aspects 3/36
Carius tubes 4/18
The effect of Radiation on the eye tissues 4/29
Hazards in the glass Industry 2/40
Nitrous fumes in glassblowers workshops 4/47
Silica working and nitrogen dioxide 3/62
Silvering Solutions, Precautions for 1/45 2/22
Turret Head Burners 4/1

SCIENTIFIC GLASSBLOWING, development in England
1/8
in Japan 2/19

SEALING glasses 2/3 2/14

SEALS, metal/glass 4/8
Glass/mullite 1/16
Glass/tungsten 1/15

SEIZED stopcocks & joints, releasing 1/40

SHAPING polystyrene for glass protection 1/16

SILICA, vitreous, for the glassblower 3/2

SILICA WORKING & Nitrogen Dioxide 3/62

SILVERING dewars 2/10
Solutions, Special precaution 1/45 2/22

SIMPLE flange holder 3/33

SINTERS, small Pyrex 2/54

SLOW-RUNNING attachment for lathe 3/33

SMALL BORES, method for exploring 3/16

SMALL DIAMETER pyrex sinters 2/54

SOLUTIONS, Precautions for silvering 1/45 2/22

SOME unusual glass 1/46

SOXHLET apparatus, support for alumina thimbles
4/55

SPHERICAL dewars, Jig 3/34

STOPCOCKS & joints, releasing when seized 1/40
design 2/45
extractor 2/9

STOURBRIDGE, glassmaking at 3/31

STRIP SILVERING dewars 2/10

STRUCTURE & processing of Pyrex 4/2

SUPPLIERS – glasses 4/15

SUPPORT for alumina thimbles in soxhlet apparatus
4/55

SYRINGE for GLC micro-sample 2/21

THERMOMETERS 4/37

THIMBLES, alumina, support in soxhlet apparatus
4/55

TOOLS, carbon 1/32

TROUGHS, chromatography, cutting 2/43
TUBE, glass, centrifuging of 3/22 3/41
mullite, grooving 2/9
carius - safety 4/18
method for exploring small bores 3/16
TURRET-HEAD BURNERS, a warning 4/1
TURRET BURNERS, Oxy-gas pre-mix. 2/22 2/56

U.H.V. Developments 2/28

VACUUM PUMPS, non-return valve for 1/53
VALVE, magnetic, all glass 4/54
non-return for vacuum pumps. 1/53
VAPOUR LAMP, Mercury 2/55
VITREOUS SILICA for the glassblower 3/2

WARNING, Turret-head burners 4/1
WORKSHOPS, Nitrous fumes in 4/47
WORKING SILICA, and Nitrogen Dioxide 3/62

INDEX

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HONORARY MEMBER

IAN C. P. SMITH

Educated at St. Dunstans College, Catford, Ian Smith started his career in 1920 when he joined the Organic Chemical manufacturing Laboratory of B.D.H. He was encouraged to go to evening classes at Birkbeck College and obtained his finals in 1924.

The two lab chiefs under whom Ian worked were not professional glassblowers, but were competent enough to do most of what was necessary in the early half of the century to keep the lab running. Preparations were carried out in five litre flasks and up to 20 gallon cast iron vessels, enamelled to prevent corrosion, all with corks. Glassblowing was all in soda glass, foot bellows being used to provide the air supply, but this did not daunt Ian, for by 1924 he was able to maintain his own apparatus.

In 1934 a firm started up in a spare section of the Triplex works and needed someone with glassblowing experience, Ian joined them and shortly afterwards they adopted the name Quickfit and Quartz. He had to design the moulding machines for the cones and shaping tools for the sockets, design the whole range of glassware and then sell the finished products as well as supervising the publicity. Many of these early designs are still standard equipment, and Quickfits still use moulding machines which are exact copies of the ones built at this time.

Having practically completed the material and layout for the 1938 catalogue, which for many years was the "Bible" of the industry, Ian moved to Baird and Tatlock where he continued designing apparatus and equipment, and also did a lot of work pioneering sintered ware which was partly responsible for his designing and building his first double-ended glassworking lathe from scrap parts.

After, among many other jobs, designing a mechanical method for necking ampoules in eggshell glass, and drawing some 350 miles of amber glass tubing for gas detection outfits. Ian left Baird and Tatlock and worked for himself as a consultant to all and sundry, as well as running



glassblowing courses at Northampton Institute, and it was during this period that he patented a design for the Free-piston Pipette. Three years later, in 1949, he made his last move – to E.R.D.E. at Waltham Abbey as the glass engineer in charge of the glassworking and glassblowing department and it was in this capacity that he indirectly caused the foundation of our Society.

The Ministry Technical Training Officer, Dr. Gwynn Jones, enquired about the possibilities of post-training for glassblowers, which were non-existent at the time. Ian first ran two one-week courses for Ministry glassblowers, but it was decided that this took too much of his time and he replaced it with a one-day Colloquium for glassblowers, the first being held in 1952. Glassblowers from the Ministry, Universities, and a few industrial research laboratories including I.C.I., G.E.C., and A.E.I., were invited and the Colloquia proved so successful that a meeting-place large enough to accommodate the numbers was difficult

to find, which resulted in the glassblowers getting together, fired with enthusiasm, and forming the Society as we know it today.

Ian, meanwhile, was the Chairman of some B.S.I. committees and a member of many more as well as being active on the international body for Scientific Glassware known as I.S.O. TC/48, and was particularly active on Dean and Stark Apparatus, Sintered Ware, Vacuum Dessicators and

observation and flange glasses for pressure vessels.

In spite of all the committee work Ian was doing for the Ministry he has always been a very active member of our Society. For a number of years he was the Society Secretary, and for a time he was the Journal Advertising and Distribution Manager; all of these positions he filled with his customary efficiency, and we hope that he will give many more years of active interest to the Society.

HONORARY MEMBER — THAMES VALLEY AWARD WINNER



JOHN H. BURROW

John Burrow is a Bristolian by birth. He obtained City Scholarships for secondary education at the Merchant Venturers Technical College and later at Cotham Grammar School. His education would have finished at that stage but for rising unemployment of the early twenties, for in the

course of finding work he was interviewed in the Chemistry Department of the University of Bristol and instead of being given a job he was persuaded to continue his education and take a degree in chemistry and physics. During those student days John showed abnormal interest in glassblowing. Prof. A. M. Tyndall had foreseen the need for a research glassblower in his new H. H. Wills Physics Laboratory, and after graduating in 1926 John was offered this position (at a salary of £150 a year) and the deteriorating employment position made the decision to accept easy.

To obtain some training he attended vacation courses held in the University of Leiden where he became acquainted with the Dutch method of working, using soft glass and foot bellows for the air supply, and after setting up in Bristol on similar lines he began gathering experience which enabled him to make apparatus which was needed for departmental research into ionic mobilities, soft X-rays and liquid Helium, first in soda-lime glass and later in Pyrex.

Although tungsten was available, the need to seal copper to Pyrex arose, and in collaboration with Dr. H. W. B. Skinner (later Prof. and F.R.S.) the first tubular copper to Pyrex seals were made and described in the Journal of Scientific Instruments in 1929. To make larger metal to glass seals a glassworking lathe was constructed on the lines of one used in the General Electric Company Research Laboratory at Wembley, but although useful for that purpose it was not versatile enough for general glassworking, so that up to 1939 hand methods persisted.

At the outbreak of war all research involving glassblowing stopped and John spent several months on one of the radiolocation chain stations in Sussex. This was followed by a short period in Birmingham attempting to make copper disc seals, and several weeks in Liverpool assisting Prof. C. F. Powell's early particle research using the cyclotron as a source.

In 1940 an Admiralty group was established in Bristol to develop short wave length transmitting and receiving valves, cathode ray tubes and other devices needed for enemy aircraft detection. John was put in charge of a valve construction group, and some of the valves made were taken through the pre-production stage to full-scale production and were successfully used in the war effort. During this stage, the copper disc and other metal glass seals were perfected and mass produced, using jigs designed for the purpose and R.F. heating. Also during this war period a Litton lathe had been obtained from the U.S.A., and this was used for cathode ray tube manufacture, valve assembly, and any other work which could be adapted to it. It was now realised that glassworking lathes could transform the old hand methods and when the Admiralty group moved in 1945 to form SERL at Baldock, John decided to stay in Bristol and exploit the experience he had gained. The glassworking facilities at the H. H. Wills Laboratory were restored and the lathe was used to make joints and stopcocks (then in short supply), and much of the research apparatus formerly produced entirely by hand.

By 1950 the improved methods were giving a greater output with a higher standard of perfection. This was followed by the purchase of other equipment such as a larger lathe, annealing ovens, diamond impregnated tools. R.F. heating and vacuum coating, which extended the scope and size of the work still further, and the glass workshop became the centre of practical techniques. At the same time came deeper involvement in the constructional side of research and the development of techniques for the many requirements of a physics laboratory. A long period was spent by John in collaborating in high vacuum, low tempera-

ture and optical research. He gave lecture courses on experimental techniques to students and there was a gradual drift to becoming an advisory service with practical help when needed.

In essence, the pattern of John's career has been continued, but always the output of glassworking has been maintained.

There have been occasional diversions. In the field of glassworking, John has spent periods in the U.S.A. and India to set up glass workshops, train operators, and give lecture courses. Non-glassworking diversions have included the flying of high-altitude balloons, and research on the growth of magnesium oxide crystals. But in spite of many opportunities to change to a different line there has always been, for John, a return to the old surroundings to continue the manufacture of glass and improve the methods used in working it.

In private life, also, he has been continuously active, with practical hobbies of various kinds including carpentry, horticulture and photography. At an early age he became a very keen cyclist and for many years this method of transport was used by him to explore the roads, lanes and village inns of the South of England. In more recent years, this interest has been maintained by the use of a car, and by this means extended to other corners of the British Isles.

John is a well-known and respected glassblower, who has done a great deal for the Society, mainly behind the scenes. He was founder Chairman of the Western Section and has given many interesting lectures, on all aspects of glassblowing, to various sections of the Society. His most notable contribution to the B.S.S.G. was as Editor of this Journal, from the first number until June of this year, seven years of very time-consuming and brain-racking work, the quality of which speaks for itself. In recognition of the invaluable service he has rendered to the Society, he was awarded the Thames Valley Cup at the Annual Dinner this year, and it was typical of John that he insisted on calibrating it at the earliest opportunity, not once but in triplicate: Thames Valley members may be interested to know that the working volume is three pints.

COUNCIL TREASURER

The retiring Treasurer was employed by the Anchor Glass Co. for 10 years up till 1958 and during that time worked as a glassblower on medical and laboratory glassware, he was also given the chance to carry out development work on glass forming machines. Initially his training was with a branch of Messrs G.E.C. in Wembley from 1940-45.

Twelve years ago he moved to the laboratories of Guinness the brewers and reluctantly giving up glassblowing started to learn the practical work of a laboratory. He worked on hops for several years and helped develop an instrument now marketed for hop analysis. He now manages the raw materials section of the laboratory with a staff of eight, and is responsible for the quality control of barley, malt, roast barley and hops.

Laurie is 44, married with two teenage daughters, a keen motorist for many years and former competition secretary of a motor club, his interests range from antique furniture and gardening to politics and boating.



INCOMING TREASURER

George Robertshaw has been with the Research Dept. of I.C.I. Fibres, Harrogate, since 1956. He joined the B.S.S.G. in 1964 and has been on the Council since that time. He has been the Treasurer of the North Eastern Section since 1967. This year he was elected onto the Board of Examiners.

George is 31 and has been married for 4 years, and he and his wife attended the 14th Annual Symposium of the American Scientific Glassblowing Society, having joined that Society in 1969.



THE CONSTRUCTION OF A SIMPLE COMPOSITE HELIUM DEWAR

V. M. Conway and M. Heath,
Department of Physics,
University of Nottingham.

INTRODUCTION

The usual dewar system employed at liquid helium temperatures consists of two dewars, one inside the other. The inner contains the helium while the outer is filled with liquid nitrogen which acts as a heat barrier. This outer dewar is essential if the helium is to last for any reasonable length of time. The main problems with such a system are that it is cumbersome and inevitably has a large external diameter due to the several thicknesses of glass and the vacuum and nitrogen spaces. The large external diameter imposes considerable difficulties on the design of the apparatus to go in the system if one must work in a confined space, such as an electromagnet pole gap.

The metal and pyrex dewar we describe here was designed to overcome this problem by dispensing with the nitrogen dewar at the bottom of the helium container and replacing it with a conduction cooled metal radiation shield placed in the helium dewar vacuum space. The performance of the dewar has been previously described.*

*Jour. Sci. Instr., (Ser. 2), 2, 1110, December, 1969.

CONSTRUCTION

A general view of the dewar is shown in Figure 1. The first step was the construction of the inner wall of the helium vessel. A piece of 36.5mm. pyrex tubing was joined to an 89mm. piece and rounded off at the appropriate length (all dimensions are outside diameters). The 89mm. tube was cut to length and flanged out to 100mm. The outer wall of the nitrogen jacket was prepared in a similar fashion using 48mm. and 140mm. tubes but omitting the flange; and in addition a 13mm. tube was

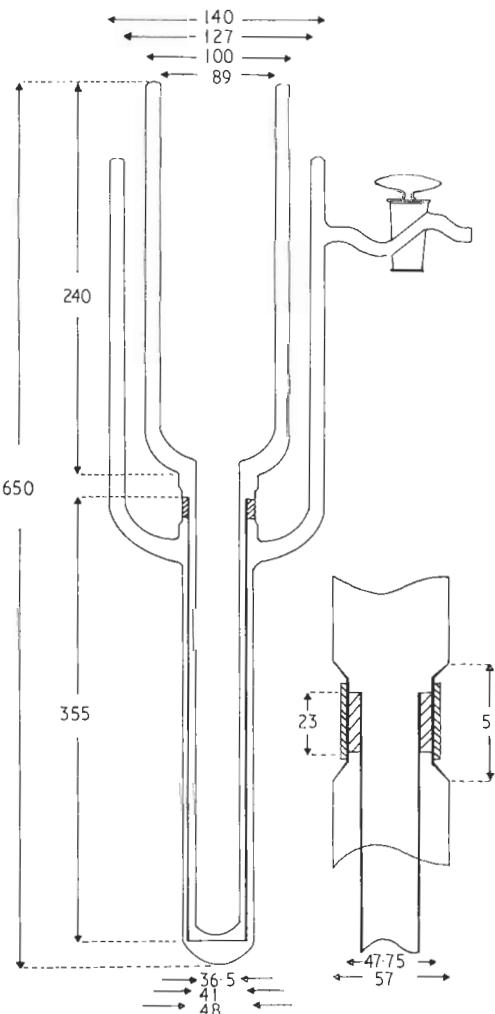


FIGURE 1:

The dewar and an enlargement of the join between the radiation shield and the copper-glass seal. (All dimensions in millimetres).

joined on to the rounded end for blowing and silvering purposes. It was now necessary to form the double ended 57mm copper Housekeeper seal to the correct shape (Figure 2). This was a commercially available item supplied by Messrs. Jencons, Limited. Initially the majority of the thin walled W.1 glass was removed and replaced with thicker pyrex glass to provide added strength at the

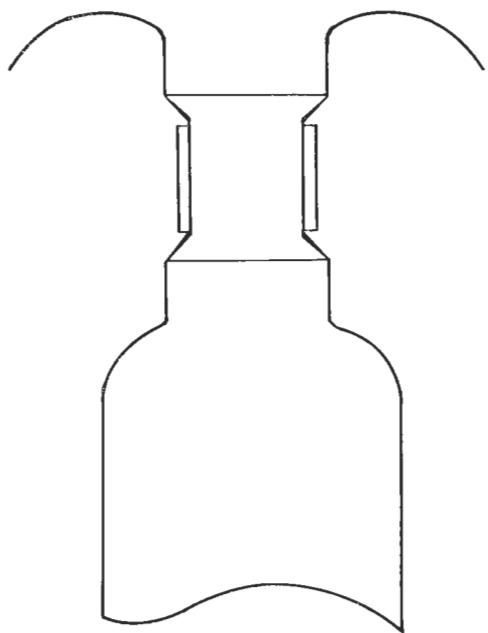


FIGURE 2:
The shape of the glass in the vicinity of the copper-glass seal.

flanges. After the seal had been protected with asbestos paper, one end was joined to 100mm. tube to form the outer wall of the helium vessel. The other end of the seal was flanged out and turned back on itself to 127mm. in readiness to connect with the inner wall of the nitrogen container (Figure 2). It is most important that this flange is well rounded,

and of a suitable thickness to join evenly with the 127mm. tube, thus making a robust section of glass between the tube and metal.

It was now necessary to join the two pieces of the helium dewar. Provision had to be made for blowing at this stage and the following was found to be a suitable technique. A cone was made from a fairly rigid sheet of plastic (Melinex in our case) and sellotape. The small end of the cone was connected to a straight running swivel by means of a short length of rubber tube sellotaped into the plastic (Figure 3). The larger end of the cone was pushed over the flange to form a seal. It was found that Melinex was supple enough to hold the cone in place without further sticking.

The next step was to join the inner wall of the nitrogen container to the copper-glass seal. Asbestos insulation was once again necessary to protect the seal from excessive heating. To facilitate the removal of this, a piece of wire was placed under and then looped back over the asbestos paper after it had been positioned. To hold the main body of the work, a piece of tubing was selected of such a diameter that it would fit between the outer wall of the helium container and the inner wall of the nitrogen vessel. The gaps were packed with asbestos paper but as provision has to be made for blowing into the liquid nitrogen space, a slot was left in the packing between the tube and the helium vessel wall. The free end of the holding tube was reduced in diameter to fit a blowing swivel.

The radiation shield was made by wrapping copper sheet round a former and silver soldering the seam. For good conduction down the shield it should be as thick as possible but in practice it was found that the thickness was limited by the dimensions of the glass tubes (in our case the thickness was 20 s.w.g.). A copper collar 23mm. long was turned to a very slightly larger diameter than the internal diameter of the copper-glass seal and was then silver soldered to the shield. An end cap was made for the other end of the shield and provision was made for attaching it by three 10 B.A. screws. Two 5/16 inch holes were drilled through the tube to provide an evacuation path and to allow access for the silvering solution.

The next step was to insert the metal radiation shield. A removable sleeve of asbestos paper was made to fit over the helium tail and its test-tube end to prevent contact between glass and copper tubes during the insertion process. An electrical heating tape was wound round the inner nitrogen jacket and the nitrogen space was filled with warm water which was then raised to 100°C. The polished radiation shield together with its end plug was cooled in liquid nitrogen. When the glass-to-metal seal and the copper collar had reached equilibrium the radiation shield was rapidly inserted and the electrical heater disconnected. When all the copper had reached room temperature it was found that the tail was a rigid fit ensuring good thermal contact. Finally the end plug was taken off, the asbestos sleeving removed, and the plug was then replaced.

The final major step was to join the inner and outer walls of the nitrogen space. This proved to be easier than a conventional dewar seal as the helium container projected (Figure 1) and could be held in one lathe chuck with the nitrogen outer wall in the other. When the seal had been completed a side arm was joined to the dewar.

ANNEALING

The copper in the dewar must be surrounded by an inert atmosphere during annealing to prevent oxidation. A T-joint was connected to the side tube and one arm was taken through a hole in the oven wall to a nitrogen gas supply. This allowed nitrogen gas to pass through the vacuum space of the dewar, venting through the tail tube. The other arm of the T-piece was connected to 8mm. tube which was led into the liquid nitrogen space and ended in the vicinity of the glass-to-metal seal. The rest of the gap at the top of the space was filled with asbestos, apart from a small vent hole. Nitrogen gas could now be passed over all the metal surfaces. The oven and the dewar were held at a temperature of 565°C for twenty minutes and were then slowly cooled.

When cold the dewar was silvered by the well-known Brashear method. It was placed in an horizontal position and silvered in two halves,

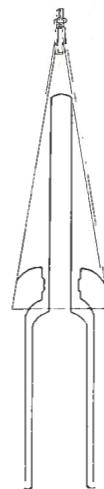


FIGURE 3:

Method of blowing for the helium dewar seal showing the plastic cone.

leaving a viewing strip. As the strip served no useful purpose in the tail it was silvered from the bottom up to the metal seal after the dewar had been placed in a vertical position.

Finally after attaching the stopcock to the side arm, the tail blowing tube was sealed off. The reason for having a stopcock is to allow any helium that has diffused through the pyrex to be periodically flushed out with air.

CONCLUSION

The construction of a simple composite pyrex helium dewar has been described. This has worked very well to date and has been completely reliable. Repeated cooling cycles between room temperature and liquid nitrogen temperature have had no adverse effects on the copper-glass seal.

*Reproduced with the permission of the Institute of Physics and the Physical Society.

OVERSEAS MEMBERS AND VISITORS

The British Society of Scientific Glassblowers extends 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.

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time and date and place of arrival.

address whilst in the United Kingdom.

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NEWS From

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The Secretary received a letter from Mr. Yoshio Kinoshita, whose visit to England was reported in the last Journal, in which he gives some interesting information on the Japanese Glassblowing organisations.

There are two of these, the Japan Glass Technology Research Society which is composed of glass engineers who work in firms and Universities, and the Japan Scientific Glassblowers' Society which is a government sponsored association of Companies with a membership of 185 firms engaged in the manufacture and sale of scientific glassware.

Both the Societies have an annual congress, and the Japan Glass Technology Research Society also hold meetings, roughly every quarter, under its chairman, Mr. Kaichi Harada.

The Scientific Glassblowers' Association, chairman Mr. Kozo Yagihara, is divided into five districts and the annual congress is organised in a different district each year. All the circulars published throughout the year are bound to form the yearly Bulletin, which is then circulated to all members. Copies have been given to us, and were on display at our Symposium, but before you rush to borrow them from the library I would point out that they are very hard to read, unless you are conversant with the Japanese language.

It is always interesting to hear from kindred Societies in other countries. Our aim is to promote a greater exchange of information and ideas internationally, and it is hoped we will be able to provide more news from overseas in future issues.



Mr. Endoh and Mr. Kinoshita with Chairman and Secretary of the B.S.S.G. together with their host Mr. J. Patrick at the Hirst Research Centre General Electric Co., Wembley.



The tea service which was presented to our Chairman and Secretary by our visitors from Japan.

On Saturday, 24th July, the Southern Section gave what is now their annual display of glassblowing at the Fete and Gala Day of the Dagenham Cables Sports Club. Alex Gunn, Jock Wingate and Stan Graham put in a hard day's work to entertain members of the Sports Club. Thank you, gentlemen . . . but is the rumour true that you could not sink all the beer provided?

The season began for the Southern Section in rather a hectic manner. The cause was the Symposium, which was organised and run this year by the Southern Section. A lot of work was done by relatively few members who volunteered either for the organising committee or assisted it. Coming hard on the summer holidays this was a bit of a push. Nevertheless, the 200 visitors were well catered for and had a smooth and, I trust, enjoyable couple of days.

While at the Symposium it did seem to me that apart from University glassblowers, the only other members were foremen or seniors from glassblowing firms. Obviously, a 'blower on the bench can have little hope of a commercial concern letting him off the leash when the production line must still be fed. This being the case it seems to me that the subject of Symposium papers should be of a kind that will interest the fully experienced glassblower: I do not think they always are.

Elementary techniques on lathe or silica working might be of use to someone who is working in a laboratory, not under pressure and not in touch with several other glassblowers, but the senior man as represented at the Symposium needs more to hold his interest.

Conversely, if the Symposium is to cater for the senior in a glass shop, who quite probably does little actual glassblowing, then I believe the Section meetings must cater for the working glassblower. Again, at present, I do not believe they always do. The glassblower in a commercial concern is, of necessity, seldom encouraged to visit exhibitions etc., and he needs something of interest to get him to turn out on a winters night, travel a little further than he would like and spend money

needed on the home or essential internal lubrication, or even the urgent pursuits of bachelorhood. What he needs is not always glass orientated, except as a container for his beverage.

If all this is true, and it is my personal view, then the Society will not consist of the glassblower proper but of people who once were. Perhaps this is the correct role of a learned society, that the majority should come from the managerial level and associated businesses – but what then of the larger number of glassblowers? Those who are one of many in a glass shop. At the last Council meeting it was generally agreed that the Society needed new members. They are there but how do we hold them once they have joined the Society? It is no good their joining only to drop out the following year, and I believe this is what happens.

My point in all this? It is that if you are one of these people who feel the Society is not giving you what you want in the way of lectures, Stag Do's, dances and so on, even if you are not a member (especially if you are not a member) and I hope glassblowers not in the Society do get the opportunity to read the Journal and come to an occasional meeting, then please write or phone in your views – either to me or any committee member. Better still, come to the meetings and help shape the Society's future.

The first meeting of the Southern Section was held at Queen Elizabeth College, Campden Hill Road, London, W.8, on Wednesday, 14th October, 1970, commencing at 7.15 p.m.

Title: "Ways and Means" – swopping of ideas and hints.

Visit to Pilkington Glass Museum

A trip to St. Helens to see the Museum has been proposed for sometime in June. If you would like to join the party please contact Mr. Bill Young, 187 Washington Avenue, Grove Hill, Hemel Hempstead, as soon as possible.

R. J. W. Harvey

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D** The last section meeting was held at the School of Physics, University of Warwick on Friday 19th June. The meeting took the form of a talk by Mr. J. Burrow of the University of Bristol on the subject of "Cold Working of Glass". Mr. Burrow drew on his many years of experience in the field of Scientific Glassblowing to pass on a great many useful tips regarding the adaptation of standard glass workshop machines, tools etc. for producing a wide range of glass articles which the standard machine would be incapable of producing. Going by the amount of discussion that took place after the talk it can be concluded that, although the number of members present was only small (9), the effort put in by Mr. Burrow was well received. A vote of thanks was given for Mr. Burrow and also Mr. Bassett, Senior Administrator for the School of Physics, for his encouragement in making the facilities of the School of Physics available.

The Midland Section has unfortunately very little to report regarding section activities due to cancellations of two proposed meetings. Numerous suggestions have been made by members for future events and these possibilities are being looked into.

Friends and colleagues of Mr. Jim Huckfield of the School of Physics University of Warwick, and also chairman of the Midland Section, will be pleased to hear that he has returned to work after a short spell in hospital due to a motor accident early in September, causing him to miss the Symposium.

Members of the Midland Section who were unable to attend the Symposium will I am sure be pleased to hear that a Student Member of the Section, Mr. Peter Brindley of the School of Molecular and Biological Sciences, University of Warwick, was awarded a Certificate of Merit for the apparatus he submitted for the A. D. Wood Cup. I feel sure that I express the wishes of the Midland Section in congratulating the Student Members of the Society on the very high standard of craftsmanship achieved in the entries for the Society Awards.

K. Holden

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D** The October meeting of the Section was held, for the first time, in Aberdeen on 3rd and 4th October, making it a two day seminar, as most members would have at least 200 miles to travel there and back. The meeting was held at Messrs. Glass Appliances Ltd., Aberdeen, whose premises were ideal for such a meeting which was to be a practical session on the Saturday; with all members doing their "bit" as it were.

The section were delighted to welcome Mr. George Robertshaw of the North East Section and Society Treasurer, who travelled up on the Friday to be with us. Some twelve members were present. During the practical session members gathered round the various benches to watch their colleagues at work. Items completed varied from 75mm. diameter flanges, atomizers in neutral glass (this caused some fun), and of course, blown figures of dragons or Loch Ness Monsters, to flamingos. One very interesting piece of equipment was a tube drawing machine and coil winder combined. It is hoped that we can get a paper on this to be published in the Journal. In the evening the members enjoyed a meal at the Dee Motel, entertainment by Mr. Frazer Simpson, Apprentice Glassblower, I.C.I., Grangemouth.

At 10 a.m. the following morning members began to assemble for another practical session and demonstration of Glass Appliances precision tube drawing set up, producing of precision bore and rectangles and shapes of all kinds.

After lunch the City of Aberdeen Police arranged for Detective Sergeant Cameron to address the Section on "Science and Crime". This included slides of past and present methods of the laboratory in crime detection.

This Section would like to thank Mr. George Finnie and Mr. Dave Milne and the rest of Messrs. Glass Appliances staff for their excellent hospitality.

GENERAL NEWS

Mr. William McCormack has joined the Glass Workshop, University of Stirling. Mr. McCormack was trained and completed his apprenticeship at Strathclyde University, Glasgow.

At St. Andrews University, Mr. Fritz Akerboom entertained Mr. Willem Tys from Australia, who has a Churchill Scholarship to visit American and European Glass Works and Societies.

NEXT MEETING:— A.G.M. at Stirling on Sunday 6th December. It is hoped to have Mr. G. Dunlop to give a talk on his Glass Blowing experiences over the last 35 years.

T. P. Young

T H A M E S V A L L E Y
The first of the Thames Valley 1970/1971 meetings was held at Reading University on 3rd September, when an excellent attendance of members had the pleasure of hearing Mr. C. P. King of Murex Ltd., give an interesting talk on Tungsten.

"A twentieth century metal with none of the "easy" characteristics, — i.e. not easy to extract, not easy to work. A metal with no past, much present and a tremendous future" were some of the opening phrases used by our speaker. He went on to give a full account of the geographical location of wolframite and scheelite, the two main tungsten-yielding ores. Scheelite being strongly and distinctively fluorescent, enables ultra-violet to be used in its detection by prospectors. Purity levels may also be estimated by the same means.

Mr. King next discussed the separation and processing of the ores together with a comprehensive description of the manufacture of tungsten and its conversion by various techniques into a wide range of forms for industry. Some of these forms were available as exhibits, perhaps the most impressive being a tungsten pot which had been spun at 1,200°C from sheet material. This pot was approximately 150mm. long, 50mm. diameter and 3mm. wall thickness.

Finally, our speaker described some of the more important uses of tungsten in industry and research, and a number of questions prompted a general discussion on some of the problems which metallurgists are striving to solve with this metal.

1st October, at Reading University.

Our speaker at this meeting, Mr. G. M. Witton of Van Mopps & Sons Ltd., divided his lecture into three sections consisting of firstly a film, then a talk and finally a second film followed by question time.

The first film dealt exclusively with mining in South Africa and showed how several types of mines, in various geographical locations, had to use different mining techniques to produce diamonds.

Our speaker then discussed the properties of diamonds both for gemstones and industrial use. This was followed by the second film "Uses of Industrial Diamonds" which showed many aspects of machining very hard materials with comparative ease and efficiency.

S. D. Fussey

E A S T A N G L I A
A visit was arranged on Friday evening 16th October to Messers C.I.B.A. (A.R.L.), at Duxford, for members of the section who were interested in learning more about the applications and productions of adhesives and Epoxy Resins. The visit began with the showing of colour slides about the forming of the company in 1934 which was then 'Aero Research Limited' founded at Duxford by Dr. N. A. de Bruyne to investigate and research into aircraft structure and new structural materials, primarily for wooden aircraft.

From 1934 until today Messrs C.I.B.A. (A.R.L.) have produced many glues of the urea-formaldehyde formulations which are now used widely in furniture and other wood industries, but the main interest to Glassblowers is in the remarkable Epoxy Resins, which most of us know as Araldite. The slides showed the many applications of Epoxy Resins, which ranged from the encasing of a Human Heart pace maker, to the nose cone of the *Concorde*.

After the Lecture and slides, members were shown round the production plants to see how the Adhesives and Resins are produced for commercial use. The production plants are all automated so that one man can control the whole of one plant at the press of a button. Most Synthetic Resins are now produced in very large quantities and are used all over the world, and I think many of the members present were surprised at the different types produced, as the Glassblower generally does not come into contact with most of them.

At the end of the evening members were able to have any queries or questions answered by the companies representatives. I think everyone who attended found the evening educational and worthwhile, and an eye opener on the uses of Synthetic Resins.

The section would like to thank Messrs C.I.B.A. (A.R.L.) Ltd. for allowing us to visit their company at Duxford. We would also like to thank Mr. Foot and Mr. Price who made our visit so interesting.

We would like to expand scope of our reports to include items of interest about members, such as news of personal achievements, weddings, news of sick members and any other items which you think would be of interest to your colleagues. If any member has any news that they would like to be included in our section reports would they please send it to me:-

R. A. Pryke,

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T** Twelve members of the North Eastern Section assembled at the University of York on 22nd October for the fourth meeting of the year.

The Chairman, Mr. H. Butler, opened the meeting by congratulating the following three Student Members on their success in the Societie's Annual Competitions.

Mr. C. Gascoigne of I.C.I. Fibres Harrogate.

Mr. B. Smith of the University of Leeds.

Mr. R. Hall of the University of York.

Mr. Butler went on to mention that members should now be thinking of the 1972 Symposium as the Section could be called upon to organise it.

The Chairman introduced Dr. A. Chambers of the Physics Department, University of York who gave a paper entitled 'Vacuum - An Elementary Introduction to Principles and Techniques.'

Dr. Chambers began by explaining the structure of solids and gasses. A solid has a crystalline form the atoms taking up ordered positions. Liquids have roughly the same volume as solids, the atoms being close together but disordered. In gases, the atoms or molecules move very haphazardly and on average are very far apart. As vacuum is mostly concerned with gases, Dr. Chambers went on to say why a gas exerts a pressure which is proportional to the number of molecular impacts on the container wall and therefore proportional to the number of molecules present in a given volume. The following table illustrates the dependence on pressure, of the average distance (d), a molecule has to travel, before collision with other molecules.

Quality of Vacuum	Pressure in torr.	d.
Coarse	1 torr	0.002"
Medium	10^{-3} torr	2"
High	10^{-6} torr	50 yds.
Ultra High	10^{-9} torr	250 miles

Factors limiting the quality of vacuum were dealt with. These are:— Leaks, permeation, the desorption of molecules from pipe and vessel walls, Backstreaming and the cleanliness of objects placed in the vacuum chamber. Dr. Chambers concluded his lecture by explaining the mechanical workings of rotary pumps, principles of diffusion pump operation and their function in vacuum systems,

We were then shown a short film which illustrated many of the points raised in the lecture, it also showed the applications of vacuum techniques in industrial processes.

Mr. J. R. Clarke of Northern Scientific (York) Ltd., had brought with him various pieces of vacuum equipment and answered questions put by members.

We would like to thank Dr. Chambers for giving this lecture which has provided a basis for future meetings on Ultra-High Vacuum Techniques.

RICHARD HALL

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The October Meeting was held in the Medical School at Bristol University. The Chairman opened the meeting by welcoming and introducing to those present, a new Student Member Mr. Laurence Coltman. Working at Imperial Tobacco Co., Research Labs, and a native of Leicester, he has been glassblowing for eighteen months.

The meeting which was to deal mainly with future programmes, got under way with requests for subjects, members would like demonstrated. The Western Section, being few in regular members has no actual committee. The Section affairs are dealt with at monthly meetings as required. Silica working techniques seem to be in greatest demand, and it was left to the Secretary and Chairman to arrange if possible a programme on the subject. Mr. A. Leeson Magrey our Councillor was prepared to receive the Section at his factory early next year.

The remainder of the evening was devoted to the showing of three films. Two of the films dealt with the increasing importance of diamonds in produc-

tion engineering. Traditional methods of metal removal such as turning and milling are being replaced by grinding using diamond impregnated wheels and form tools. These diamond tools offer a greatly increased rate of production with less tool wear.

Although diamond grinding wheels have been available for some time, they have had limited success in the manufacture of steel components. Research in South Africa has produced diamond impregnated tools capable of high speed production with almost any metal. Another method of grinding was shown. Here an electrical contact was made between the diamond wheel and the work, producing high quality finish and high speed metal removal.

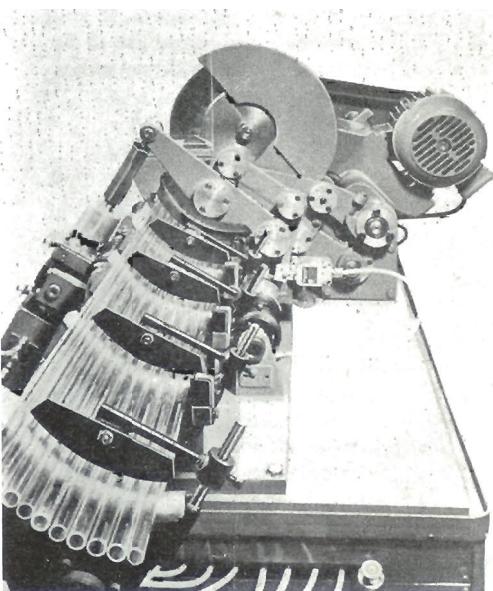
The third film principally demonstrated the uses of a small hand blowlamp which incorporated its own gas container. Its trade name is Soudogaz, and its main use, doing household jobs e.g. paint removal, thawing out pipes. It also proved itself to be a useful handyman tool for electrical repairs and jewelry making.

R. BATCHEN

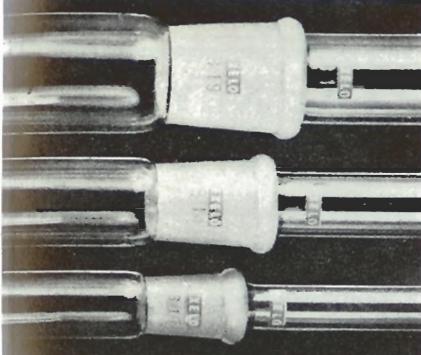
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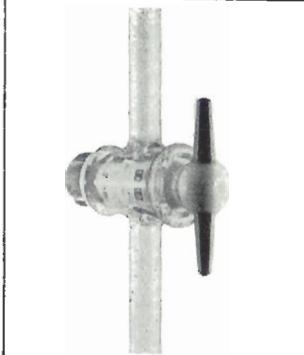
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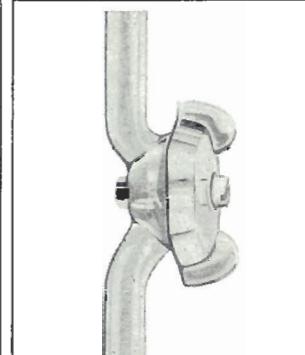
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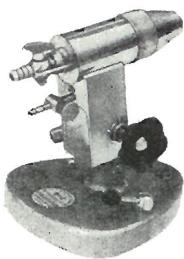
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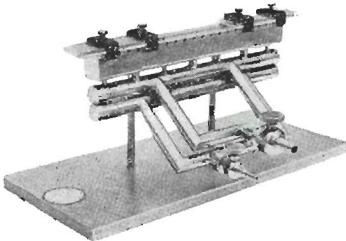
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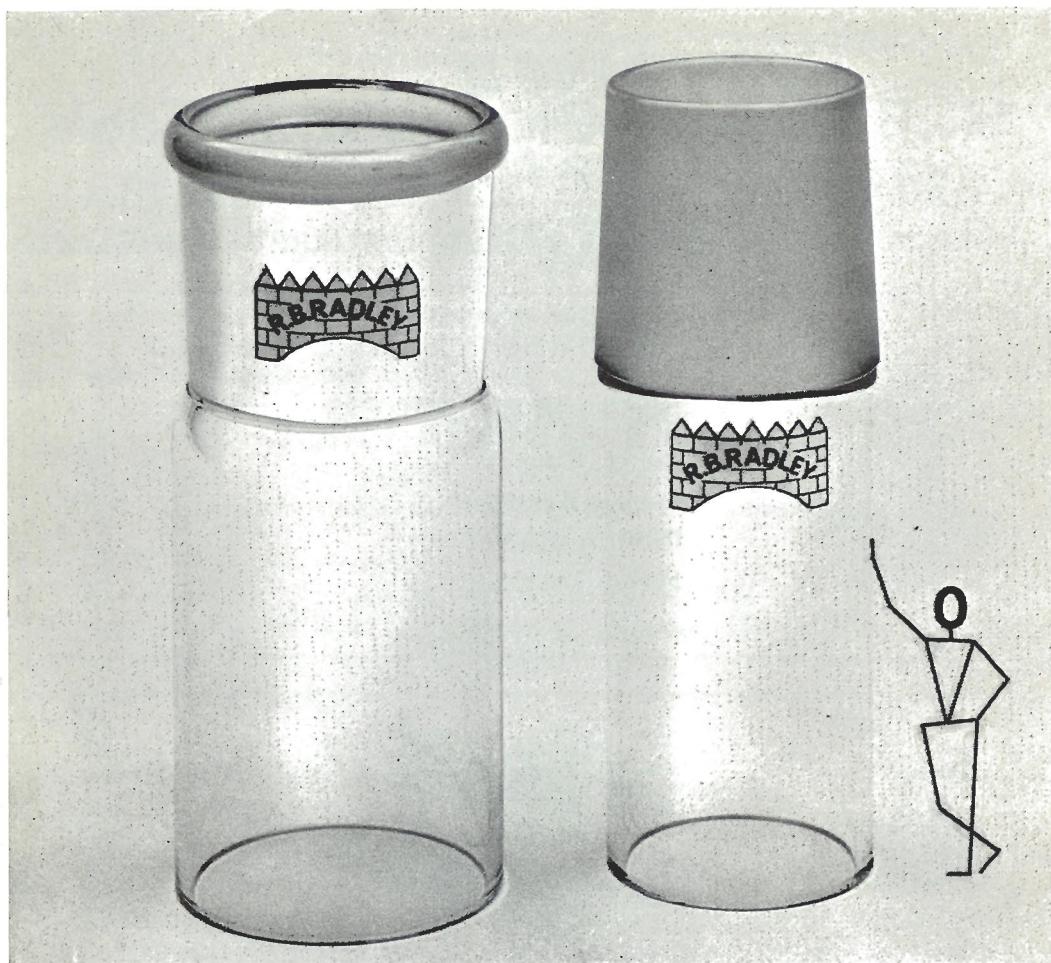


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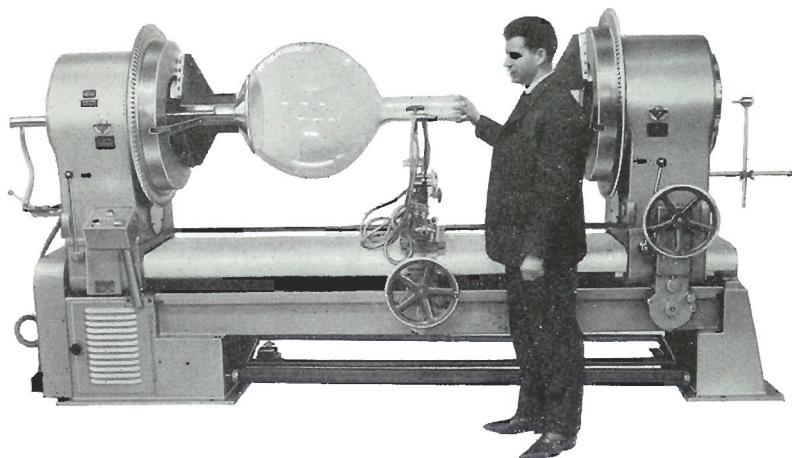
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BELL TYPE ANNEALING OVEN



OVEN 'UP POSITION'

Operational advantages of this design are:
Versatility—easy loading—flexibility of
operation—heat lost when opening
minimized.

Specification:

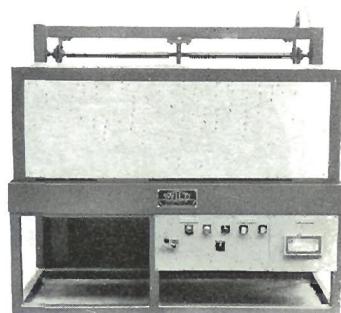
Normal 'Up and Off' and 'Up and Hold' plus
temperature setting. Maximum operating
temperature 650°C.

Inside dimensions of Bell:

60" long 21" high 17½" wide.

May we send details of our range of lathes and equipment?

Write or Phone



OVEN 'DOWN POSITION'

The HEATHWAY MACHINERY CO LTD

UXBRIDGE ROAD, HILLINGDON, MIDDLESEX

Tel. UXB 36345/6 Grams. HEKO UXBRIDGE