# BCA IG Newsletter

**January 2008**

## Notes from the Chair

The latter half of 2007 was a productive one for the IG Committee: we held two very-well attended meetings, and have been busy planning our programs for the Spring Meeting in April AND two meetings on minerals in May. November 2007 saw back-to-back meetings of the Pharmaceutical Special Interest Group and the Autumn Industrial Group; we were fortunate not only to have the use of AstraZeneca's conference facilities, but also to receive financial sponsorship from them.

In April we will have several sessions at the Spring Meeting, then meetings on minerals in May, and finally we hope to have a joint Autumn meeting with the Young Crystallographers. Details of all these meetings are on the website. Some of these events still have spaces free for speakers, and I hope some of you will consider contributing talks.

I would like to invite your input into the planning of future meetings: suggestions on

## Forthcoming Events 2008

- 8th to 10th April **BCA Spring Meeting** University of York
- 14th May 2008 **Joint BCA/RSC XRF Meeting** at BGS, Keyworth – Minerals and much more!
- 15th May 2008 **XRD and Minerals** British Geological Survey, Keyworth, Nottingham.

See the Industrial Group's web site for more details of these meetings.

**XRF Newsletter 6 published electronically in January 2008.** View a copy on the web.

## Inside This Issue




**Charity Registration Number: 284718**


**World Wide Web addresses:**
**BCA** http://www.crystallography.org.uk
**IG** http://bca.cryst.bbk.ac.uk/bca/ig/ig.htm
**Tip** Google BCA IG (with a space) to find us!

## Newsletter Sponsorship

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topics, speakers, meeting format and venue would all be welcome. I'd also like to point out that you don't need to be on the Committee to get involved with organising……..any volunteers?

Finally, I'd just like to thank Roy Copley, who is standing down from the IG Committee at the end of his term of office, in April. Roy has been a major contributor to the success of the IG meetings, and represented us on the program committee of the Spring Meeting, with great effect.

**Anne Kavanagh**
AstraZeneca

## EDITORIAL

Welcome to this edition of the BCA Industrial Group's Newsletter. It contains details of the Industrial Group's XRD sessions at this years BCA Spring Meeting which will be held at the University of York. You will also find reports for the Pharmaceutical Special Interest Group Meeting and the Industrial Group Autumn Meeting which were both held at AstraZeneca, Macclesfield in November.
I would like to remind you that unedited versions of all the reports covered in this Newsletter can be found on the group's web site
http://bca.cryst.bbk.ac.uk/bca/ig/ig.htm

**Industrial Group E-mail Mailing lists – Online registration.**
We now maintain separate lists for XRF and XRD mailings so please register for BOTH if you want to be kept totally in the picture. The IG sends about six E-mail notices each year to anyone interested (You don't even need to be a BCA member!). These inform of Newsletter postings and the various meetings we organise each year.

You can now register for our E-mail lists online - follow the link from the IG home page. There is an opportunity to be removed from the list with each mailing.

**Please sign up NOW!**

The IG Committee have been discussing the Group's constitution. Rather than making changes for changes sake the focus has been to improve the constitution so that it more closely reflects what actually happens in the running of the Group. The proposed changes are will be voted on at the Group AGM which will be held during the BCA Spring Meeting (see below for details)

**Newsletter and Web Site Content**

We continually try to improve the content of both the Newsletter and web pages and would like to ask you to submit articles etc. Do you use web sites for your day to day work in XRD and XRF? If yes, then which sites do you visit, let us know and send us a paragraph about what you use the site for and why you like it.

That's it for now. Enjoy your Newsletter.

**Mark Farnworth** – Pilkington Group Limited
Editor

## Industrial Group AGM

The 25th ANNUAL GENERAL MEETING of the Industrial Group will be held at York on 9thApril 2008 at 11:45

Nominations are sought to fill vacancies for **one** committee member to serve for three years from April 2008.

Nominations, which shall be proposed by not less than two members of the Group and shall be accompanied by the written consent of the nominee, shall be sent to reach the Honorary Secretary of the Group not later than seven days before the Annual General Meeting.

Contact David Beveridge

Secretary/Treasurer

**NOTE:**
The AGM agenda is posted on the web and proposed changes to the constitution are detailed on page 10.

# 2008 Spring Meeting University of York
# 8-10 April 2008 Industrial Group Sessions

**Tuesday 8th April 2008, 15:30-17:00**

**"Jekyll and Hydrate"**
Chairs: Roy Copley & Anne Kavanagh

Hydrated solid-state forms are commonly found in the pharmaceutical industry and their discovery can be both a benefit and a hindrance. This session will concentrate on the characterisation, properties and behaviour of hydrates.

15:30 Gérard Coquerel (Rouen)
*The different roles of water molecules in chiral discrimination in the solid state*

16:00 Alan Kennedy (Strathclyde)
*Mony a Mieikel Maks a Muckel: Systematic Investigationss of Crystal Structures of Organic Salt Hydrates.*

16:30 To be confirmed

**Wednesday 9th April 2008, 10:15-11:45**

**"Applied Crystallography Showcase" - including the IG YC prize talk.**
Chair: Chris Staddon

10:15 2008 Industrial Group Young Crystallographer prize talk.
*To be announced at the meeting*

10:30 Alison Burke (Huntsman Pigments)
*Application of XRD within the Pigments Industry*

10:45 Judit Debreczeni (AstraZeneca)
*Protein Structures in Drug Discovery*

11:00 Mark Farnworth (Pilkington Group Ltd)
*Application of XRD within the Glass Industry including 2D mapping*

11:15 To be confirmed
*To be confirmed*

11:30 To be confirmed
*Provisional: Application of XRD within the Cement Industry*

**Wednesday 9th April 2008, 11:45**

**Industrial Group AGM**

**Wednesday 9th April 2008, 13:30-15:00**

**"Small is Smart"**
Chair: David Beveridge

13:30 Steve Norval (Intertek MSG)
*Powder Diffraction of Nanomaterials.*

14:00 Chris Staddon (University of Nottingham)
*In Plane Scattering from GaN Nanorods*

14:30 Chris Gilmore (University of Glasgow)
*Solving Crystal Structures of Zeolites using Powder Diffraction and Electron Crystallography.*

**Wednesday 9th April 2008, 15:30-17:00**

**"Big is Beautiful"**
Chair: Judith Shackleton

15:30 Supriyo Ganguly, Materials Engineering, The Open University.
*Measurement of weld residual stresses in design geometry engineering components and structures using pulsed neutron diffraction*

16:00 George Bibby, Rolls-Royce plc.
*Title to be advised.*

16:30 To be confirmed
*To be confirmed*

**Wednesday 9th April 2008, 17:15-18:00**

**Plenary: *X-ray Diffraction on Mars?***
Rob Delhez (Delft)
Chair: Anne Kavanagh

**We hope to see you in York!**

Full Spring Meeting details can be found at:

***www.crystallography-meetings.org.uk***

# Meetings at the British Geological Survey, Keyworth, Nottingham

## 14th May 2008
## XRF Minerals and Much More.

**A Joint Meeting:**

RSC | Advancing the Chemical Sciences

Atomic Spectroscopy Group
Analytical Division, RSC

**Speakers include:**

**Nick Marsh**, University of Leicester.
*The preparation and presentation of mineral samples for XRF analysis.*

**John Mansell**, Omya UK Ltd.
*Mineral Analysis using ED-XRF. From ppm to %.*

**Alison Burke**, Huntsman Pigments
*Routine Analysis of $TiO_2$ by WD XRF*

**Anita Radovnikovic**, Indaver Ireland.
*Trace elements analyses of liquid and semi liquid hazardous waste by WD XRF*

**John Boyle**, University of Liverpool.
*Geochemical analysis of lake sediment cores by XRF.*

**OFFER A TALK** – there is still time to offer a short talk at this meeting, contact Dave Taylor.

**Meeting Registration:**
A registration form will be posted on the web nearer to the meeting.

**Fees:**
**Note:** Non-member supplements are waived.
**One day fee: Full £40, Concessions £20, STUDENTS FREE!**
**Both days: £60, £30, STUDENTS FREE!**

**Sponsorship**:
We are still looking for sponsors for this meeting, more details on the web page. Help us provide free student places!

## 15th May 2008
## XRD and Minerals

**Speakers include:**

**Helen Maynard,** Edinburgh University.
*High Pressure Crystallography of Methane.*

**Caroline Kirk,** Loughborough University.
*Structural Studies and High Temperature Properties of Bismuth Vanadate Sillenite.*

**Eric Ferrage,** Laboratoire HydrASA, Université de Poitiers
*Investigation of Smectite Structure Heterogeneities: an XRD Profile Modelling Approach.*

**Stephen Cairns,** Glasgow University.
*Synthesis and Structural Studies of the Ettringite Group of Minerals.*

**Andrew Hardy,** Exeter University.
*Heavy-metal minerals in old and new cosmeceuticals? An unusual application of XRPD.*

**Peter R. Stacey.** HSL, Buxton.
*Accuracy in Analysis - How much crystalline quartz do you think you have?*

**Paul Scofield,** Natural History Museum.
Using Neutron Diffraction to Characterize the Mechanical Properties of Rocks.

**David Beveridge.**
*Chasing the Blue Mixed-valence Iron Sulphate.*

**Alison Pawley,** Manchester University
*Synchrotron Studies of the Structures of Hydrous Phyllosilicates at High Pressures and Temperatures.*

**Jenny Huggett,** Petroclays.
*Geology of wine - including some sampling!*

**Programme organisor: Martin Gill**
**See opposite for Fees and Registration.**

**Why not attend both days and take advantage of the reduced fees to broaden your knowledge?**

## Joint British Society for Strain Measurement / Industrial Group Meeting
## University of Manchester, 14th February 2007

Detailed reports can be found at http://bca.cryst.bbk.ac.uk/bca/ig/ig.htm

A workshop covering the measurement of residual stresses, using, neutron synchrotron and laboratory X-rays was held on February 14th in conjunction with the British Society for Strain Measurement (BSSM). The BSSM are interested in all methods of measuring strain, for example hole drilling, photo elasticity, contour measurement, optical correlation etc.

The workshop was aimed primarily at people in the Engineering Industry, who have no specialised knowledge of crystallography. Fourteen people attended.

Firstly, **Prof. Philip Withers** gave an introduction to the activities of the new School of Materials, which was formed by the amalgamation of three Departments, Materials Science, Corrosion & Protection and Paper Science. Phil presented an over view of the Department's Research activities and the new building program

**Judith Shackleton** then gave an introduction to basic crystallography and diffraction we discussed the nature of crystalline materials, Bragg's Law and diffraction geometry. We talked about the various components of laboratory X-ray diffractometers, how they work and how to get the best results.

**Dr Jo Kelleher**, from the School of Materials, discussed elastic constants. The $\sin^2\Psi$ method actually measures strain by determining the change in *d*-spacing. Stress is not measured directly; it is calculated via Hook's Law, using the elastic constants, usually Young's modulus and Poisson's Ratio.

Jo described the differences between X-ray and bulk elastic constants. Sources of elastic constants were also discussed for example, tables and literature references, as well as how they can be calculated.

After lunch **Joao Fonseca** took up the baton and introduced more exotic techniques using neutron and synchrotron radiation. These are much more energetic than laboratory X-rays and can be used to probe to a greater depth within a component. Neutrons will penetrate several centimetres into a sample, where as with laboratory X-rays it's just a few microns.

Joao described the various experimental facilities, the methods, which can be used, their strengths and weaknesses. Joao illustrated his talk with lots of examples, these included a strain map of the damage to a gas turbine blade which was caused by a bird strike, the stress fields around TIG welds and examples of gauge corner cracking in railway lines

**Jo Kelleher** took the stage again talked about sample preparation and electro polishing. This is very important, particularly when using laboratory X-rays, as the technique is very surface sensitive. If we want to look at the bulk of the material we have to remove the surface chemically. Mechanical removal will radically change the stresses, which we are tying to measure. Electro-polishing is a bit of a black art and can be little dangerous. Jo talked us through methods for polishing safely and effectively.

The final talk was given by **Tony Fry** of the National Physical Laboratory (NPL). Tony described the NPL's Good Practice Guide which was written to provide practical advice for those who are making measurements with laboratory X-rays for the first time. Tony also described the round robin studies, which are run by the NPL (using many methods, not just X-rays) and invited everyone to join in. Finally, we adjourned to the X-ray laboratories to make some measurements using Manchester's two Proto residual stress diffractometers.

**Judith Shackleton**, Materials Science Centre, University of Manchester.

## Pharmaceutical Special Interest Group Meeting
## 7th November 2007 AstraZeneca, Macclesfield

Detailed reports can be found at http://bca.cryst.bbk.ac.uk/bca/ig/ig.htm

**Morning Session: Photograph of Speakers.** From Left to Right: Bill Jones, Jerry Heng, Roger Davey, Tal Austin, Gordon Barr, Anne Kavanagh(chair).

This meeting was held at AstraZeneca's excellent conference facilities at their Macclesfield site, and attracted seventy delegates. The morning consisted of talks of general pharmaceutical interest, with considerable time devoted to polymorphism.

**Roger Davey** (Manchester University) opened the meeting with a personal perspective on 'Polymorphism – what have we learnt?'. Examples from over 100 years of the scientific literature were given, illustrating, for example, the different solubilities of polymorphs, the solution-mediated transformation of the metastable to the stable form, the methods of discovering new forms. Roger questioned the use of high throughput methods with thousands of experiments and huge quantities of data

**Gordon Barr** (Glasgow University) spoke on the use of automated cluster analysis of XRPD and Raman data for use in solid form screens in a talk with a thought-provoking title: 'Is PXRD the Gold Standard in High Throughput Experiments?' Gordon described the benefits and disadvantages of XRPD and Raman spectroscopy: preferred orientation and degree of crystallinity are two disadvantages which can affect the cluster analysis of XRPD data, while Raman data can suffer from relatively small differences between polymorphs, variability in background level, and cosmic ray spikes.

**Talbir Austin** (AstraZeneca) gave a talk titled, 'Understanding relative polymorph stability through structure and thermodynamics'. She described the process of polymorph selection of a pharmaceutical and explained how it is essential to understand which polymorphs can form since their different physical properties may affect bioavailability, and hence efficacy, of the drug. Having identified which polymorphs exist, it is then necessary to understand the stability relationships between them.

**Bill Jones** (Cambridge University) described the use of grinding to produce new forms in his talk 'Screening for New Crystal forms Based on Mechanical Activation of Mixtures'. Grinding together of components, particularly in the presence of a drop of solvent, can produce novel co-crystals, salts, polymorphs and solvates, which solution experiments may (at least initially) fail to produce. Many examples of new solid forms produced by grinding were given.

**Jerry Heng** (Imperial College) considered the importance of surface functional groups to the behaviour of pharmaceuticals in his talk, 'Crystal Engineering: Importance of Surface Properties'. Jerry described the use of macroscopic crystals of paracetamol, aspirin and ibuprofen to enable physical and chemical measurements to be made on individual faces. Jerry used a combination of methods: contact angle measurement, XPS, and approximations from knowledge of the crystal structure to understand how wetting properties are affected by the chemistry of different crystal facets.

## Pharmaceutical Special Interest Group Meeting
## 7th November 2007 AstraZeneca, Macclesfield

Detailed reports can be found at http://bca.cryst.bbk.ac.uk/bca/ig/ig.htm

**Afternoon Session: Photograph of Speakers.** From Left to Right: Roy Copley(chair), Fred Vogt, Maryjane Tremayne, Johnathan Burley, Jacco van de Streek.

After (a very tasty) lunch, the afternoon session concentrated on structure solution and refinement. Two themes ran through all the talks: a sense of confidence that good quality powder data can be used for structure solution from powders and a requirement that complementary techniques are used to confirm structures and avoid pitfalls.

**Fred Vogt** (GSK) spoke on 'X-ray diffraction, Computational Chemistry and NMR: A Multi-disciplinary Approach to Understanding the Pharmaceutical Solid State'. Fred demonstrated the use of the combined approach to maximise the understanding of the structure, dynamics and properties of pharmaceutical compounds. Fred described the use of ssNMR in the determination of the crystal structure of a pharmaceutical compound for which single crystals were not available.

**Jonathan Burley** (Nottingham University) gave an introductory lecture – 'Cocrystals and Other Complex Pharmaceutical Materials: Structure Solution from Powder Diffraction'. He described the process of data collection and strongly recommended the use of the Debye-Scherrer (i.e. capillary) over Bragg-Brentano (flat plate) geometry. This was to avoid or reduce the errors associated with the latter: preferred orientation, X-ray absorption by the sample and sample height effects. Jonathan then described how the structure could be obtained in three stages: indexing, obtaining an approximate structure solution, and refinement to obtain an accurate structure.

**Jacco van de Streek** (Frankfurt University) spoke on 'Semi-automated Rietveld Refinement of Molecular Crystal Structures with *DASH* and *TOPAS*'. Jacco described the use of *DASH* to direct a Rietveld refinement in *TOPAS*, by generating input files, then taking the output files from *TOPAS* and adapting them to be used as new input files. This removes the need for tedious manual intervention, and going back and forth between *DASH* and *TOPAS,* and speeds up the process so that high-quality Rietveld refinements can be carried out routinely in a matter of minutes.

**Maryjane Tremayne** (Birmingham University) speaking on 'Powders and 'Peer-Pressure': Pitfalls and Progress'. Maryjane described her work on the development of the Cultural Differential Evolution (CDE) technique for structure solution from powder data. The 'biological' evolutionary approach to the generation of trial structures is enhanced with the addition of a 'cultural' driving force, or 'peer pressure' in which the distribution in values of structural parameters in each generation is used to guide and enhance the optimisation process. This enables a more rapid convergence to the global minimum.

I would like to extend my thanks to the speakers for making this such a fine meeting, with very high quality and informative talks.

**Anne Kavanagh**
AstraZeneca

# Industrial Group Autumn Meeting
# 8th November 2007 AstraZeneca, Macclesfield

Detailed reports can be found at http://bca.cryst.bbk.ac.uk/bca/ig/ig.htm

**Morning Session: Photograph of Speakers.** From Left to Right: Tony Bell, Jeremy K Cockcroft, Michela Brunelli, Steve Norval, Stuart Turner

The Industrial Group Autumn Meeting was held at the AstraZeneca Silk Road Business Park site in the outskirts of Macclesfield. The morning session focussed on Rietveld refinement and its applications; the afternoon session focussed on Crystallography in Industry.

The meeting was opened with a welcome from Anne Kavanagh (AstraZeneca) and Steve Norval (Intertek MSG).

**Jeremy Cockcroft** (UCL) started the programme with a brief introduction to the Rietveld method, followed by a discussion of the pitfalls it can provide for the unwary user. Hugo Rietveld's original paper in 1969 referred to neutron diffraction, and recognised that peak positions are determined by the unit cell and may be affected by instrument set-up; peak area intensities are determined by the contents of the unit cell i.e. crystal structure; peak width is determined by the measurement resolution and is a fundamental parameter factor derivation, and peak shape is a convolution of many symmetric functions – in reality it is often very close to Gaussian.

**Tony Bell** (Daresbury) continued, looking at the transformation of waste iron oxide into commercially useful materials, using the bacterium Geobacter sulferreducens. He described how the bacterium can produce nanoparticulate magnetite ($Fe_3O_4$) by the reduction of amorphous Fe(III) oxyhydroxide. Synchrotron X-ray powder diffraction gave high-quality data. Topas Rietveld Refinement and Pair Distribution Function (PDF) software have been used to characterise the materials.

**Steve Norval** (Intertek MSG) spoke on application of Rietveld refinement in the real world. A basic and common limitation for many laboratories, especially in industry, is the reality of non-ideal materials. Real world materials often contain several phases, some of which can be of variable or uncertain composition. For example, boehmite (AlOOH) bio-protein carrier has been found to be a less effective carrier after freeze/thaw cycling. The aqueous gel was dried onto a silicon crystal surface. Rietveld refinement showed it to be very oriented.

**Michela Brunelli** (ESRF, Grenoble) has investigated hydrogen-bond patterns in organics and looked into temperature effects. A particular focus has been the analysis of new nitro-S proligands which have applications in Biometrics. The role played by water in the crystal structure of amino-acid has been found to be diverse.

**Stuart Turner** (Birkbeck College) described the experimental methods that have been used with the Rapid2 detector which is located at station 6.2 of the Synchrotron Radiation Source (SRS). Research undertaken has included studies of the dehydration of gypsum; and investigations of cement kiln feedstocks. He also talked about the different refinement methods in the Fullprof suite. He stressed the need for good initial models before undertaking batch refinements.

## Industrial Group Autumn Meeting
## 8th November 2007 AstraZeneca, Macclesfield

Detailed reports can be found at http://bca.cryst.bbk.ac.uk/bca/ig/ig.htm

**Afternoon Session: Photograph of Speakers.** From Left to Right: Moataz Attallah, Robert Hammond, Judith Shackleton(chair), Ian Ferguson, Andrew Winn, James Chisholm.

After an excellent lunch, the afternoon session - chaired by Judith Shackleton - was begun by **Ian Ferguson** (formerly UKAEA), who discussed what inverse pole figures are and how they can be used to obtain a detailed understanding of anomalous intensity and line positions in X-ray Powder Diffraction. They are produced by the projection of a pole figure onto an equatorial plane. A Nelson-Riley function is used. The figures reveal information about texture and cell-edge variations. He placed specific emphasis on their use in the metals industry.

**Moataz Attallah** (Materials Science Centre, University of Manchester) spoke next, on the use of synchrotron X-ray diffraction for characterising stresses in two-phase titanium linear friction welds. Linear Friction Welding (LFW) is a novel welding technology, which combines frictional heating and plastic deformation to join difficult-to-weld materials. He discussed the welding of the Ti-6246 two phase alloy used in the construction of parts of aeroengines. High pressures and temperatures are generated, and the materials are not melted – only softened. The material usage is much more efficient material than with other welding methods.

**Andrew Winn** (Materials Testing and Analysis Unit, Manchester Materials Science Centre) described the study of residual stresses by XRPD. In XRPD it is strain that is measured and from this stress is calculated. The lattice planes are used as a strain gauge. Andrew uses the $\sin^2(\psi)$ method to calculate stress.

**Robert Hammond** (Leeds University) described how in-line XRPD had been applied to a flow-through cell for the quantitative analysis of a phase transformation, within a slurry during crystallisation, that converted the metastable a-form of L-glutamic Acid to the stable b-form. Crystallisation involves nucleation (3D formation and assembly of molecular clusters) and growth (2D growth of clusters to crystals). The crystals need to match the specification with respect to their size and shape.

**James Chisholm** (CCDC) showed how the new Materials module of the Mercury software for the Cambridge Structural Database (CSD) can be used to study the packing patterns of polymorphs, hydrates and solvates. The Mercury CSD Visualizer program can compare crystal structures and identify similarities between polymorphs and specific regions that are similar. It can investigate packing to provide insights into the forces that direct crystal growth. Other new features in Mercury allow searching of the CSD for specific interaction motifs or more general packing features

Overall, it was a very interesting meeting. Both sessions were well-attended, and the venue was excellent. We are grateful to AstraZeneca for their sponsorship of the meeting.

**David Beveridge**
Harman Technology Limited

# Proposed Changes to BCA Industrial Group Constitution

**These changes will be proposed at the AGM on 9th April 2008 at the York Spring Meeting.**

Additions are underlined; deletions are ~~struck through~~; comments are in *italics*.

**10 OFFICERS.** The Officers of the Group shall be a Chairman, a Vice-Chairman, ~~and~~ an Honorary Secretary (who shall also act as Honorary Treasurer) and an Honorary Assistant Secretary/Treasurer. Only members of the Group shall be eligible to be officers of the Group.

*When changes to the Group Officers occur, problems and delays are experienced in issuing cheques, this is especially the case if two officers retire at the same AGM. The problem is exacerbated by the increased security measures now involved in changing bank signatories. The Honorary Secretary/Treasurer has the highest workload of all the Group Officers. The committee propose a new office of Honorary Assistant Secretary/Treasurer to overcome both these problems. It will increase to FOUR the number of cheque signatories (any two from four) and relieve some of the Honorary Secretary/Treasurer's workload. The committee will oversee the division of duties between the Honorary Secretary/Treasurer and Honorary Assistant Secretary/Treasurer to best suit the needs of the Group and the individuals. The new assistant position is seen as a training role for future office as Honorary Secretary/Treasurer.*

**12 PERIOD OF OFFICE FOR OFFICERS AND COMMITTEE**. Each Officer and Ordinary Member of the Committee shall retire after a maximum of three years service. No officer or Ordinary Member of the Committee shall be eligible for re-election to the same office until one year has elapsed since his or her retirement. In this section a year's service is deemed to be the period between successive AGM's.

*There is a need to make clear that the period of office of committee members is not governed by calendar years, but the period between successive AGM's. The proposed change gives clarification of this issue.*

**13 CO-OPTION TO THE COMMITTEE.** The Committee shall have power to co-opt to fill casual vacancies in compliance with Rule 11. In addition it may co-opt such other members not exceeding ~~two~~ three in number as may be required from time to time, without the restrictions contained in Rules 11 and 12 *Experience has shown that only permitting two co-opted members can lead to inadequate flexibility, so it is proposed to increase to three the number permitted.*

**16 DELEGATION.**
(a) The Committee may delegate any of their powers or functions to a subcommittee consisting of two or more Committee members, one as chair, and a small number of nominated experts. The terms of reference of any such delegated subcommittee must be recorded in the minutes.
(b) No expenditure may be incurred on behalf of the Industrial Group except in accordance with a budget previously agreed by the Committee.
(c) The Committee may revoke or alter a delegation.
(d) All acts and proceedings of any subcommittees must be reported to the Committee.

*It has become clear with the experience gained in bringing XRF into the Group that some of the work of the Industrial Group Committee is best handled by smaller sub-committees. A new addition to the constitution on delegation sets forth what we have found to work well for XRF and opens up the possibility of the delegation of other tasks in the future. Rules 16-20 would become 17 - 21.*

# X-RAY FLUORESCENCE (XRF) PAGE

## Next XRF Meeting -14th May 2008
**British Geological Survey, Keyworth.**

For more details of this meeting see page 4.

**SPRING MEETING April 2009**
This meeting will include parallel XRF sessions and an exhibition. Planning the programme will start soon. If you have ideas for a theme, or there are specific topics you want to see covered, or if you already have a presentation in mind, then please contact Dave Taylor ASAP with your suggestions.

**WEB Newsletter:** We are always on the look out for articles for the web and Newsletter, so if you have something to offer contact the editor.

Don't forget that we need your help in expanding our **supplier pages** on the web to build it into a really useful guide for XRF users.
A new section has been added on Fusion Machines – if you are not listed then let us know!

**A Tribute to Harold Leslie Giles:**

We are saddened to report the passing of Les on the 11th December 2007.

Les joined London & Scandinavian Metallurgical in 1959 and worked there for 32 years until 1991. During his time at LSM, he was a pioneer of the fused bead method for many different types of sample, and of the runny egg breakfast for unsuspecting service engineers and sales representatives. His ability to produce beads from otherwise refractory materials encouraged others to pick up their platinum ware, cast their first bead and run their first calibration. His practical skills with a muffle and keyboard found world wide acclaim following the publication of the Wide Range Oxide calibration strategy.

Les eased into retirement by confronting a younger audience of prospective analysts at Sheffield Hallam University with wondrous demonstrations of dexterity with spatula and long nosed tongs.

The XRF community is all the better for his wit and wisdom, never acknowledging that he felt better than 'Mondayish' and surrounded by people that made him long to call the missionaries back from abroad, he encouraged many now expert practitioners. During his 81 years he rose from the national service ranks as an aircraft fitter to be respected by Durham Conference delegates as the *Venerable Bead*. After his funeral on 14th December, his family invited us to enjoy a 'small glass of lemonade' in his memory.

He is survived by his wife Joan, son Martin and daughter Tina.

*Margaret West et. al.*

**May meeting Sponsorship:**

Sponsorship is now extended to both the XRF and XRD meetings on the 14th and 15th May 2008. Tables and poster boards will be supplied to give sponsors the opportunity to display literature and promotional posters during the two days of the meetings. These will be close by the lectures and give delegates ample access to view the materials during the meeting breaks.

**We look forward to seeing you at the British Geological Survey in May.**

## Industrial Group Committee 2007-2008

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