

Society of Crystallographers

in

Australia

Newsletter No. 5

OCTOBER 1982

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OFFICE BEARERS

President: B.M.K. Gatehouse (Monash Univ.)
Vice President: T.M. Sabine (NSWIT)
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W.T. Robinson (Univ. Canterbury, N.Z.)
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E.N. Maslen (Univ. WA)

Standing Committees (*Chairperson)

Electron diffraction: D.J.H. Cockayne (Univ. Sydney)*
P. Goodman (CSIRO Chem. Phys.)
A.W.S. Johnson (CSIRO Chem. Phys.)
J.R.J. Sellar (ANU)

X-ray Diffraction: R.B. Fraser (CSIRO Protein Chem.)*
I.E. Grey (CSIRO Min. Chem.)
J.M. Guss (Univ. Sydney)
S.W. Wilkins (CSIRO Chem. Phys.)

Neutron Diffraction: F.H. Moore (AINSE)*
V.J. James (Univ. NSW)
C.J. Howard (AAEC)
T.J. Hicks (Monash Univ.)

Computing: B.J. Poppleton (CSIRO AOC)*
S.R. Hall (Univ. WA)
N.W. Isaacs (St Vincents Sch. Med. Res.)
A.D. Rae (Univ. NSW)

Nominations: I.G. Dance (Univ. NSW)*
E.W. Radoslovich (CSIRO Soils)
S.L. Mair (CSIRO Chem. Phys.)
M.R. Snow (Univ. Adelaide)

Newsletter Editor: R.J. Hill
CSIRO Div. Mineral Chemistry
PO Box 124, Port Melbourne
Victoria, 3207

INCORPORATION OF THE SOCIETY

As reported in the last Newsletter, the 1982 AGM approved a motion to proceed with Incorporation of the Society. Max Taylor has now completed these arrangements and the SCA has been a Corporate body, registered in South Australia, since May 24, 1982.

The Council of the SCA wishes to express its thanks to Max for his considerable effort and perseverance in bringing the matter of incorporation to a successful conclusion.

CRYSTAL 14

Note that the next SCA meeting will be held at the Morpeth Conference Centre, near Maitland (in the Hunter Valley) from Aug. 30 to Sept. 2, 1983, not in February 1984. The Hunter Valley is a beautiful place to be in late winter (the best of the vintages are still available in reasonable abundance), and with the distractions of the Big City far away, we can concentrate on Science and Cameraderie.

It is early days yet, but an attempt is being made to set aside a full day for an X-ray and/or neutron Powder Diffraction sub-meeting, incorporating oral and poster presentations of research work, and also discussion sessions. Contributions on any aspect of powder diffraction, from preferred orientation, through residual stress, quantitative phase analysis and pattern search and match, to full profile structure solution and refinement methods will be most welcome.

If you have any suggestions about other topics for more detailed treatment at Crystal 14, let Rick Tietze (Dept Chemistry, Univ. Newcastle) know and he can get the ball rolling. One area which seems to have been neglected since people began using Direct Methods Packages on a routine basis is the reporting of "Problems with Crystal Structure Solution", and "How to deal with Supersymmetry, Non-crystallographic Symmetry etc." How about sending in an abstract on your latest "curly" structure solution (or failure)?

RACI 7TH NATIONAL CONVENTION

The 7th National Convention of the RACI was held in Canberra, August 22-27, 1982. All 11 Divisions of RACI took part, and a total of some 1100 delegates were in attendance, including many overseas visitors. For the first time every Division participated by arranging specialist symposia, and in some cases a conscious attempt was made to arrange interdivisional joint specialist discussions. This new format departed from the practise of devoting almost the entire meeting to broad aspects of the social and political responsibilities of Chemists, and certainly contributed to the outstanding success of the Conference.

Two highlights, for crystallographers in particular, were the Convention Lecture by Prof. Sir David Phillips, FRS, of Oxford University, and the Polymer Division Lecture by Prof. T.L. Blundell, of Birkbeck College, London, both concerning the structures of proteins. The abstract of Prof. Phillips is reproduced below:

X-RAY DIFFRACTION STUDIES AND PROTEIN STRUCTURE

D.C. Phillips

Laboratory of Molecular Biophysics, Department of Zoology,
Oxford University, Oxford, England.

Sir David Phillips FRS is Professor of Molecular Biophysics at Oxford University. He was the first to determine the three dimensional structure of an enzyme (lysozyme) which was carried out while he was at the Royal Institution in London. This work also involved the elucidation of the details of binding of the substrate and the mechanism of action of the enzyme. More recently he and his group have used X-ray and other techniques to determine the structure of various proteins including a range of enzymes.

ABSTRACT

It is now more than twenty years since the detailed structure of a globular protein molecule was first determined by crystal structure analysis. Since this first successful study of the oxygen-storage protein myoglobin, by John Kendrew and his colleagues in 1959, the structures of nearly one hundred different proteins, comprising many different types, have been analysed and their biological functions investigated by diffraction methods.

The first enzyme structure to be determined was that of hen egg white lysozyme in 1965 and since that time many enzymes and their interactions with inhibitors and other ligands have been studied in detail. General principles governing the complex conformations of protein molecules have emerged and progress has been made towards the classification of enzyme (and other protein) structures in a limited number of families, evidence bearing on the evolution of proteins has been obtained, and the prediction of three-dimensional structures from chemical data alone has begun to seem practicable. At the same time the chemical properties of protein molecules and the effects of protein conformation upon the reactivities of functional groups have been considered and clarified. Illustrations of these advances will be given.

During recent years the availability of intense X-ray sources and increasingly powerful computers has made possible the refinement of protein structures at very high resolution so that more precise descriptions of them are being obtained that include information about their dynamic behaviour. It is now generally recognised that protein molecules are highly mobile structures subject to complex internal motions and that these motions are important to their activities. Crystallographic studies, including a growing number at low temperature, in association with spectroscopic and other investigations are helping to provide new insights into the nature and properties of these vital molecules.

FORTHCOMING MEETINGS

February, 2nd week: AIP Solid State Meeting, Wagga Wagga, NSW
Contact: Prof. G.V.H. Wilson, Dept Physics,
Faculty of Military Studies, Royal Military
College, Duntroon, ACT 2600

- March 14-18, 1983: Missouri ACA Meeting, University of Missouri, Columbia, Missouri. Contact: Jack Williams, Division of Chemistry, Bldg 200-A113, Argonne Nat. Lab., 9700S. Cass Ave, Argonne, Illinois 60439 USA
- Mar.21-Apr.1, 1983: X-ray Crystallography and Drug Action, Erice, Italy. Contact: Prof. A.S. Horn, Laboratorium voor Farmaceutische en Analytische Chemie, Rijksuniversiteit, 9713 AW Groningen, The Netherlands
- March 28-31, 1983: Crystallographers' Spring Meeting, British Crystallographic Association, Royal Holloway College, Egham, Great Britain. Contact: Dr M. Moore, Dept of Physics, Royal Holloway College, Egham Hill, Egham, Surrey, TW20 OEX, Great Britain
- May 16-20, 1983: 5th National School and Conference on X-ray Analysis, Melbourne. Contact: Mr R.A. Coyle, PO Box 90, Parkeville 3052, Victoria
- July 4-8, 1983: 4th International Conference on Solid State Ionics, Grenoble, France. Contact: M. Kleitz, SSI 83, ENSEEG, BP 44, 38 401 Saint Martin d'Heres, France
- July 11-15, 1983: Gordon Conference on Electron Distribution and Chemical Bonding, Plymouth State College, New Hampshire. Contact: Prof. G.A. Jeffrey, Dept of Crystallography, University of Pittsburgh, Pittsburgh, Pennsylvania 15260, USA
- August 1-5, 1983: ACA Meeting, Snowmass, Colorado. Contact: Prof. R.D. Witters, Dept of Chemistry, Colorado School of Mines, Golden, Colorado 80401, USA
- August 8-12, 1983: 8th European Crystallographic Meeting, Liège, Belgium. Contact: Léon Dupont, Institut de Physique B5, Université de Liège Sart-Tilman, B-4000, Liège, Belgium
- August 18-27, 1983: International Summer School on Crystallographic Computing, Kyoto, Japan. Contact: Dr S.R. Hall, Crystallography Centre, University of WA, Nedlands 6009
- Aug.30-Sept.2, 1983: 14th Meeting of the SCA, Morpeth Conference Centre, near Maitland in the Hunter Valley, NSW. Contact: Mr H.R. Tietze, Dept of Chemistry, Univ. of Newcastle, NSW 2308
- August 9-18, 1984: IUCr 13th Congress, Hamburg, Germany.

Contact: Dr H. Saalfeld, Mineralogisch-Petrogr.
Inst., Universität, Grindelallee 48, D-2000
Hamburg.

HONOURS

Mr E.A. (Bill) Palmer, Executive Officer of the Australian Institute of Nuclear Science and Engineering (Lucas Heights) was awarded the OBE in the 1982 Queen's Birthday Honours List for his services to Science and Technology.

Dr A.F. Reid, Assistant Chief at the CSIRO Division of Mineral Chemistry was elected a Fellow of the Australian Academy of Science in 1982 for his outstanding contributions to Crystal Chemistry and Mineralogy. In addition, he has recently been appointed Chief of the CSIRO Division of Mineral Engineering at Clayton, Victoria.

Dr I.E. Grey, Senior Principal Research Scientist at the CSIRO Division of Mineral Chemistry is the recipient of the inaugural RACI Solid State Division Medal for 1982 in recognition of his contributions to Solid State Pure and Applied Chemistry.

Dr B.M.K. Gatehouse (your President) of the Department of Chemistry at Monash University has had his 1957 paper on the infrared spectra of nitrate-coordination complexes decreed a "Citation Classic" by the Institute for Scientific Information based in Philadelphia. The paper, co-authored with S.E. Livingstone and the late R.S. Nyholm, was designated a "classic" when it became one of the most cited items in its field as identified by data from the Science Citation Index and the Social Sciences Citation Index. Only one other Monash scientist has been honoured similarly.

Prof. T.N.M. (Neil) Waters of the Chemistry Department at the University of Auckland has been elected a Fellow of The Royal Society of New Zealand. This distinction may be added to his other success in 1982 in being appointed Vice-Chancellor of Massey University.

Dr R.B. Fraser of the CSIRO Division of Protein Chemistry was awarded the 1981 Research Medal of the Royal Society of Victoria for his studies of the structure of fibrous proteins.

PERSONALIA

During 1981, two prominent people from the field of X-ray analysis within Australia retired. Vince Manners - a founding father of the AXAA - retired from the Department of Defence Materials Testing Laboratories, Alexandria, NSW. At the last AXAA National Meeting held at A.N.U. in 1980, Vince was bestowed with a Life Membership of the AXAA for the time and effort spent in promoting the ideals of this Association.

The second retirement was John Hutton, CSIRO Division of Soils, Glen Osmond, SA. During 1964, the now famous "Norrish & Hutton Flux" was developed in Australia and it is still used world-wide for quantitative XRF analysis. Quite apart from this fame, John is well known for

his numerous publications in the field of XRF.

Congratulations to Margaret Elcombe on the birth of her daughter Emma in early August 1982. Margaret will be returning to her duties with the AAEC towards the end of 1982.

The CSIRO Division of Mineral Chemistry was privileged to be visited by Professor G.V. Gibbs of VPI & SU in Blacksburg, Virginia, during the week prior to the 7th National Convention of the RACI in Canberra. Professor Gibbs is the immediate past president of the Mineralogical Society of America, and has recently been promoted to University Distinguished Professor at Virginia Tech. in recognition of his pioneering contributions to the application of ab initio molecular orbital methods to mineralogy/crystal chemistry. He was an invited speaker for the Solid State Division of the RACI during the Convention .

IUCR COMMISSION ON SMALL MOLECULES

The Society has recently been informed of a proposal to establish an IUCr Commission on Structural Analysis of Organic and Biologically Active Small Molecules. One of the justifications for the formation of the Commission is that (quoting from a letter by Bill Duax of the Medical Foundation of Buffalo):

"There is a growing tendency to relegate most small molecule structural work to poster sessions, and to dismiss correlations of data with chemical, physical, biological and pharmacological properties. It is all too often forgotten that such structural studies often provide precise data unavailable by other means, yet of use to a wide body of scientists. Small molecule structural studies are, and should not be, taken as the poor relations of macromolecule work."

The suggested terms of reference for the new Commission are:

I. Terms of Reference

- a. To advise the IUCr in organizing or sponsoring sessions on organic and biological small molecule structural analysis at congresses and conferences.
- b. To promote and coordinate scientific exchange between countries in the field of organic and biological small molecule structural analysis.
- c. To cooperate with other Commissions of the Union on matters dealing with organic and biological small molecule structural analysis.
- d. To cooperate with other international bodies interested in organic and biological small molecule structural analysis.

II. Selection of Commission Members

- a. The commission will consist of no more than 9 members.
- b. Commission members will be elected for three year terms.

- c. Prior to each IUCr congress, the Commission on Structural Analysis of Small Organic and Biological Active Molecules will submit to the IUCr ranked lists of fifteen nominees for commission membership.
- d. It is desirable that the commission conduct a poll of practicing scientists representative of the field, to assist in establishing the above list of nominees.

The mechanism for establishment of a Commission is by proposal from one or more of the National Committees or adhering bodies of the IUCr and subsequent vote of the delegates to the International Assembly.

The SCA Council is interested to hear from any member who feels strongly for or against the formation of the new Commission, and from anyone who would be willing to serve on this body. In the absence of any response Council will assume that the membership approves of the move and will proceed to lend the support of the SCA.

STRUCTURAL DATABASE DATA DEPOSITION FORM

Please consider lodging information about your recent structure work with the Structural Database. Return a copy of the form on page 9, with an abstract of the published material, to:

Keith D. Watenpaugh
Dept of Biological Structure
University of Washington SM-20
Seattle, Washington 98195

MEMBERSHIP NEWS

Membership of the SCA as of September 1982:

| | |
|---------------------------------|-------------|
| Full members | 130 |
| 1 year in arrears | 7 |
| 2 years in arrears | 16 |
| Student members | 25 |
| 1 year in arrears | 2 |
| 2 years in arrears | 8 |
| Total membership as at 10/09/82 | <u>155*</u> |

* Includes members who are in arrears.

Names of members who are in excess of two years in arrears have been removed from the mailing list.

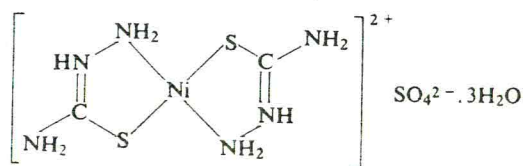
DATA DEPOSITION FORM

IMPORTANT: Please use one form for **each** organic, organometallic or metal complex structure in the abstract. Contents of the form will be input directly to the Structural Database maintained by the Crystallographic Data Centre, Cambridge (U.K.).

| | | | | |
|---|--------------|----------|---------------------------|----------------|
| COMPOUND NAME (and important synonym, if any) | | | | |
| MOLECULAR FORMULA (eg. $C_{10}H_8NO_2^- \cdot Na^+ \cdot xH_2O$) | | | | |
| AUTHORS' NAMES WITH INITIALS | | | | |
| CRYSTAL AND EXPERIMENTAL DATA | | | | |
| <i>a</i> | () | <i>b</i> | () | <i>c</i> () |
| α | () | β | () | γ () |
| <i>Dm</i> | <i>Dx</i> | <i>Z</i> | Space Group | <i>R</i> |
| Neutron Study | Abs. Config. | | Temp. (if not room temp.) | °C |
| <p>PUBLICATION HISTORY</p> <p>If this structure has been reported elsewhere by you (or others) give reference(s):</p> <p>If this structure has been submitted for publication give journal and indicate if in press:</p> | | | | |

CHEMICAL STRUCTURAL DIAGRAM — Please use other side of form

Please give conventional **chemical** (not crystallographic) diagram with clear indication of elements and bond types, charges, etc. Include solvent molecules *even if indeterminate*, eg. xH_2O . Thus:



Members who joined in 1982:

Full members:

Dr W. Barker (WA)
I.B. Browne (ACT)
Dr J.P. Glusker (USA)
Dr T.J. Hicks (Vic.)
Dr K. Machin (Vic.)
I.C. Madsen (Vic.)
Dr J.N. Varghese (Vic.)
G.S. Walker (Vic.)

Student members:

C. Dean (SA)
T.P.J. Garrett (NSW)
Miss J. Hodge (NSW)
Miss J. Siripctayananon (ACT)
Miss V. Tooptakong (ACT)

Resignations 1982

Dr W.M. Kriven (West Germany)
Dr M.J. O'Connor (Vic.)

Deaths

Obituary for Dr W. Boas (from Australian Physics, July 1982):

Dr. Walter Boas, one of Australia's most highly respected scientists, died suddenly in Melbourne on Tuesday, May 12, aged 78. He leaves a wife, daughter and son.

Internationally known and recognised for his work on the physics of metals and their behaviour under stress and deformation, Dr. Boas was the author of numerous books and specialised papers on the subject as well as one of the pioneers of the scientific study of engineering materials.

For 20 years, before his retirement in 1969, he was Chief of the CSIRO Division of Tribophysics where he was "father" to a hand-picked group of Australia's most promising young scientists, many of whom rose to great distinction under his guidance.

Walter Boas was born in Berlin in 1904 and received his doctorate from the Technical University there in 1930. Having established his scientific reputation in various universities and research institutions in Germany and Switzerland, he came to Melbourne University in 1938 as Carnegie Lecturer, and later Senior Lecturer, in Metallurgy. During the war years, he worked in close collaboration with the CSIRO section of Bearings and Lubricants, which later became the Division of Tribophysics and which he joined in 1947 as Principal Research Officer. He was ap-

pointed Chief of Division in 1949. Under his leadership, the Division broadened its work and carried out highly successful and distinguished research into the properties of materials and of solid surfaces. He was elected Fellow of the Australian Academy of Science in 1954; was Foundation Member and President of the Australian Institute of Metals, Honorary Fellow of the Australian Institute of Physics, Foreign Scientific Fellow of the Max Planck Institute for Metallurgical Research in Germany and was honoured by numerous other learned societies both here and overseas.

After his retirement from the CSIRO he became Honorary Fellow in the Department of Metallurgy at Melbourne University as well as Chairman and Vice-President of the International Union of Pure and Applied Physics.

His position as senior statesman in the world of science and as friend and advisor to his colleagues continued to the very end. Boundless enthusiasm and irrepressible good humour were the main attributes of this lovable and humane man who will be sadly missed by his numerous colleagues, friends and students. There will be no one left to tell them first-hand what Planck said to Einstein after the lecture by Schroedinger.

Obituary of V. Subramanian (from the May 1982 ACA Newsletter):

Venkatraman Subramanian, a postdoctoral research fellow at the Crystallography Centre of the University of Western Australia, died tragically on 27 December 1981 at the age of 30 as a result of a swimming accident.

Subbu, as he was known to his friends and colleagues, was born in Bombay. He obtained a B.Sc. in Chemistry at Madras University in 1972; an M.Sc. at Birla Institute of Technology in 1974; and a Ph.D. in Chemistry at the University of Hawaii in 1980. In 1974-75 he was a CSIR Research Fellow at the Indian Institute of Science in Bangalore. Subbu was a member of the American Crystallographic Association, American Chemical Society, Sigma Xi and the Society of Crystallographers in Australia.

Subramanian had in the course of his short career made significant contributions to a number of fields. His work on zeolite crystal structures at the University of Hawaii contributed much to the understanding of these complex systems. He was also very interested in improving application techniques in crystallography. This led to his appointment at the University of Western Australia in July, 1980 as an ARGC research fellow for the development of crystallographic computer software for the XTAL System. During his short tenure in the position he collaborated in a number of publications on the precision of normalized structures and was responsible for developing two major computer programs.

Subbu was a diligent research worker with a care for detail. His enthusiasm, warm personality and bright disposition made him a friend to all he met. He was highly respected by his colleagues and admired by the many students he went out of his way to assist. We will all greatly miss this young man who gave his all, and certainly science has lost a devotee who still had so much to offer.

Sydney R. Hall
Karl Seff

TREASURER'S REPORT

Statement of Income and Expenditure for the year ended 30th June, 1982

| | \$ | \$ |
|--|-------|-------|
| <u>Income</u> | | |
| Membership Subs. | 796 | |
| Savings Bank Interest (ANZ) | 215 | |
| Interest on FCA debts. | 287 | |
| Profit from Crystal XIII | 12 | |
| Sales World Directory | 24 | 1334 |
| | <hr/> | <hr/> |
| <u>Less expenditure</u> | | |
| Incorporation Expenses | 66 | |
| Postage | 41 | |
| Ottawa Prize Examining | 30 | |
| Stamp Duty | 6 | |
| Miscellaneous | 4 | 147 |
| | <hr/> | <hr/> |
| Surplus for year transferred to accumulated funds | | |

Balance Sheet as at 30th June, 1982

Accumulated funds

| | | |
|---------------------------|-------|-------|
| Balance as at 30/06/81 | 5683 | |
| Add surplus for this year | 1187 | 6870 |
| | <hr/> | <hr/> |

These funds are represented by current assets

| | | |
|--|-------|-------|
| Finance Corp. of Aust. Ltd debs (maturing 24/11/83) | 3000 | |
| Bank of NSW Interest Bearing Dep. (maturing 05/04/84) | 3500 | |
| Bank of NSW Savings Account | 370 | 6870 |
| | <hr/> | <hr/> |
| <u>Liabilities</u> | - | - |
| | | <hr/> |
| | | 6870 |
| | | <hr/> |

14/07/82

(Signed) M.F. MACKAY
Hon. Treasurer

AVAILABILITY OF X-RAY PHOTOGRAPHIC FILM

1. KODAK

- a) Industrex A - is available (ex. stock) in the following sizes:
 - 10 x 40 cm Sheets (No. 408 6005) 35 x 43 cm Sheets (No. 408 7698)
 - 18 x 24 cm Sheets (No. 408 6450) 24 x 30 cm Sheets (No. 414 3541)
 - 30 x 40 cm Sheets (No. 418 7589) 70 mm x 60 m Roll (No. 414 2402)

Also TMX in 10" x 12" (No. 162 6779) or 14" x 17" (No. 162 6563) Sheets.

- b) No Screen Film - Type NS 392T (No. 173 3989) available Ex Stock in rolls of 3.5 cm x 7.5 m. A replacement for the old "Kodarex"

2. CEAVERKEN AB (Postal Address: S-152 01 STRANGNAS, SWEDEN)

- a) Reflex 15 available in 18 x 24 cm sheets or 35 mm x 35 m rolls.
 - b) Reflex 25 available in 5" x 7" sheets or 35 mm x 35 m rolls.
- Reflex 15 is single-sided while Reflex 25 is double-sided emulsion.

(Information obtained from AXAA Newsletter 1982.1)

ANNOUNCEMENT FROM SIEMENS LTD (Roald Horni)

Following our successful appointment of Sietronics Pty. Limited as Technical and Application Consultants for Siemens X-Ray Analytical Equipment on 1st February, 1981, Siemens is pleased to announce that this association has been extended, in that, as of 1st July 1982, Sietronics Pty Limited has been appointed Australasian Distribution of Siemens X-Ray Analytical Equipment.

Careful planning and preparation has preceded the transition period to ensure that service to our customers will not be impaired. In the

course of the next months, Roald Horni of Siemens will assist Sietronics with the changeover, so that a continuity of both sales and service functions will be maintained.

Other products from the manufacturers Herzog, Huber, Stoe and Paar, which were also obtainable through Siemens, will be similarly now available from Sietronics.

CRYSTALLOGRAPHY CAN BE FUN

Convinced that many crystallographers often take themselves and/or their profession too seriously it was a very pleasant surprise to see that the Applied Crystallography Special Interest Group of the ACA sponsored a Special Session entitled "Crystallography Can Be Fun" during the Winter Meeting in Maryland this year.

Among the papers presented were:

The art of crystallography and the science of M.C. Escher (Arthur L. Loeb)

A pigment study of the Fogg's self portrait by Vincent Van Gogh (Eugene Farrell and Richard Newman)

Forensic materials science and the role of X-ray diffraction (Bill C. Geissen)

Gems, bugs, dinosaurs, and meteorites: crystallography in a natural history museum (Daniel E. Appleman)

Longevity of Roman and Greek concrete: orderly observations of disordered structures (Della M. Roy et al.)

Sea urchins, sand dollars, and the Laue method (H.V. Hart et al.)

Symmetry and antisymmetry in Maori rafter designs (J.D.H. Donnay)

Phase transitions while you wait (C.W. Lee et al.)

How about a Session along these lines for the next SCA meeting?

CALL FOR CONTRIBUTIONS

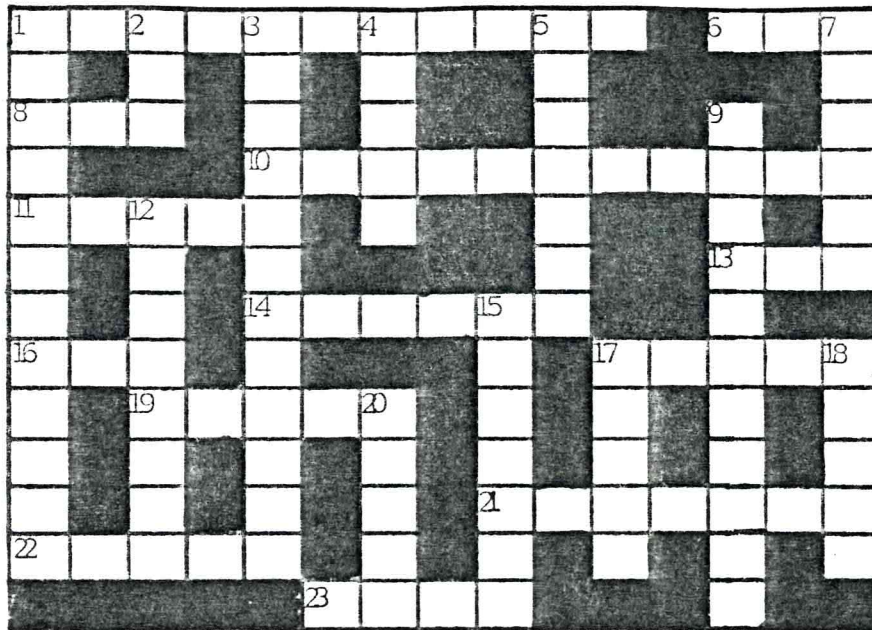
In the intervening 6 months since the same plea for contributions was made in the last Newsletter the Editor has been inundated with unsolicited items from only three individuals, and one of those items was by way of an unpaid advertisement. Is there anybody out there besides Roald Horni, Maureen Mackay and Bob Cheary?

APPLICATION FORM FOR MEMBERSHIP

Please detach the back leaf of this Newsletter and forward it to any person whom you think may be interested in becoming a member of the SCA.

CRYPTIC CRYSTALLOGRAPHIC CROSSWORD

The following crossword has been devised by Bob Cheary (NSWIT) and is reproduced here with his kind permission. The answers will appear in the next SCA Newsletter, along with the name of the first person to submit a correct solution to the Editor.



ACROSS

1. How an x-ray views the charge distribution is unsettling R.A.F. comforts (4,7)
6. Layer upon layer obtained by extracting coal from the U.S.S.R. (3)
8. Grog pusher in a cool drink (3)
10. A sample problem which is garbled on air tonite (11)
11. Bryce confused by the CSIRO computer network (5)
13. Bragg was one of these society chaps (3)
14. Blending intars gives crystals a mosaic spread (5)
16. In July, it's grey in Antarctica and white in Timbuktoo (3)
17. In the beginning 80% was bromine and silver (5)
18. An incident case when the definite article is written by Acta without Arthur Compton's initials (5)
21. Nearly all of us have had dealings with them, but not for a twisted hip slip (7)
22. The current situation will be rectified if the dioxide is devoid of its eleven impurities (5)
23. An extract of laurel is a laureate! (4)

DOWN

1. Confronted by a Bull's eye (4,7)
2. There's something fishy about the mass attenuation coefficient (3)
3. Convolution of clue, for scene of this radiant effect (12)
4. I can arrange to see you before that ball point pen manufacturer, how does that shape up? (5)
5. Hidden in the front, genius who saw the invisible beam. (7)
7. Sounds like flat open spaces which is just how they look in a lattice (6)
9. E.M. bending it off rancid mixture (11)
12. He and Bragg are married by symmetry, but maybe this will upset Ann or Bet! (8)
15. A Romanized version of stirred up lime sap is all you need to start an investigation (1, 6)
17. Anyone but Dirac would recoil from him in a sombre Italy (5)
18. Featureless patterns are a feature of ground slags (5)
20. Place aluminium next to the pulse height analyser to generate this type of emission (5)

SOCIETY OF CRYSTALLOGRAPHERS IN AUSTRALIA

APPLICATION FOR MEMBERSHIP

Name:

Please print full name and include formal title (Mr, Ms, Dr, Prof., etc)

..... Title Forenames and/or initials Surname

Mailing address:

.....

.....

..... Postcode

Membership category:

☐ Regular. Annual dues \$10 ☐ Student. Annual dues \$2 ☐ Corporate. Annual dues \$100

Membership is on a calendar year basis. Applications received after June 30 will apply for the following year unless otherwise requested.

Sponsorship:

Two current members of the Society must sponsor the application.
Please write to the Secretary if you do not know any current members.

Sponsor 1

Sponsor 2

Name (please print)

Signature

P.T.O.

Students must fill out the information below and have it certified by a faculty member of their school:

The applicant is known to me and is a bona fide student at
..... for the current academic year.
name of school

Faculty member:
Name Signature

Special interests:

Please indicate major fields of interest

Students should indicate the degrees or diplomas sought

1.

2.

Payment:

I enclose \$..... for membership dues for the year

.....
Signature Date

Please make cheques payable to the "SCA" and forward to:

Dr M.F. Mackay
Department of Physical Chemistry
LaTrobe University
BUNDOORA, VIC. 3083