THE AUSTRALIAN METROLOGIST

Published by the Metrology Society of Australia. ISSN 1321-6082

FROM THE PRESIDENT

"Measure with a micrometer.
Mark with chalk.
Cut with an axe."
John's Rule of Precision

Key into your kilobytes and ink into your diary the 30th November and the 1st December. These are the dates for our very first national conference at the National Measurement Laboratory, Lindfield, Sydney. A "Call for Papers" has already been widely distributed and is reprinted on the back page. I urge every member to participate by submitting papers and attending the conference. This will be a great opportunity to meet and exchange information with MSA members from all over Australia. Further details on the conference will be found in this issue of TAM.

± ± ± ± ±

With this issue, you will have received your membership certificate. We have been aware that the delay in accomplishing this has caused concern to many of our members, but we had taken the view that the design of the logo and certificates is an important and once-only step and should, therefore, be done carefully and thoroughly. I am sure, however, that you will all be delighted with the results.

± ± ± ± ±

The Management Committee held a day-long forward planning meeting in January. Some of our more significant goals for 1995 are:

- to modify the rules of the MSA to incorporate State branches. The rapid growth and enthusiasm of State branches now demands that their structure and function be devised *(even their name needs to be decided! Branches, Divisions, Chapters, Groups?).* We will be asking all State Coordinators to raise these issues with local members as we need your ideas on such important matters.

- to produce an information kit on the MSA that includes a promotional brochure, membership application forms and examples of MSA activities.

- to begin marketing and promoting the MSA to the wider community.

- to develop linkages with educational institutions and provide a list of metrology courses available in Australia for our membership.

- to conduct another targeted membership drive, probably later in the year. Our aim is to have at least 500 members by the year 2000. Meanwhile, I urge all of you to try to recruit new members. If each of us recruited one member, our membership would double *(I worked this out on my calculator!).*

- to provide a calendar of events for 1995, including State activities, conferences, etc.

Our longer term goals (by the year 2000) include: interaction with and recognition by international organisations and groups, the provision of awards for excellence in metrology, raising our profile in industry, lobbying government on metrology issues, raising the status of metrology as a profession, etc.

± ± ± ± ±

A very important development that has already begun to occur is the formation of Technical Groups within the MSA. The Pressure Technical Group was officially formed at the last meeting of the Management Committee, consisting of both members and non-members of the MSA with a common interest in the technical aspects of pressure metrology. Details of this Group are included inside. It is envisaged that Technical Groups will provide a forum for the exchange and discussion of technical issues. The MSA umbrella will give the Technical Group an independent voice, capable of representing their views to government and industry. The details of the structure and organisation of Technical Groups will need to be worked out in due course. If you are interested in forming such a group, please contact the Management Committee.

John Miles

The Australian Metrologist is published four times per year by the Metrology Society of Australia Inc., an association representing the interests of metrologists of all disciplines throughout Australia. Membership is available to all appropriately qualified and experienced individuals. Associate membership is also available.

Membership Fees

Members	$30 Joining Fee
	$30 Annual Subscription
Associates	$25 Joining Fee
	$25 Annual Subscription

Contributions

Articles, news, papers and letters, either on disk or hard copy, should be sent to:

The Editor
The Australian Metrologist
c/o 71-73 Flemington Road
North Melbourne VIC 3051

Fax (03) 326 5148
Phone (03) 329 1633

The deadline for the next issue is 10 May

Sponsorship

Would you or your company be interested in sponsoring a future issue of *The Australian Metrologist*? If you are a Member or your company is in the metrology business, a contribution of $350 goes a long way towards covering the printing costs and permits the sponsor to include a relevant insert (up to A4 in size) in the mail-out.

Write or fax the Editor if you are interested.

Positions Wanted/Vacant

Need a Position?
Write to or fax the editor with your details including years of experience and qualifications. This service is offered free of charge.

Need a Metrologist?
If you have a position vacant, write to or fax the editor with the details. A charge of $20 for up to 10 lines applies. Remember, the circulation may be small but it's well targeted!

The deadline for positions wanted/vacant is five days before publication.

Letters to the Editor

Letters should be limited to 200 words. Authors will be contacted should editorial changes be considered necessary.

Editorial Policy

The editor welcomes all material relevant to the practice of Metrology. Non-original material submitted must identify the source and contact details of the author and publisher. The editor reserves the right to refuse material which may compromise the Metrology Society of Australia. Contributors may by contacted regarding verification of material.

Opinions expressed in *The Australian Metrologist* do not necessarily represent those of the Metrology Society of Australia.

IN THIS ISSUE

Membership Enquiries

Contact either your State Coordinators (see Page 11 for contact details) or the Secretary, Mr Colin Wagg by telephone (03) 329 1633 or fax (03) 326 5148, or write c/o:

71-73 Flemington Road
North Melbourne VIC 3051

Editor John Mitchell

LABORATORY COMPUTING

Do I have to calibrate my computer?

"After I get my transducers calibrated, do I have to get my voltmeter calibrated too? And what about the data logger? Oh, and then what can I really do about the computer? Surely I don't have to calibrate that. It doesn't make sense ... does it?"

What you get out of a transducer is an electrical signal. This signal may be a voltage, a current, a resistance or a frequency change that depends on the input condition. If you have the transducer calibrated in isolation from the instrument that will be used to read it in practice, you have immediately produced a more expensive and more tenuous calibration path. You often may not have a choice due to the nature of the installation. BUT having the transducer calibrated and then forgetting the rest will not produce a traceably calibrated measurement system or traceable result.

The data logger may be used to switch the various transducers in your measurement system to the meter. It can introduce small voltage or resistance offsets into your readings and, if not operated correctly, may not allow sufficient time for readings to settle on the meter before advancing to the next channel.

If your meter is not calibrated then, quite simply, it doesn't know what a volt or an ohm is. No amount of transducer calibration will tell you the result with any certainty.

Finally, consider the computer, the readout device for your measurement system. To carry out your measurement function, the computer will need some software to operate the data logger and algorithms to convert the transducer readings into engineering units. The software may be written in-house or be a commercial package. In the former case you will certainly know the system inside and out. In the latter you can only see the result. Both, however, must be subject to the same scrutiny at regular intervals.

Now the answer to that almost trivial question, "Surely I don't have to calibrate the computer?" Well, this very subject came up and was strongly debated at a recent seminar. Some people have the need to either keep a spare computer for critical functions or use the same portable transducer/logger system at various sites where a computer is already available. At this point I must ask, "when have two PCs ever been the same before.."? Then why on earth do you expect the same result out of two separate PCs simply because they are connected to the same logging equipment? Some obvious differences that spring to mind are;

- the operating system
- is a maths co-processor present
- what level of floating maths is operating
- how will this system round or truncate data
- what program version is on the hard disc.

At this point, lets go right back to the start. Once upon a time it was simple. You got your ruler, pressure gauge or thermometer calibrated. The readout was fully integrated (or rather engraved on the front) and the number of things that required checking or could go wrong was very limited. But we will go and automate things to make them simple won't we.

If you must use a transducer/logger/computer system, then you must have available some form of verification system to maintain the calibration integrity of all the individual calibrated components. If this is not possible then you have to seriously consider on site calibration either by a third party or by yourself.

Neville Owen

NEWS FROM THE NATIONAL MEASUREMENT LABORATORY

Internal changes in the Division of Applied Physics, CSIRO

Dr Barry Inglis, Vice President of the MSA Committee of Management, has been appointed to the position of Chief Standards Scientist and Deputy Chief - Standards at the National Measurement Laboratory (NML), Division of Applied Physics, CSIRO, effective from 1 January 1995.

The new *Standards and Quality Group* at the NML will be the point of contact for NATA-accredited laboratories in future. The Group comprises Glenda Sandars (member of the MSA Committee of Management), Dr Rohana Ediriweera and Dr Angela Samuel. Ms Sandars is co-ordinating the Group, with Dr Ediriweera most closely associated with proficiency testing and intercomparison programs and Dr Samuel chiefly involved in the operation of the Asia-Pacific Metrology Programme Secretariat. Contact numbers for the SQG are Ph: 413 7459; Fax 413 7383)

The Asia-Pacific Metrology Programme (APMP)

In October 1994, Dr Barry Inglis of NML became the sixth Regional Coordinator of the Asia-Pacific Metrology Programme (APMP) for the period 1994-1998. Dr Inglis takes over from Dr Jong-Chul Park of

the Korea Research Institute of Standards and Science (KRISS). The 22-member APMP aims to improve regional competence in metrology through activities such as training workshops, publications, conferences and international intercomparison programs. The APMP Secretariat will be operated from NML for Dr Inglis' term of office. For further information, contact Dr Angela Samuel - Ph. 413 7788; Fax: 413 7383].

New Calibration Facilities for Electromagnetic Compatability (EMC) Test Equipment

Testing laboratories can now have their electromagnetic compatibility (EMC) test equipment calibrated with new facilities at the National Measurement Laboratory. This now enables the laboratories to satisfy NATA accreditation requirements and will provide manufacturers of electrical and electronic goods with an unbroken chain of traceability to the national physical standards of measurement held at NML. Manufacturers will be required to meet new national and international EMC standards (e.g. CISPR, EN and AS standards). While allowing manufacturers to be competitive in international markets, it also ensures that electrical and electronic products that reach local markets are of satisfactory standard.

The new national and international regulations on electromagnetic compatibility, due from January 1 1996, have been initiated by the increasing recognition of the potentially disastrous consequences of electromagnetic pollution, such as disruptions to aviation systems or medical measurement equipment. To address these issues, Europe developed the European EMC Directive (1989) for emission and immunity standards, taking effect at the beginning of 1996. Electrical and electronic products marketed in Europe will have to meet these new *European Norms* on electromagnetic compatibility. The US and now Australia are also taking up the challenge.

NML's calibration facilities for EMC test equipment are designed to meet this challenge. NML offers calibration services for emission measurement equipment including EMC receivers, antennas, open area test sites, lime impedance stabilisation networks, signal port impedance stabilisation networks, and current probes. Immunity measuring equipment calibrated include electrostatic discharge generators and current injection clamps. Although, to date, the facilities have been designed to meet information technology equipment (ITE) measurement requirements, much of the equipment for which calibration services are now available is also used in testing other electrical products.

For further details, contact John Hunter at NML on: Phone: (03) 413 7391; Fax: (03) 413 7631.

THE COMMERCIAL SIDE

The Customer is Always Right Occasionally

It is always irritating for a client to receive a call from a laboratory advising that they don't actually have the capability to perform the task which was asked of them. This can include situations where the customer wants something verified against a specification and the laboratory has mistakenly (or carelessly) forgotten their uncertainties (see page 4) or find that they are missing the equipment to calibrate a particular range or parameter.

Both the ISO 9000 series of quality system management standards and ISO Guide 25 require, respectively, service providers and laboratories to review incoming work to ensure that they can meet the requirements of the client. This requires, of course, that an adequate description of the job is obtained from the client. On some occasions, however, this is akin to extracting teeth and still no guarantee that all of the necessary details will be elicited.

Take for example the following fictitious (?) exchange.

> Lab: "You want your Goodasgold multimeter calibrated Mr Bloggs. Do you just want calibration data or do you also have a particular specification in mind."
> Client: "Eh?"
> Lab: "Well do you want it done to manufacturers specs?"
> Client: "Yeah, I suppose that will do."
> Lab: "Well, in that case, I must tell you that your instrument's DC voltage specifications of a few parts per million is stretching our capabilities in terms of uncertainties."
> Client: "Eh?"
> Lab: "We won't definitely be able to declare compliance on DC volts."
> Client: "Not to worry. Send me a quote."
> Lab: (a week later) "Your Goodasgold meter you sent in for calibration?"
> Client: "Yes."
> Lab: "It doesn't work."
> Client: "Yes - well?"
> Lab: "Do you want us to fix it?
> Client: "Yes. I asked you to calibrate it didn't I? Say, you aren't going to tell me that this going to cost more are you?

Not all clients are like this though and spending those few minutes on the phone may save both parties time, money and aggravation. It is also important in conveying a professional approach to being a metrologist.

FORMATION OF MSA TECHNICAL GROUP ON PRESSURE METROLOGY

A Technical Group for pressure metrology is being formed under the auspices of the MSA. A number of particular matters, amongst them issues of re-calibration intervals, scope of calibration services, proficiency testing and requirements brought about by new technical developments, have been on the agenda for pressure metrologists for some time now.

Late last year, a meeting of individuals representing a cross section of commercial suppliers, calibration service providers, public utilities, industrial users, and technical bodies met at Clayton. In particular, the issue of recalibration intervals of pressure balances and the need for "*round robin*" or proficiency testing exercises in various pressure ranges and media were discussed at some depth. One of the outcomes of the meeting was a strong indication of interest in a more permanent and effective forum for dialogue and representation.

The formation of an MSA Technical Group on Pressure will (it is hoped) allow interested parties and organisations to maintain a relevant and continuing dialogue on matters of current interest to the industry, generate new initiatives as appropriate and make recommendations to relevant bodies in a more formal and effective way. Such a group could fulfil the dual functions of being a "voice" as well as an "ear" for Australian pressure metrology. As with all such groups, the degree to which these aims will be achieved will depend on the input of its participants.

It is intended that at some time over the next few weeks, the group will be formally constituted. One of its first tasks will be to progress the matters discussed at last years meeting to the next stage of formulation of firm proposals. It is important that the group have technical breadth and depth so that it can be truly representative and authoritative. Participation in the group will be open both to Members and Associates.

If you have a specialist interest as;

- a user of pressure measurement equipment
- a calibration/testing/measurement service provider
- a supplier of instruments and equipment
- any other relevant role within the pressure metrology field.

and you would like to participate and contribute to the activities of the group, you are invited to contact the convenor, **Walter Giardini.**

There is a time for pushing lots of little barrels, and there is a time for everyone pushing one big barrel together, we all need to do a bit of both and we all gain from it; so if you think you can contribute to (and get something back from) the MSA Technical Group on Pressure Metrology, then please consider making an input.

The first meeting of the MSA Technical Group on Pressure Metrology will be held at 6.00 p.m. on the 20th April 1995, at the David Rivett Laboratory, CSIRO - Division of Materials Science and Technology - (Normanby Road, Clayton).

Following the formal establishment of the Group, we will move onto dealing with the agenda which will be circulated prior to the meeting.

Contact Walter Giardini for details.
Phone: (03) 542 2963
Fax: (03) 544 1128
Mail: CSIRO, Division of Applied Physics,
Private Bag 33, Rosebank MDC.
Clayton Vic 3169.

Have you forgotten to pay your membership subscription? It's not too late!

PRESIDENTS ADDENDUM

I urge all members to volunteer to contribute in some way to the MSA. This could be a Letter to the Editor or an article for TAM, the running of a technical workshop, organising a social event, volunteering to help in some capacity, etc. The MSA will only work if we all get off our backsides and do something. Remember, *"If you're too busy to help those around you succeed, you're too busy."*

John Miles

"It is much easier to make measurements than to know exactly what you are measuring."

J W N Sullivan, 1928

THE BASICS

Uncertainties of Measurement and Specification Limits

Any measurement has some uncertainty associated with it. This is for the simple reason that no measuring system is perfect. Even the national standards of measurement have uncertainties associated with them. Down the calibration chain, these uncertainties compound.

Most people know that a measurement result expressed with an uncertainty statement means that there is some possibility that the actual value of what was being measured may lie a little higher or lower than the measurement. What some seem to be unsure of, however, is what to do with this information, particularly when they are testing or measuring something to determine whether it is within specification or not. Let's have a look at the relationship of a measurement result and its uncertainty to a specification limit.

Figure 1 shows the situation where several individual measurements have been made of some parameter. Let's say the measurements are simply a length measurement on a component of a widget. The measurements themselves are shown by the crosses and the uncertainties of each are indicated by the bar. For simplicity, all of the uncertainties are the same in magnitude. While this example shows both upper and lower specification limits, the same principles apply where there is only an upper or lower limit.

The first group of measurements all show that the components are within specification. The second group are all outside the specification. The third group, however, present a problem as the uncertainty of measurement says that there is some chance that the actual value is within the limit and some that it is outside the limit. Indeed, the result which falls right on the limit has a 50/50 chance of passing or failing. These are not great odds when we may be using this information to make a decision on whether to continue manufacture of a large quantity of the components. Based solely on the results given, we can only say that we don't know whether the product is within specification or not.

When faced with this dilemma, the metrologist has only two options. The first is to report the measurements and uncertainties to the client so that they have the necessary information to decide on what to do with the widgets. Alternatively, a re-measurement could be made with a better measuring system or method so that the uncertainty will be reduced. This may allow some of the previously marginal results to be resolved.

Many calibration laboratories are asked to calibrate instruments to specification. (Actually, this is verification but we won't go into semantics.) It must always be remembered that the ability to determine compliance with the specification limits, whether manufacturers or clients, is dictated by the measurement uncertainties achievable by the calibration laboratory just as it was in the case of measuring widgets.

John Mitchell

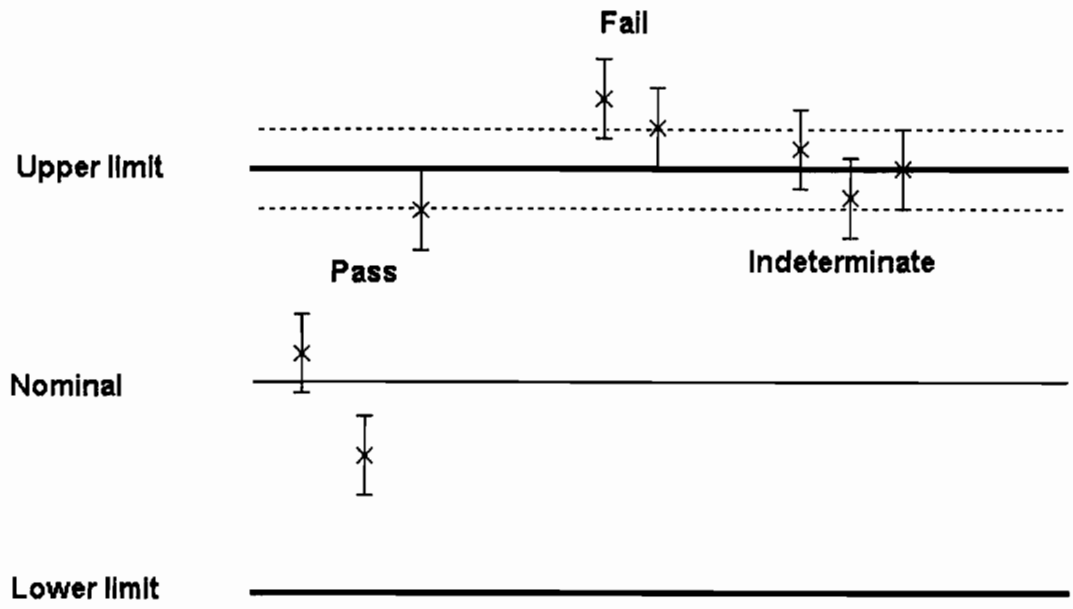

Figure 1

MEMBERSHIP NEWS

NEW MEMBERS

Whoops! In the new members list in the November issue, Mr Douglas Simpson appeared on both the NSW and NT lists. We only have one Douglas Simpson and he is most definitely a Northern Territorian. Sorry about that Douglas.

We are pleased to announce that the following metrologists have been granted membership since the November issue.

New South Wales	
Mr Anthony Jackson	Multi-disciplinary
Mr Geoffrey Boulton	Electrical
Queensland	
Mr Glen Hay	Dimensional/Electrical
Mr Gary Want	Dimensional/Electrical
South Australia	
Mr Dennis Cooper	Dimensional
Mr David Gray	Dimensional/Electrical
Victoria	
Dr Mark Shortis	Optical
Mr Angelo Monteleone	Electrical
Mr Richard Strickland	Electrical/Physical
Mr Benedykt Simankowicz	Dimensional
Western Australia	
Mr Kevin Durney	Multi-disciplinary
Mr Werner Nickel	Dimensional

Welcome to the Metrology Society of Australia.

The current status of the membership is given below.

State	Members	Associates	Totals
ACT	1	-	1
NSW	57	9	66
NT	3	-	3
QLD	25	3	28
SA	25	2	27
TAS	2	-	2
VIC	100	27	127
WA	8	1	11
Totals	**223**	**42**	**265**

STATE EVENTS

Queensland

Quiz!!

Question 1.

How do you slice apple pies, at a rate of three a minute, into six or eight precise portions, and with a cut less than 0.2 mm wide?

Question 2

What can you do with STEREOLITHOGRAPHY ?

These were two examples of the technologies presented in a lecture by Mr Noel Frost, Technology Consultant at Queensland Manufacturing Institute. attended by seventeen Queensland members in late November.

This new technology centre is a joint venture of the CSIRO, the Queensland Department of Business, Industry & Regional Development, and the educational arms of Q.U.T. and T.A.F.E.

Noel Frost described his role in combining the aspects of emerging technologies (applied research), advanced technologies (technology transfer) mature technologies (education and training) and ably supported by modern machine innovations, to offer a forum for solving manufacturing industries' technical and (often related) marketing problems.

Members were particularly impressed by case studies in which local manufacturers were enabled to be at the forefront of world markets. 'Concurrent engineering' allowed for major reductions in lead-times for prototype development and for subsequent production of completed engineered components.

Mr Erwin Schilling ably supported Mr Frost with video illustrations and an inspection of the various technology centres involved in computer aided design, laser cutting, water-jet cutting and robotic machining and, of his own speciality, the co-ordinate measuring machine.

Quiz answers

1. Water-jet cutting.
2. Using STEREOLITHOGRAPHY together with sophisticated polymers and lasers, designers and engineers are able to build accurate physical models of their latest product within hours instead of the days or weeks required by traditional processes. Further, medical surgeons and specialists are able to prepare custom-made prosthetic devices and models of bone structures direct from data acquired by the hospital imaging equipment. Planning of complex medical procedures can be streamlined, and with reduced risk,

by the surgeon's prior examination of bone replicas, even before touching the patient.

On the 14 February during a very welcome rainy night, fifteen members battled through the motor show traffic to be guests of the Trade Measurement Branch at their Spring Hill laboratories.

Gerry Samuel and Tom Reugebrink were our hosts for the evening which began with an address by Gerry on the role and scope of his work in length, mass, volume, density and flow measurement. Tom, the laboratory manager, conducted the members on a tour through the cavernous test areas, purpose built for their particular roles as State reference standards. (A fascinating archival storage area was shown in which very well preserved bygone era standards of length and capacity were displayed.)

A most interesting question and answer session on many interesting case studies concluded the evening whereupon 'Robin' Hood shot himself in the foot by thanking "Tom and Gerry" for their entertaining evening.

Roy Hood

Next Meeting

Date:	Tuesday 23 May
Time:	6.00pm
Venue:	SEQEB Laboratories Blinzinger Road Banyo
Speaker:	Doug Quinn
Topic:	Measurement in the Electrical Industry.

South Australia

The South Australian chapter of the Metrology Society met at Telecom Australia's conference room at Mile End on the evening of 24th November last year. Approximately 30 people attended and curiously, about half of these attendees were non-members. Some new memberships were initiated during the course of the meeting.

This meeting took the form of a seminar. The subject *The New ISO Guide to the Expression of Uncertainty in Measurement* was a heavy one and was the first activity of this nature held by the South Australians.

The indefatigable Jeffrey Tapping conducted the programme and was the sole presenter. Jeffrey was able to give our members valuable insight into the mechanics of this comprehensive document. He had researched his topic well and was, considering the fact this ISO publication was extremely rare at the time, probably one of the very few people in South Australia who had in fact studied it in any depth.

Jeffrey pointed out the differences between the approach taken by the ISO Committee and the more traditional methods of expressing uncertainties which most of us are more familiar with. It was very clear that one short seminar on this involved topic could at best provide an overview of the document. I am sure that the appetite of those who attended was wetted and I suspect that many will take it upon themselves to obtain and study the document in detail.

The South Australian metrologists are indebted to Jeffrey for his effort.

The first gathering for 1995 was a visit to the aircraft maintenance facilities of Ansett Australia at Adelaide Airport. The facility is part of a national system for carrying out service programs on the various sections of aircraft during their overnight rest periods. In addition to the obvious interest in sitting in the driving seat of an Airbus, having the computer systems explained and peering into turbines and hydraulic systems, the work being done was an example of the end result of the metrologist's work.

Once more, we had a very good roll-up of seventeen members and a number of guests. Four apologies were received from members who would have liked to come but couldn't. That covers most of our South Australian Members. We hope to continue our good record at our next meeting which is to be a technical evening at the new calibration facilities of member Richard Duncan. Richard's company, Duncan Tool and Gauge, specialises in length metrology as you might have guessed. Members will be informed of the date when it is fixed.

Next Meeting

Date:	To be advised
Venue:	Duncan Tool and Gauge 10 Allan Street Melrose Park
Host:	Richard Duncan

PHOTOGRAPHS

Sorry about the lack of photos in this issue but I just didn't manage to fit them in. If, however, you have some from your State meetings, please send them in for the next issue. Ed.

NSW

The last meeting of the NSW members was that held on the 5 December at NML where Dr Bill Blevin became our first Honourary Fellow.

Victoria

We're having a late start to the year but the next visit, to Glaxo, will take place about the time you read this. A write-up will appear it the next issue.

Next Meeting

Date:	Wednesday 29 March
Time:	7.00 sharp
Venue:	Glaxo Australia 1061 Mountain Highway Boronia
Host:	Patrick Fogwill Phone 721 6611

UNCERTAINTY OF MEASUREMENT COURSE ON THE ISO GUIDE

A three day course on the ISO TAG WG4 *Guide to the Expression of Uncertainty of Measurement* will be conducted by the CSIRO's Division of Applied Physics in the following cities on the indicated dates.

Sydney:	6th - 8th September
Melbourne:	3rd - 5th May 18th - 20th October
Brisbane:	5th - 7th April 20th - 22 September
Adelaide:	4th - 6th October
Perth:	8th - 10th November

This course is intended for calibration laboratory staff who are required to make formal estimates of their measurement uncertainties. It is expected that attendees will be able to perform calculations involving algebra and partial derivatives. To enable better interaction between the presenters and the attendees, numbers will be strictly limited to 20.

The fee, all inclusive, is **$680**.

Contact: Mrs R Crawford
CSIRO Division of Applied Physics
Phone: (03) 542 2965 Fax: (03) 544 1128

CHEMICAL METROLOGY

A National focus for Analytical Chemistry

Metrology has long been the province of physics. While the international measurement system, based on traceability to national standards of mass, length, and time and the equivalence of National Standards, has served the physics and engineering communities well, it has not been applicable to chemistry where analytical measurements are often method dependent.

There is a pressing need to make chemical analysis a more rigorous discipline. Results must be reliable and fit-for-purpose. The uncertainties associated with results must be well understood by analysts and carefully explained to clients. Unfortunately this situation is far from the current reality. Interlaboratory proficiency programs at both local and international levels have shown appalling variations between experienced laboratories. Such variations, when translated to real world samples, could have resulted in significant harm, both personal and commercial.

The need to put our house in order is urgent. Chemistry has enough bad press without adding the stigma of unreliability, ignorance or dishonesty. The task is a difficult one because the remedies require us to examine our education system, our commercial practices, local and international laws and our professional attitudes.

Analytical chemistry is poorly taught in many tertiary institutions by academics with little respect for or knowledge of its practice in the real world. This belies its commercial importance. Until chemistry courses teach metrology skills, data analysis, and quality assurance practices in addition to techniques of analysis, graduates will start their professional life at a significant disadvantage.

In the commercial world, those who purchase analytical chemistry services are obsessed by price, and generally do not have the skills to recognize or value quality. There are some commercial operators who provide low cost services without considering whether the results will truly meet the client's needs. A case of "Caveat Emptor" which can have serious repercussions, since the client does not have the skills needed to make reliable judgments.

There are many local and international laws which prescribe limits for contaminants in foods and in the environment. These are policed on a pass/fail basis without consideration of uncertainties. Analysts are often asked to 'round down' results so that a commodity will meet specification. A refusal always offends.

The most important change of all, which must be achieved before the return process can start, is a change in the attitudes of professional analytical chemists. As a group, analysts need to understand the importance of their work and to acknowledge their personal responsibilities in reporting correct results and interpreting their significance. They must be ready to alter work practices, be self critical and to promote themselves as key players in commerce and in regulation.

It is of value to consider the current world situation. Spurred on by recent trends towards the globalization of trade, which requires mutual recognition of analytical test results, many countries are examining the quality of their testing services.

In Australia, the National Standards Commission, the statutory body operating under the National Measurement Act, is responsible for co-ordinating our National Measurement System and recommending legislative changes. The Commission set up a committee in Chemical Metrology to consider.

- traceability of chemical measurements
- certification of reference materials
- infrastructure needs of chemical metrology.

Australia also has a well established laboratory accreditation body, the National Association of Testing Authorities.

In 1989, Europe set up Eurachem, a body which provides a focus for analytical chemistry and quality issues within EC and EFTA countries. Many European countries have Eurachem groups to promote their strategies and to co-ordinate national efforts. The Laboratory of the Government Chemist in the UK has set up a program called Valid Analytical Measurement which will assist UK laboratories to demonstrate the validity of their data and to facilitate mutual recognition of analytical measurements.

The USA has followed a different path. Its quality surveillance organisation are industry based and therefore fragmented. The Director of the National Institute of Standards and Technology, in a paper to the 1992 National Conference of Standards Laboratories, drew attention to the urgent need for USA to take account of international developments in establishing global standards. He mentioned the newly perceived need to deal with chemical measurements, "a field new to legal metrology" and a need to "assure that everyone is speaking the same measurement language, particularly when discussing slippery topics like measurement uncertainty". Some progress has been made in unifying the North American metrology community (US, Canada, Mexico) to provide "a common, regional voice for North American Standards issues to meet the European Community on an equal footing".

It is clear that action is commencing on many fronts. Conferences are being held and collaborations are being organised. As yet there is no international body to co-ordinate these efforts.

There is, however, broad agreement concerning the issues which need to be addressed under the heading Chemical Metrology.

These include:

- Definitions, concepts, units
- Quality
- Traceability and calibration
- Reference materials
- Uncertainty
- Training skills

Global agreement on these issues will be difficult to achieve, but we must begin hopefully and proceed with good will. The first step for us is undoubtedly to provide Australia with a sound Chemical Metrology Policy backed up by support systems which guarantee international recognition.

Doreen V. Clark

Dr Clark is a past president of the Royal Australian Chemical Institute and is a National Standards Commissioner. This article first appeared in Chemistry in Australia *and is reproduced with the kind permission of Dr Clark and the editor of that journal.*

I believe that I am not overstating the truth when I say that half the time occupied by clerks and draftsmen in engineers' and surveyors' offices .... is work entailed upon them by the present farrago of weights and measures.

Lord Kelvin

Oh Langley devised the bolometer:
It's really a kind of thermometer
Which measures the heat
From a polar bear's feet
At the distance of half a kilometre.

The fusion plasma requires a temperature of 500 million degrees, but I forget whether that's Centigrade of Absolute.

Remark overheard at the Oak Ridge National Laboratory, USA

Quotes from *A Random Walk in Science* compiled R L Weber and published by the Institute of Physics, UK.

MSA DIARY - 1995

Management Committee Meetings and Planning Days

Members wishing to contribute agenda items or attend any of the Management Committee Meetings shown in the diary should contact the President, John Miles on (03) 542 2964 or by fax (03) 544 1128.

April

3 The MSA Bulletin published
13 Management Committee Meeting
20 Inaugural meeting of the Pressure Measurement Technical Group at CSIRO, Melbourne.
30 Victorian social event - Yarra Valley winery tour.

May

9 Victorian technical meeting - Visit to the Bureau of Meteorology.
10 *The Australian Metrologist* deadline for the May issue.
23 Queensland Technical Meeting - Visit to the SEQEB Laboratories.

June

8 Management Committee Meeting - NATA, Melbourne.
15 Victorian Technical Meeting CSIRO

July

3 The MSA Bulletin published
19 Half-day planning meeting - NATA Melbourne
27 Annual Dinner (National), Melbourne

July/August

TBA Queensland Technical Meeting - ADI Calibration Laboratories, Amberley RAAF Base, Ipswich (Tentative)

August

9 Management Committee Meeting - Melbourne
10 *The Australian Metrologist* deadline for the August issue.

September

14 Victorian Technical Meeting - Topic to be confirmed.

October

2 The MSA Bulletin published.
10 Management Committee Meeting - Melbourne

October/November

TBA Queensland Technical Meeting - Photometry at QUT, Gardens Point, Brisbane (tentative).

November

10 *The Australian Metrologist* deadline for the November issue.
29 Management Committee Meeting - NML, Sydney.
Annual General Meeting - NML Sydney

November/December

30/1 The Metrology Society of Australia Conference, NML, Sydney.

December

12 Planning day for 1996

STATE CONTACTS

NSW		Barry Sutcliffe	736 8222
		Kerry Marston	888 3033
		Ilya Budovsky	413 7201
	Postal C/O	Mr Barry Sutcliffe NATA 7 Leeds Street Rhodes NSW 2138	
Queensland		Roy Hood	274 7750
		Erwin Schilling	864 2248
		Ian Cowling	864 2592
	Postal C/O	Mr R Hood GEC Alsthom Australia Ltd GPO Box 406 Brisbane Qld 4001	
South Australia		Brenton Watkins	268 6077
		Jeffrey Tapping	362 1240
	Postal C/O	Mr R Duncan Duncan Tool & Gauge 10 Allen Street Melrose Park SA 5039	
Western Australia		Denis Baylis	333 8832
		Paul Edwards	451 0883
	Postal C/O	Mr P Edwards NATA Suite 5, Technology Centre 2 Brodie-Hall Drive Bentley WA 6102	

METROLOGY SOCIETY OF AUSTRALIA

CALL FOR PAPERS

1995 AUSTRALIAN METROLOGY CONFERENCE

NOVEMBER 30 - DECEMBER 1, 1995, SYDNEY NSW

The Metrology Society of Australia will hold its first National Metrology Conference at the National Measurement Laboratory, Lindfield, NSW on November 30 - December 1, 1995. The aim of the Conference is to promote the importance of Metrology within government, business, industry and the community and in particular the contribution Metrology makes to the quality of manufactured goods, and services, and hence to industrial development and international competitiveness.

This will be the first national forum within Australia which will enable all members of the measurement community such as industrial measurement specialists, students, engineers, researchers and teachers to meet and share experiences. The program will include technical visits within the National Measurement Laboratory and a variety of social events.

SCOPE OF THE CONFERENCE

The conference will welcome contributions in all areas of metrology (e.g. dimensional, electrical, mechanical, chemical). Particular emphasis will be given to the practical application of measurement and associated areas such as uncertainty, measurement in quality systems, etc. forms of presentations can include oral and poster papers; workshops; and practical demonstrations. Submissions will be reviewed on the basis of their relevance to the aims of the conference and to the development of metrology skills.

SUBMISSION GUIDELINES:

Authors are required to submit by **30 April 1995** three (3) copies of a 1 page summary clearly describing the scope of the work and the preferred form of presentation (oral paper, poster paper, workshop, practical demonstration, etc). Successful applicants will be notified by 31 May 1995 when they will receive instructions for the preparation of camera ready manuscripts.

MAIL TO:

Mr Ilya Budovsky
Program Committee, MSA
CSIRO Division of Applied Physics
National Measurement Laboratory
P O Box 218
LINDFIELD, NSW, AUSTRALIA 2070

TEL: (02) 413 7201
FAX: (02) 413 7383
EMAIL: ilya@dap.csiro.au