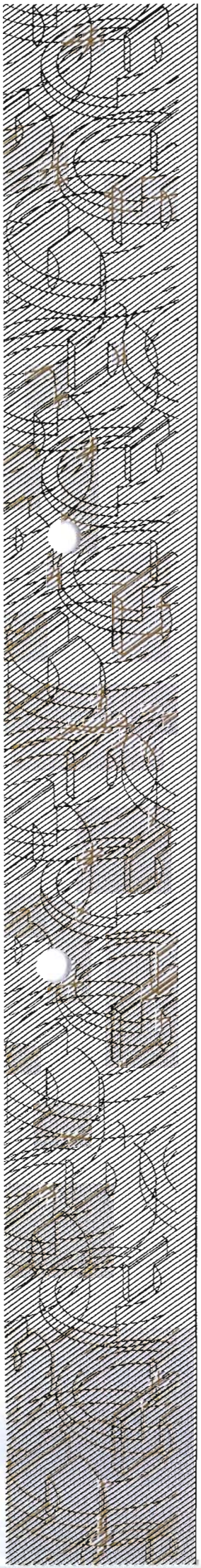

THE AUSTRALIAN METROLOGIST

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MAY-JUNE ISSUE

CONTENTS

FROM THE PRESIDENT

Congratulations to editor Maurie Hooper on surviving the deep end that was his first issue of TAM, and doing a good job in the process. The first is always the hardest, particularly when new suppliers of both services and materials had to be organised with the move of TAM to Adelaide. We should now be on track for regular issues, provided you the members keep providing the material.

I recently took advantage of being interstate to meet with MSA members in Adelaide. It was good to see such a diverse bunch of Metrologists on their home turf, and to have a two-way discussion on what the MSA is doing, and what it could do, for its members. Our recent change in the National Committee is that Jim Miles has replaced Mark Spillane as the states liaison officer, due to Mark's changed work commitments. We would again encourage the state contacts to feed information to the liaison officer, to be forwarded to TAM and to the website.

A reminder - response to the survey form sent with the last TAM is slow. First priority of course was to catch up with general happenings, as the gap between TAMs was fairly long so the survey form was probably put aside for "ron", as in later-on. Trouble is Ron can't fill it out on your behalf. We'd appreciate getting more forms back to get a picture of what members see as important.

Finally, MSA'99, "Measurement for a Sustainable Future" is creeping closer. The conference committee have been working hard to produce an interesting program. In addition to the regular papers, Peter Roberts, a regular contributor to the Financial Review, is guest speaker at the cocktail session on the opening evening, speaking on "Industrial Policy for the New Millennium". A panel session on "the profitable laboratory" is also being planned.

The world of metrology is altering significantly at the international level, driven by the process required to support the Mutual Recognition Agreement on measurement between countries, related to international trade based on a "measure-once, measure anywhere" philosophy. The acronym MRA will eventually become part-and-parcel of the metrologist's lexicon, with the consequences and opportunities for Australia still to be clarified.

You can find out more about the topic on the web-site of the International Bureau of Weights and Measures at http://www.bipm.fr, and can discuss it with your colleagues at MSA99. Register soon to assist the organisers, and I'll look forward to meeting you in Sydney September 22-24.

- Jim Gardner

FROM THE EDITOR

TAM17 is a little late, and you will get your next issue sooner than expected. The committee has now set down a schedule to fit best with such things as AGM notice requirements, holiday periods and such, with the result that we will be aiming for a TAM during February, May, August and November.

This is all very well, but the committee cannot be expected to come up with all of the journal content required. General membership has to get involved in providing input somehow. Some suggestions for revamped TAM content will be given in the next issue and possibly placed on our website (see page 16).

TAM is for you all, so if you think of something you want to see published, write to a committee member (or me) about it.

Some of you may wonder what my background is. I started my working life at Defence Standards Laboratories (later MRL), Maribyrnong in 1960 in the Electron Microscopy section. On graduation from RMIT in 1964 with an Applied Physics Diploma I moved to the SA DSL branch at Finsbury (now Woodville North) in its Physics section. The section engaged in metrology, and I gained expertise and later became a NATA assessor in the areas of Electrical Measurement, Temperature Measurement, and Physical Metrology (mass, density and hydrometry, balances and volume). In 1977 CSIRO acquired the Adelaide Laboratory and the Physics section was attached to NML as a Branch Laboratory, which was closed in 1994. I still carry out NATA work when possible, and work as a metrology and computing consultant from home.

- Maurie Hooper

Register NOW and SAVE for MSA 99 Conference

Measurement for a Sustainable Future

Our third biennial conference is generously sponsored by:

Fluke Australia Pty Ltd, Bellinger Instruments, National Standards Commission, CSIRO – National Measurement Laboratory, National Association of Testing Authorities.

Should you too wish sponsor the conference contact Julian Wilson, Tel: (02) 9736 8267 and email: julian.wilson@nata.asn.au.

Register Now

Registration brochures are now available (MSA members should have received one through the post) for MSA 99 Conference. Register before 1 July and Save $60. Registration fees include the conference proceedings, conference welcome cocktails on the Wednesday, lunches, morning and afternoon teas. Optional extras are the conference dinner and quest speaker at Taronga Park Zoo and a farewell barbecue on Friday night.

Latest Information

For the latest information on all details including the Program, Registration Details, and Accepted Abstracts, visit the conference website at:

http://www.metsoc.aust.com/~confmsa

Venue

The venue for Australia's Premier Conference on Metrology will be at the Square House, University of New South Wales, Kensington, New South Wales on 22-24 September, 1999.

Trade Exhibition

Service providers and equipment manufacturers are encouraged to display/demonstrate their latest services/products employed in the field of metrology. Display booths located within the conference venue are available. For more information contact: Julian Wilson

Technical Visits

A number of technical visits are being organised during the conference. For more details see the conference website.

Special Features of the Program includes an exploration of the issue facing many calibration laboratories of how to balance customer needs with the need for accuracy and precision.

Another special feature under development is a **series of workshops** on topics of interest such as laboratory management, torque measurement, uncertainty of measurement, laboratory automation. It is planned that these workshops will run throughout the conference depending on demand. Numbers at each workshop will be limited to a maximum of fifteen. Register for these workshops at the conference. Visit the website for more details.

NATIONAL STANDARDS COMMISSION NEWS

Measurement and Sport – the long and the short of it

When the Olympic Games kick off in Sydney in September 2000, there will be many measures of success. Behind the scenes, a wide range of scientific and technological wizardry will be employed to ensure that those measures are as accurate as possible. Visit the Academy of Sciences award winning web site on www.science.org.au/nova to find out more about Measurement in Sport. This section of the site has been sponsored by the NSC and builds on the material already in the teaching kit Measurement in Sport.

Radio VNG

Radio VNG is Australia's standard frequency and time signal service. This service has been broadcasting traceable time and frequency information throughout Australasia, SE Asia and the South Polar region for many years. Obviously this free to air HF radio service is an important part of Australia's technical infrastructure. Developments in time technology have meant that it is almost inevitable that this part of the national measurement system will be replaced by new technology the end of the year 2003. However, recent developments relating to the funding of this service have meant that it may have to close as early as 1 July 1999 before any appropriate replacement is available. If you use this service as a metrologist we would really like to hear from you. Effective lobbying for the maintenance of this service until an alternative is available depends upon the Commission, and its National Time Committee, being able to identify a valid user group for this service. So if you use this service, or you would like to make a comment on this situation, or you would like further information about Radio VNG, please contact Dr Richard Brittain, Secretary of the National Time Committee at rbrittain@nsc.gov.au

National Measurement Legislation

Utility Meters

The 1995 the Report of the Committee of Inquiry into Australia's Standards and Conformance Infrastructure, the Kean Review, recommended that the National Measurement Act (the Act) be amended to provide mandatory metrological controls for specified utility meters. Both sides of Parliament supported this recommendation.

In March 1999 the Act was amended to include such provisions for utility meters. Initially all types of utility meters will be exempt from the provisions of the Act. However, as consultations are concluded within a particular metering sector, the relevant exemption will be lifted and that type of meter will fall within the ambit of the Act.

The amendments provide for the pattern approval and verification of utility meters. The reverification activity will remain with the State and Territory regulators. All bodies appointed by the Commission for pattern approval testing or verification must be accredited by the National Association of Testing Authorities (NATA) and hold the relevant reference standards of measurement, verified under the National Measurement Regulations.

Consultations are essentially complete with the electricity sector and it is expected that this exemption will be lifted at the end of 1999.

National Measurement Regulations

The National Measurement Regulations are currently being revised and are expected to be made within three months. The new regulations represent a rewrite and consolidation of the present National Measurement Regulations as reprinted as at 31 March 1993 and the National Measurement (Patterns of Measuring Instruments) Regulations.

The changes in the new regulations include:

1. specification of the Australian legal units of measurement in an abbreviated and internationally harmonised fashion;
2. provisions relating to the certification of certified measuring instruments;
3. provisions relating to the certification of certified reference materials;
4. provisions relating to pattern compliance testing of measuring instruments approved by the Commission;

5. specification of mechanisms for the recognition by the Commission of calibrations carried out overseas;
6. minor amendments to the State and Territory hierarchy of standards made at the request of the States; and
7. a schedule of exemptions for utility meters exempt from the provisions of the Act.

ELECTROMAGNETIC SUSCEPTIBILITY TESTING FACILITIES

The Commissions Electromagnetic Susceptibility Chamber tests to standards of the International Organisation for Legal Metrology, the International Electrotechnical Commission (IEC) and the International Special Committee on Radio Interference.

Radiated Interference

Our automated electromagnetic susceptibility facility tests the susceptibility of instruments to radiated interference over the frequency range 26 to 1 000 MHz and at field strengths up to 10 V/m (in accordance with IEC 61000-4-3). The anechoic chamber is 8 m long, 6 m wide and 4.5 m high.

Line-borne Interference

A Schaffner NSG 600 interference test system (see Figure 6) tests for the effects of short-time power reductions and electrical bursts at voltage levels from 500 to 4 000 V and for frequencies equal to and below 5 kHz (in accordance with IEC 61000-4-4).

Electrostatic discharge testing is carried out to IEC 61000-4-2.

ENVIRONMENTAL TEST FACILITIES

Temperature

The Commission has three temperature controlled chambers with capacities of approximately 14 m^3, 16 m^3 and 25 m^3. The chambers operate over a temperature range from –10 to +45□C.

Humidity

We have two humidity chambers:

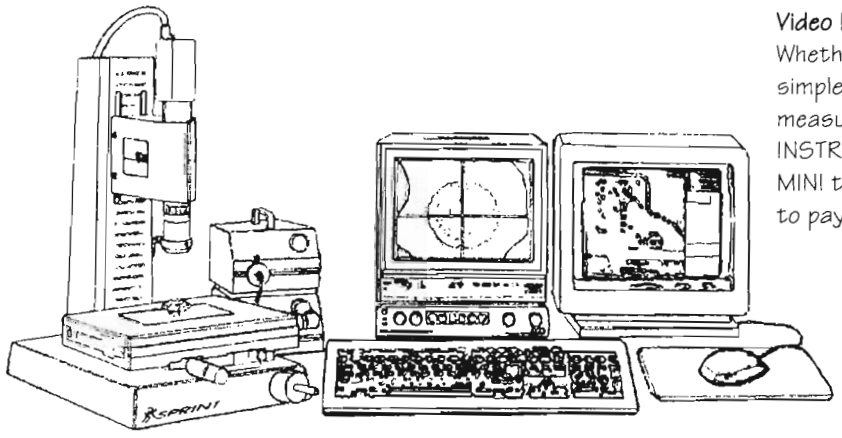
- a small chamber (1 m^3) which operates from 30 to 98% relative humidity over a temperature range from 15 to 45□C; and
- a large chamber (2.5 m long, 2.5 m wide and 2.7 m long) (see Figure 7) which operates from 30 to 99% relative humidity over a temperature range from 5 to 60□C.

The large chamber also operates as a temperature controlled chamber over a temperature range from –30 to +60□C. ❑

WORK WANTED

Philip Hovey BSC MMSA

Philip is a metrologist with experience in dimensional metrology and CMM work and is looking for employment opportunities. If you can help phone Phil on 08 8278 6714 or 0412 472292.



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What We Look Like

A Profile of the Membership of the Metrology Society of Australia

Laurie Besley, Secretary, MSA

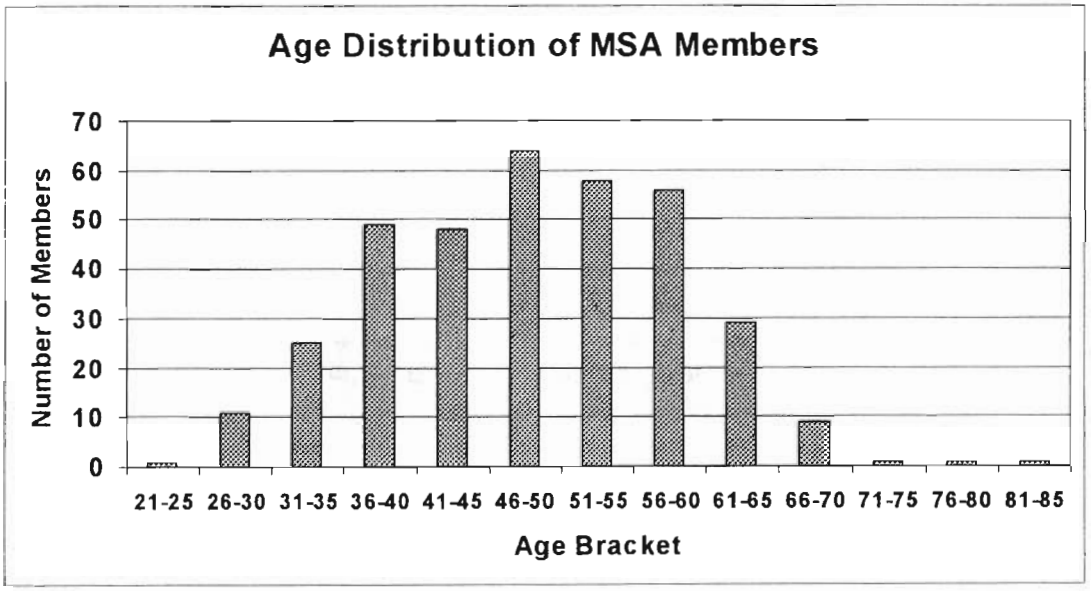
The MSA has now grown to encompass 350 members. I thought that it might be of interest to you to look at an overview of what the profile of that membership is. So here goes.

Gender

The MSA is overwhelmingly (horrifyingly?) male. Only 17 of our 350 members (or about 5%) are females. It is interesting, though, that 2 out of 12 of the National Committee are females (last year there were 3 out of 12) and that our Conference Committee is headed by a female. So it seems that the female members we are lucky enough to claim are a particularly active lot.

Age

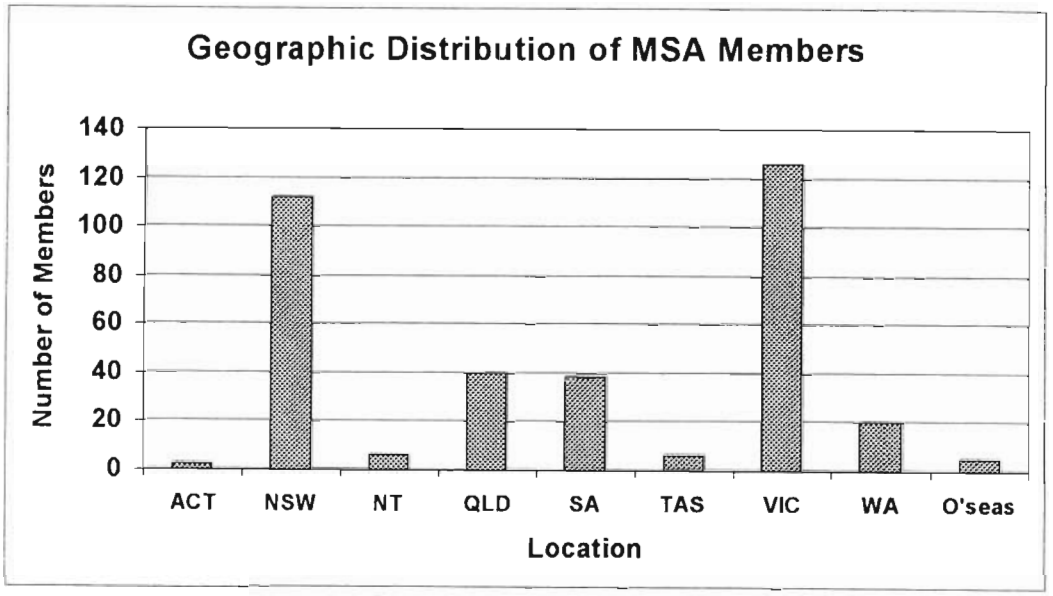
We present a somewhat aged profile to the world. The distribution of ages is shown below:



It would seem that we are on the "experienced" side of the spectrum of the working population. This would suggest that one aim of the MSA should be to look at ways of attracting to the Society younger people working in the measurement field.

State of Residence

The next graph shows the geographic distribution of our members:



The figures relative to the population of each of the Australian states are as follows:

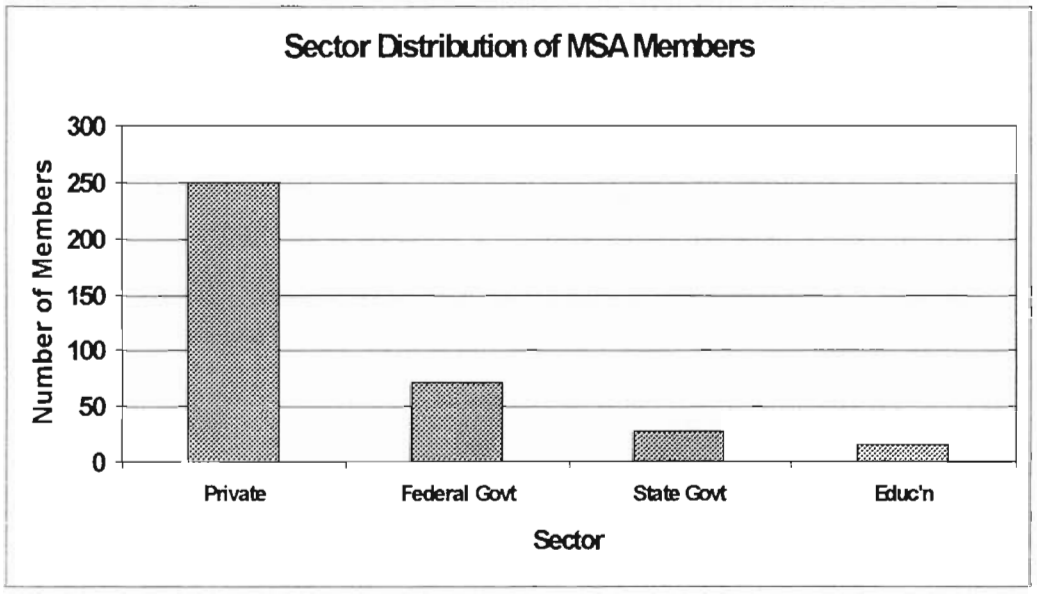
Northern Territory	33 members per million population
Victoria	28
South Australia	21
New South Wales	18
Tasmania	13
Queensland	12
Western Australia	11
Australian Capital Territory	6

The MSA had its origins in Victoria, and because of the relative youth of the Society itself (formed in 1993), this is still reflected in our membership numbers, though the Victorian membership has been falling slightly in the past two years. However, the NSW membership has grown since the National Committee was located there at the beginning of 1998. This suggests that a strategy of moving the National Committee to a different state every three or four years may have desirable consequences for the spread of our membership. I would be interested to hear our members' views on this.

Economic Sector

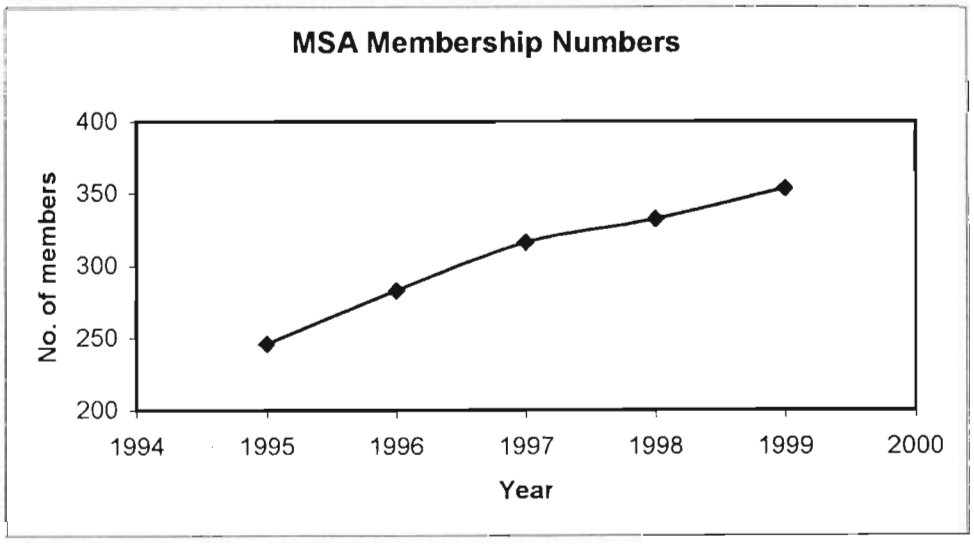
The following plot shows how our members are distributed between the private sector, federal and state government entities, and the education sector.

It can be seen that we are mostly (about 70%) from the private sector, but that there is a strong component from federal government entities (largely the CSIRO National Measurement Laboratory) and a significant contribution from state government institutions.



Membership Growth

As can be seen from the following plot, there has been steady growth after a spectacular start. We clearly have potential for further expansion, but the Society's numbers are in a very healthy state.



Missing Information

The information that we do not have in much detail at the moment on our membership database is that concerning the areas of expertise of our members. It seems to me that it would be of great advantage to our membership if they could have access to an MSA membership skills database where they could find out who could help them in a particular area.

This issue will be discussed at the next National Committee meeting with the aim of putting into place a plan of action to address this. I guess that you are likely to hear more of this in the future, perhaps through a questionnaire of some sort.

Summary

My view of the membership as a whole is that we represent an extremely vigorous society addressing an area of specific skills and needs in the community. Our age distribution is skewed towards the upper end of the workforce and we are too concentrated geographically. However, at least the second issue relates to the short history of the MSA and both are areas that we are endeavouring to address. We are still growing and still developing our facilities for members.

I would be only too delighted to hear from any member on the issues raised in this brief report. Happy measuring! ❑

WANTED

Contributions for The Australian Metrologist -
Photos to show the diversity of our activities.
Member profiles.
Letters to the Editor, Etc,...

Member Profile

Mike Hadley

Commencing in 1956, Mike served a full engineering apprenticeship with Armstrong Siddeley Motors, which later became Bristol Siddeley Engines, and later again Rolls Royce Aircraft Engines in Coventry, England.

He was being trained as an aircraft engine fitter when forced to change his apprenticeship to metrology after "acquiring" a partially paralysed right shoulder as one result of a road traffic accident.

Mike gained experience in such diverse areas as Gear Inspection, Non Destructive Testing, The Creep Laboratory, Turbine Disc and Blade Inspection, Engine Strip Inspection, Gas Turbine Engine Test, Sub Assembly and Final Engine Build Inspection and Industrial Radiography.

After finishing my apprenticeship he secured a position in the Standards Room and was involved with the measurement of all types of gauges used in the manufacture of gas turbine aircraft engines together with the measurement of roundness, aerodynamic profiles and surface finish. Life-sampling checks on engine main bearings, shafts and gears together with turbine blade profile degradation measurements were also carried out.

He commissioned the first C.M.M. acquired by the company, a D.E.A. Delta which was built around a rotatable segmented granite table of approximately 10 ft diameter, and was also responsible for checking and calibrating surface tables and plates using differential electronic levels.

Mike arrived with his family in Australia in 1981 to take up the position of Chief Inspector, Special Products (turbine blades) at A.N.I. National Forge in West Footscray, then went as Chief Inspector to Zenford Zeigler machine tool manufactures, Quality Engineer at Safe 'n Sound child safety seats and is now a Metrologist with S.G. Prittie Precision Gauges of Airport West, where he also assists with the maintenance of the Quality System. ❑

Metrology in Retrospect

Contributed by Julian Holland,
Macleay Museum, University of Sydney

Facts not Opinions

In May 1884, the Curator of the recently established Technological Museum in Sydney, J.H. Maiden, wrote to England to acknowledge the receipt of more than 300 specimens. Every one of these was twisted or broken or fractured, yet Maiden's only complaint was that one small specimen was missing. All the rest had arrived in 'perfect order'. How could this be?

In those days, the Technological, Industrial and Sanitary Museum (to give it its full name), forerunner of the Powerhouse Museum, was much concerned with the economic uses of natural and manufactured materials. The newly arrived specimens of wood and stone and metal had been subjected to a variety of tests at the Testing and Experimenting Works of David Kirkaldy in Southwark, London. The process had been initiated a year earlier. Replying to Maiden's letter of April 1883, Kirkaldy gladly undertook 'to supply a suitable collection of Specimens illustrative of the Mechanical Properties of various kinds of Structural Materials tested under Pulling, Thrusting, Twisting, Bending, Shearing & Bulging Stresses', each specimen to be accompanied by an explanatory card.[1] Although seldom mentioned in histories of engineering, Kirkaldy was an important pioneer of scientific testing methods applied to structural materials.

David Kirkaldy was born near Dundee in Scotland in 1820.[2] Not wishing to follow his father's mercantile career he gained an appointment at Robert Napier's Vulcan Foundry Works in Glasgow. In due course Kirkaldy moved from workshop to drawing office and later became renowned for the quality of his draughtsmanship. Glasgow was then a major port and Napier built ships. Kirkaldy took a keen interest in the characteristics of his employer's ships, meticulously recording performance data as well as dimensions and weights.

With rapidly changing technology, old materials were being directed to new tasks and new materials were being introduced. The properties of these materials were not well understood. In conjunction with his work for Napier and Sons, Kirkaldy undertook a long series of tensile load tests between 1858 and 1861. He published his *Results of an Experimental Inquiry into the Comparative Tensile Strength and other properties of various kinds of Wrought-Iron and Steel* in 1862.

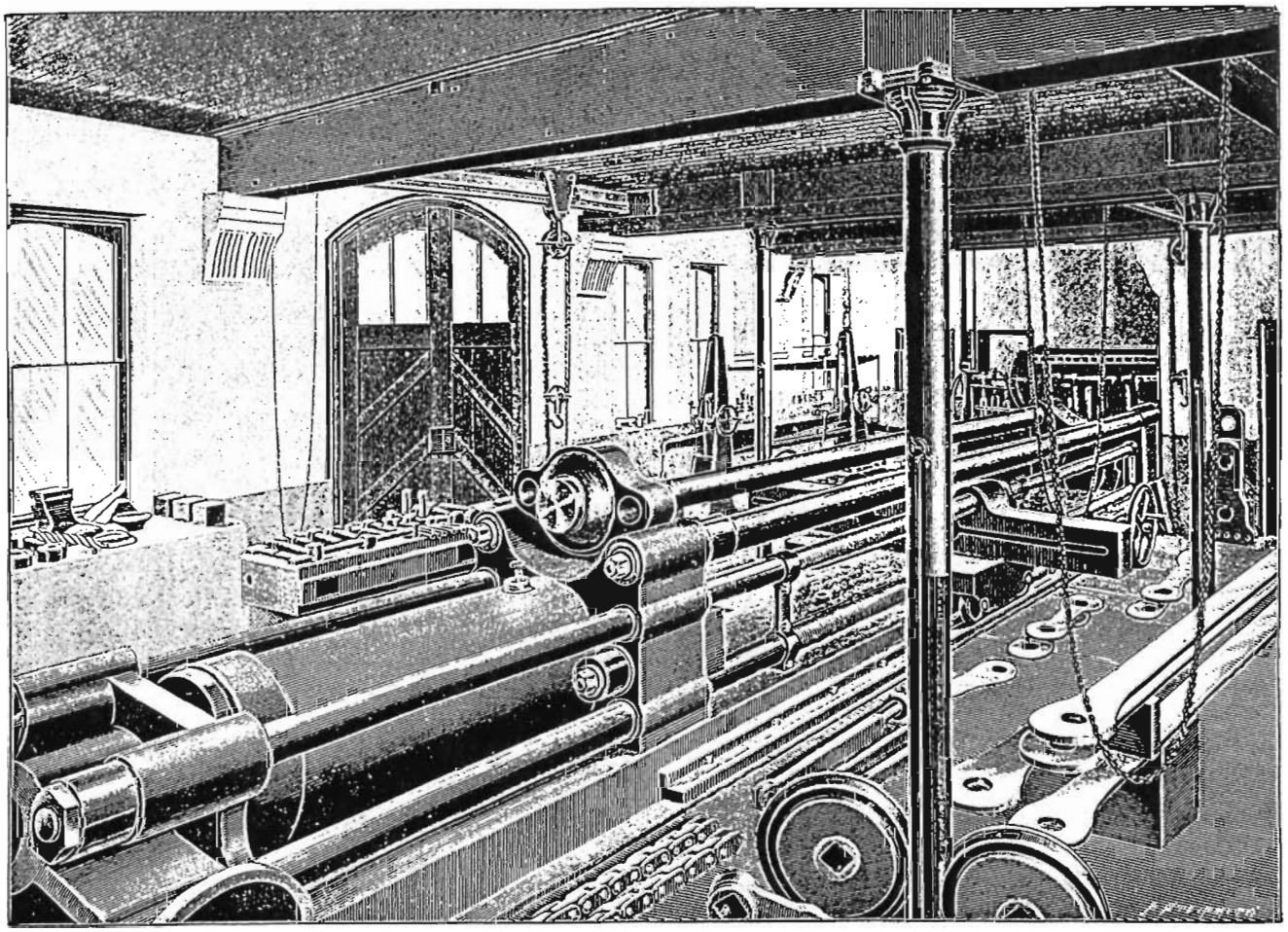
Wishing to develop his interest in engineering testing Kirkaldy left Napier in 1861 and over the next two and a half years studied existing testing techniques and designed his own testing machine. Entirely at his own expense, he commissioned this machine from the Leeds firm of Greenwood & Batley, closely supervising its production. Aggrieved over the slow rate of manufacture, after fifteen months he had it delivered to London still unfinished, in September 1865. The testing machine is 47 feet 7 inches long, weighs some 116 tons, and was designed to work horizontally, the load applied by a hydraulic cylinder and ram. It could apply all the various stresses mentioned in the letter quoted above.

Installed in rented premises at The Grove, Southwark, Kirkaldy's Testing Works was ready for business on 1 January 1866. Business was not slow in coming. Tests in conjunction with the new Blackfriars Bridge were commissioned, and news of the new facility had spread so rapidly that a box of steel from Krupp in Essen, Germany, arrived within weeks. After some years business was such that Kirkaldy erected a purpose-designed building at 99 Southwark Street. This consisted of a basement, the testing machine and other equipment on the ground floor, a well-equipped machine room for preparing specimens on the first floor, and museums of tested specimens on the second and third floors. Business commenced at the new premises at the beginning of 1874.

[1] Kirkaldy to Maiden, 1 June 1883 (MRS202, Inward Correspondence); Maiden to Kirkaldy, 1 August 1883 (MRS4, Letterbooks, vol. 2, pp. 350-51); Maiden to Kirkaldy, 17 May 1884 (*ibid.*, pp. 719-20), Powerhouse Museum archives, Sydney

[2] The following account is largely based on William G. Kirkaldy, *Illustrations of David Kirkaldy's System of Mechanical Testing* (London, 1891), especially 'Historical Sketch', pp. 266-302; and Denis Smith, 'David Kirkaldy (1820-1897) and Engineering Materials Testing', *Transactions of the Newcomen Society*, 52 (1980-81), pp. 49-65

TESTING ROOM. II.



Driven by a personal vision of the role of testing in engineering, and an unswerving commitment to accuracy and honesty, Kirkaldy was ahead of his time, and to some extent suffered for it. The value of independent testing was increasingly recognised by some, and several materials testing laboratories were established in engineering schools in various parts of Europe in the 1870s.[3] In 1877 the Belgian Government ordered a Kirkaldy machine which was again made by Greenwood & Batley. About the same time the Leeds firm also received orders for smaller versions of Kirkaldy's machine, including one from University College, London.

While the notion of engineering testing was gaining acceptance, engineers and manufacturers were not always ready to accept findings to their disadvantage. In various ways attempts were made to discredit Kirkaldy's procedures. One example of this relates to the Inquiry following the collapse of the Tay Bridge during a storm in December 1879. The idea of bridging the Firth of Tay to shorten the rail journey to Dundee dated back to the 1850s. This called for a bridge some two miles long which was built during the 1870s and operated for more than 18 months before the fatal night. At the moment when a train was crossing, the storm was at its height. The train and the high girders - the central section of the bridge - were cast into the Firth with the loss of some 70 lives. In the subsequent Inquiry, Kirkaldy's services were called on to test salvaged samples – but he had no say in the selection of samples, access to the samples was delayed, he was not called to give evidence himself before the Inquiry, and the

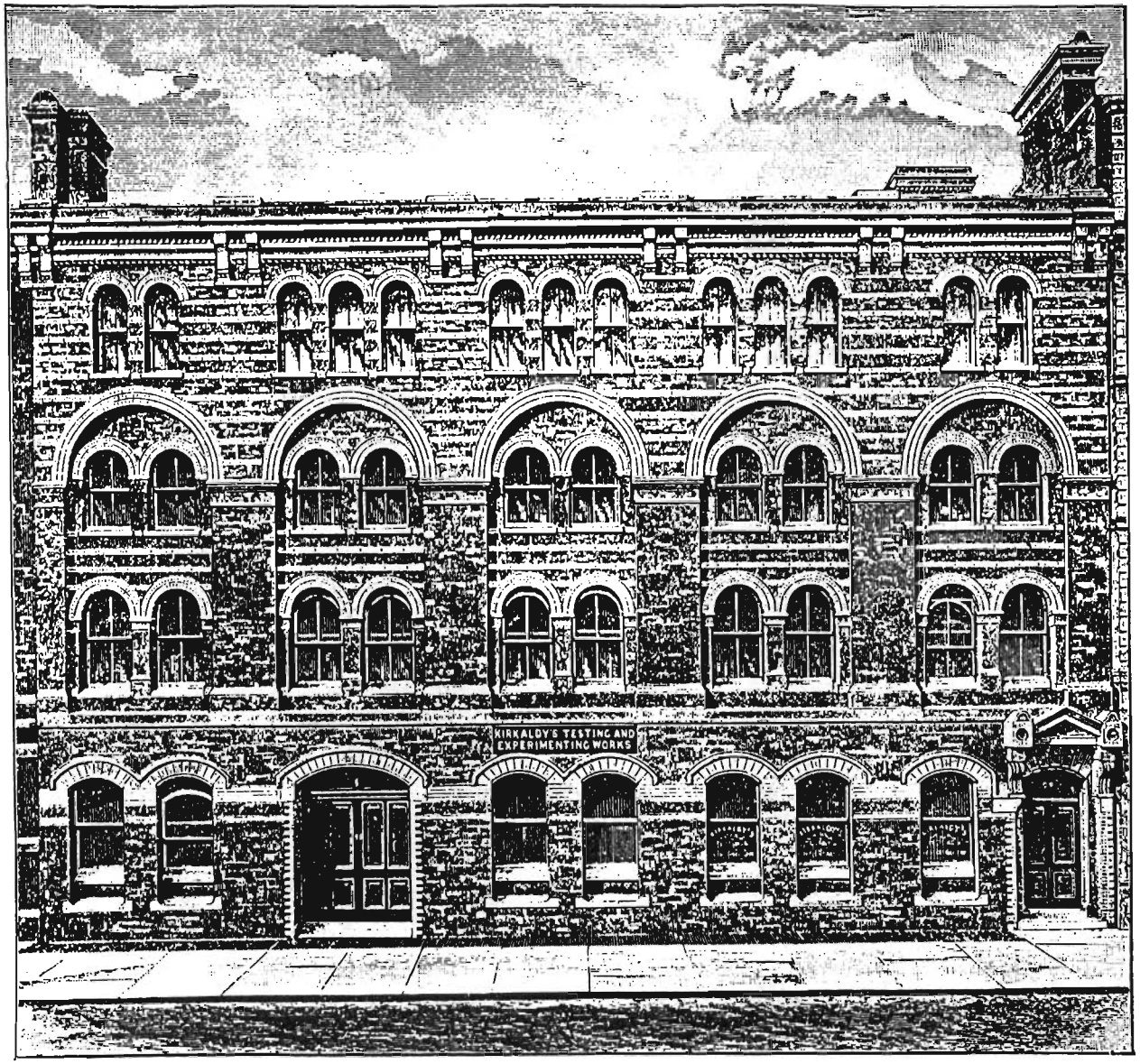
[3] Aubrey F. Burstall, *A History of Mechanical Engineering* (London, 1963), p. 289

DAVID KIRKALDY & SON,

TESTING ✦ AND ✦ EXPERIMENTING ✦ WORKS,

99 SOUTHWARK STREET,

LONDON.



person who presented his evidence distorted it and cast doubt on its reliability.

While he had difficulties with some engineers and officials in England, Kirkaldy's work was widely appreciated abroad. Krupp in Germany and Westanfors and Fagersta in Sweden were among numerous European firms that engaged Kirkaldy to undertake substantial testing programmes. Recognition of the value of systematic testing also led to the supply of sets of test samples. As Kirkaldy informed Maiden in Sydney in 1883, he had supplied collections to several colleges and museums, and appended a list of specimens he had sent to the Imperial College of Engineering in Tokei, Japan, for £150. A similar collection was supplied to the Technological Museum that W.G. Kirkaldy later described as 'an extensive one' in contrast to other smaller ones.[4] Sydney was the beneficiary of Kirkaldy's endeavours in another way. In 1884 W.H. Warren, the new professor of engineering at the University of Sydney, ordered a small Kirkaldy machine from Greenwood & Batley. The testing of Australian timbers on this machine underpinned their subsequent use in structural work for several decades.[5]

Kirkaldy took his son William George into partnership in 1884. On David Kirkaldy's death in 1897, his son became sole proprietor until his own death in 1914. The firm was maintained by William's widow until his son, another David, in turn took charge of it in the 1930s. The younger David ran the business until he sold it in 1965. The new proprietors maintained the Testing Works until it was closed in 1974.

The future of this important engineering heritage site was doubtful until 1980 when moves were begun to preserve it. The Kirkaldy Testing Museum was established in 1983. The original museums on the upper floors are no longer extant - the building suffered bomb damage during the Second World War - but the great testing machine is in place where it has stood for a century and a quarter, and still in working order. Anyone with an interest in engineering metrology visiting London would be eager to see this museum. The entrance today is from the street at the back, but the Romanesque facade of Kirkaldy's Testing and Experimenting Works at 99 Southwark Street remains much as it was when Kirkaldy built it. If you go up to the main entrance you can read Kirkaldy's motto carved in stone over the door: 'FACTS NOT OPINIONS'.

Acknowledgements

I am grateful to Peter Skilton for sparing the time to show me over The Kirkaldy Testing Museum in July 1998, to Des Barrett of the Powerhouse Museum for obtaining copies of archival documents and for giving me access to the Kirkaldy test specimens now in storage, and to Ian Bowie who drew my attention to the Kirkaldy machine in Civil Engineering at the University of Sydney some years ago and first interested me in the work of David Kirkaldy.

[4] W.G. Kirkaldy (note 2), p. 16

[5] W.H. Warren, *The Strength, Elasticity, and Other Properties of New South Wales Hardwood Timbers* (Sydney, 1911)

Reaching Out to Members

Last year a questionnaire was distributed to members asking for our views of the way the Society was being run, and I made a few comments about the relationship between the national and state sectors of the Society. In response it was suggested I nominate for the National Committee, so now I find myself on the Committee principally with the brief of improving relations and communications with the state branches of the Society. I will be attending only one or two meetings a year to keep costs down, but will have a continuing interest in national-state relations. In February I attended a meeting of the Committee in Sydney and substantial discussion took place on this subject. At this stage the main gain has been in conveying ideas and opinions, and raising awareness of the needs of the state groups, and how they see things from their perspective. Hopefully improvements will come from subtle changes rather than grand gestures.

One suggestion to come out of the meeting is that state structures be reviewed (by the state groups themselves), to optimise state-national communications. In South Australia we have operated on a very informal basis with no annual meeting and no elected office bearers. This seemed appropriate in our early days but my feeling now is that we need a more formal assignment of roles so that responsibilities are better defined both for the individuals and the Society at large. This should also mean that channels of communication will be better defined. For example if we have a Membership Officer, then a National Committee member will be able to go straight to the right person with information about new members, or membership development ideas. With regular rotation of office bearers the load should be more evenly spread and enthusiasm maintained.

I have found that all office bearers of the Metrology Society are keen that it is, and is seen to be, run for the benefit of all members and not just some elite. We are always open to ideas, suggestions and criticisms. One problem causing concern at the moment is how we can provide services to members in regional centres where the local membership is low. We await your ideas.

- Jeffrey Tapping

South Australian Report

The following is derived from a talk given in February to the South Australian section by Georg Henzold, an engineer working for Siemens in Germany and an ISO Working Group member.

Unification of standards in Europe

"European Union" is much easier to roll off the tongue than to realise. Politicians never give up power or control easily, as much in regard to standards as to anything else. But money and profits speak with the loudest voice, and it was trade considerations that provided the leverage to enable industry to wrest control of standards formulation in the European Community. Within the Community endless argument and negotiation is avoided by using a simple majority voting system in the standards-making bodies, and once a standard is accepted it automatically becomes a national standard for each nation in the Community. Industries soon found that there was great advantage in making European standards the same as international versions, so there has been a relentless move towards integration of the whole standards-making process. Georg quoted the example of his own company, Siemens, selling a power station in Australia. This country, like many others, demand that a proportion of the contract be carried out locally. The process of trying to specify every aspect of manufacture, parts, testing etc. to local subcontractors without ISO standards would be expensive, time-consuming and fraught with danger. The so-called globalisation of manufacturing would be difficult, if not impossible without universally accepted standard specifications.

Why change standards so often?

Geog asserted that microprocessors are the invention which has brought the fourth great wave of change to human society, after writing, paper, and printing. An important result of their use for control of measuring machines and for computing results is that corrections have been found that were not previously suspected. Co-ordinate measuring machines (CMM's) became possible because of microprocessors and allowed unprecedented measuring power. Manufacturers began to demand tighter and tighter tolerances in dimensional specifications. In earlier times, answers for a particular CMM measurement depended on which brand of machine you

used. Each model of machine was different, and each manufacturer had their own method of calibration. So although CMM's gave great reproducibility the absolute accuracy was difficult to determine reliably. Establishing standard methods of verification have now ironed out these problems, but revealed new ones in the components CMM's are used to measure. As a result of improved measurement capability, tolerances specified in standards have often been found to be inappropriate. Sometimes they have needed to be tightened, but often they have been found to be tighter than they need to be leading to excessive rejection rates. So there is a constant need for improvement of standards, and as one is updated another needs to be reviewed as a result. Probably the march towards perfection will never end.

NSW News

Seminar on Education in Metrology

The NSW Metrology Society hosted a seminar on metrology education in conjunction with the Annual NSW Members Forum that took place NATA on the 23 February 1999. The speakers included Tony Russell (NATA), Lee Coleman (TCA), Brian Costello (Swinburne University) and Marian Haire (NSC).

Tony Russell explained that assessing the competence of metrologists was an important aspect of a NATA assessment. Lee Coleman described TCA's in-house training program. The program involves a large number of TCA's technical staff and is tailored to individual needs of a particular staff member. Most of the program is facilitated internally, involving those who work in the standards Laboratory to train the Calibration Laboratory personnel. This has proven to be helpful to all concerned. Marian Haire outlined the limited success achieved through the TAFE modules. It is unlikely that these modules will be available, as there is never demand at the same time.

Brian Costello from Swinburne University to explained a new course, under development, called *Graduate Certificate in Metrology and Quality*. The course consists of four subjects. The first three subjects will be delivered by distance education.

- Experimental Analysis
- Measurement Systems
- Calibration, Documentation and Laboratory Management
- Metrology and Quality Practices

The fourth subject, Metrology and Quality Practices, is taught by face-to-face contact, and offers specialisation in one of the following areas:

- Dimensional & Mechanical
- Electrical & Time & Frequency
- Chemical & Temperature
- Optical & Radiometry

Generic Skills

The course provides skills that will enable participants to:

- Calculate the uncertainty of measurement.
- Select and apply an appropriate statistical technique for a measurement task.
- Understand basic metrological terms.
- Explain the role of NATA, NSC, CSIRO, ISO, SA, BIPM.
- Write and update a quality manual.
- Understand different quality standards and their purpose.
- Understand the calibration process.
- Manage a measurement system.
- Design practical measurements according to metrological practices and standards.
- Conduct measurements using standard equipment and instruments.
- Competently analyse and report experimental results.

Course Delivery and Fee

The course commences in semester 1 of 1999, and the duration of the course is one semester by full-time study or two semesters part-time. Three of the four subjects are taught by distance education, and one is delivered by face-to-face teaching. The fee for each subject is $1000, and the total course fee is $4,000. Students may enrol for individual subjects.

Entry Requirements

Normal entry is a Diploma in Engineering or Science with relevant industrial experience, or a Bachelor of Engineering of Science. However, consideration will be given to those who do not possess formal qualifications, but can demonstrate substantial industrial experience.

Contact

Further information regarding the course and enrolment may be obtained by contacting

Mr. Brian Costello, Course Coordinator
Tel: 61-3-9214 8005
Fax 61 3 9214 5050
Email bcostello@swin.edu.au
Web http://www.iris.swin.edu.au

The group compiled a list of training needs for metrologists with some hurdles that need to be overcome before metrology training is readily available. Everyone seemed to agree that training was required and a solution needed to be developed. The summary of the responses is given below.

Training needs of metrologists

- Training on Uncertainty that is simple and uses examples that are relevant to the workplace. Need several levels such as introduction to uncertainty, then more in depth material leading to the specific such as Torque, Force, Pressure, Dimensional etc. Must have practical applications. Links to ISO guide (standard interpretation and format) plus practice at the calculations.
- Lab management should include principals and practice, technical competency required for ISO 25, Quality, ISO 9000 & 2, Performance measurement - targets and achievements.
- Industry standards, Structure and traceability of standards.
- Swinburne course OK as it stands - perhaps the 4th module could be tailored to individual needs.
- On going training in new technologies and changes in technology.
- Broader skills for specialist staff
- Courses on ultrasonics, optical, specialist training in balances.
- Flow both gas and water. Currently only have in house training
- Overview of the measurement process

Obstacles

- Lack of availability
- Cost
- Isolation of people
- Time away from the bench
- Employer/ management inability to see value of training

If you would like to add to this list, suggest a solution or endorse a comment please contact Marian Haire on 9888 3922.

NSW Annual Members' Forum

Dr Ilya Budovsky (NML, CSIRO) presented an overview of the NSW Branch activities in 1998. Six visits took place in 1998 to Police Radar Section, Telstra EPS Calibration Laboratory, AMBRI Biosensor Facility, Sydney Observatory, RTA Crashlab and Optus Satelite Control Facility.

The NSW Branch also hosted two MSA seminars: "Calibration Intervals – do they Make a Difference" (see http://www.ozemail.com.au/~ausmet/calint.htm for more information including notes of several presentation) and the above seminar on education of metrology.

A long list of suggested venues for 1999 was circulated. The members of the audience were asked to indicate their preferences and new suggestions. The questionary also revealed that the median preferred number of MSA events is 4-5 a year for site visits and 1-2 a year for seminars. The meeting elected the following NSW Coordinators Committee for 1999 comprising Ilya Budovsky (chair), Marian Haire, Bob Kelly, Brian Pritchard and Mary Ryan. The following visit venues are being investigated by the Committee : Caltex Oil Refinery, ABC Studios, Manly Sewerage Treatment Plant, NSC Pattern Approval Laboratory, Prince Alfred Hospital, ANSTO, and Garden Island (ADI). Attempts to provide an Uncertainty Course at the appropriate level will also be investigated.

Consider joining the Metrology Society of Australia or introducing a new member to the society. Membership applications can be obtained from Dr Laurie Besley, on 02 9413 7770 or fax 02 9413 7202 e-mail laurieb@tip.csiro.au or write to: The Secretary, Metrology Society of Australia, CSIRO - NML, PO Box 218, Lindfield NSW 2070

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 Enquiries

Contact either your State Coordinators or the Secretary, Dr. Laurie Besley on (02) 9413 7770 or fax (02) 9413 7202, e-mail address laurieb@tip.csiro.au or write to:

The Secretary, Metrology Society of Australia
c/o CSIRO National Measurement Laboratory
PO Box 218
LINDFIELD NSW 2070

The MSA website (www.ozemail.com.au/~ausmet) is worth visiting.

Membership Fees

Fellows	$45 Joining Fee
	$45 Annual Subscription
Members	$40 Joining Fee
	$40 Annual Subscription
Associates	$35 Joining Fee
	$35 Annual Subscription

Contributions

Articles, news, papers and letters, either via e-mail, disk or hard copy, should be sent to:

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The deadline for the next issue is **20th March 1999.**

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If you have a position vacant, write or e-mail the Editor with the details. A charge of $20 for up to 10 lines applies. (The circulation may be small but it is well targeted.)

The deadline for positions wanted/vacant is as above.

Letters to the Editor

Letters should normally be limited to about 200 words. Writers will be contacted if significant editorial changes are considered necessary.

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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 that may compromise the Metrology Society of Australia. Contributors may be contacted regarding verification of material.

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