CoResearch

No. 319 January 1989 CSIRO's staff newspaper

CSIRO AUSTRALIA

Closet wets revealed at Parliament House

CSIRO scientists have proved that the 'wetness' and 'dryness' of politicians can be determined scientifically.

A team from the Centre for Environmental Mechanics in Canberra brought their Wets and Dries Testing Unit to Parliament House in late November as part of a major display of research on climate change and the greenhouse effect.

Results of the test were most interesting. The wettest of all who were tested was Senator Peter Cook, who scored 71 on the scale from 0 to 100. This result is perhaps not as surprising as it first appears, as Senator Cook is the Minister responsible for water resources.

The driest was Peter McGauran, the Opposition Spokesman for Science, who recorded an arid 29. Two of the damper members of the Liberal Party, Senators Peter Baume and Chris Puplick, scored 42 and 48 respectively, above the results for several ALP parliamentarians.

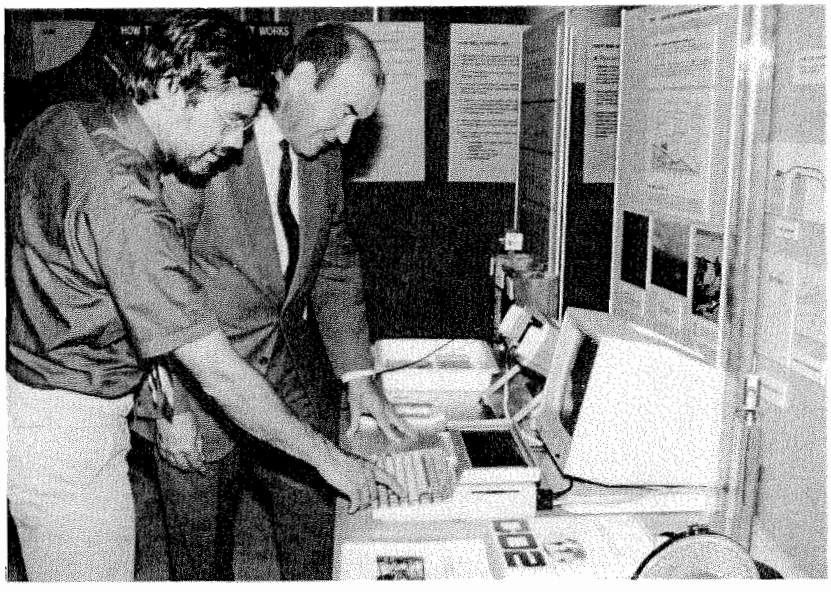
An unidentified staff member from Treasury, who was found to be decidedly wet, was quickly removed from the display in disgrace by three of his colleagues.

Barry Jones, the Minister for Science, was most impressed by the technique. 'I think we've really got something here,' he declared as he dashed out of the room in search of two of his colleagues. 'We've got to get Peter Walsh and John Howard in here. Then you'll see some really spectacular results. They'll be right off the scale!'

The equipment used to determine political wetness is normally used to measure the water content of soil and other porous materials. It was part of the CSIRO display on planning for a changing environment as a result of the greenhouse effect.

The comprehensive display, organised by the Bureau of Rural Resources and the Institute of Natural Resources and Environment, described climate change research being carried out by CSIRO, the Bureau of Meteorology, the ANU and the Commission for the Future.

Scientists will return with their Wets and Dries Testing Unit to Parliament House early this year as part of a display of research on land degradation. They hope to test Howard, Walsh and other prominent parliamentarians at that time.



Dr Will Steffen of the Centre for Environmental Mechanics in Canberra, was on hand at Parliament House to help objectively measure the wetness or otherwise of our politicians. He's pictured, left, with Senator Brian Archer (Lib. Tas.) at the climate change research display.

Photo: Greg Heath

CSIRO Medals presentation in Sydney

Mr John Brooks, project manager for the Australia Telescope, received his CSIRO Medal for research leadership. It was the first time this criterion had applied to determining a recipient. For a photo of the other 1988 winners, turn to p.7.

Photo: Maria Basaglia

The 1988 CSIRO Medals were, for the first time, a public affair. They were presented before an audience of industry, academic and scientific representatives at a ceremony in Sydney in November by the Minister for Science, Mr Jones.

Once again, the Medals honoured exceptional work completed within CSIRO as well as for one project from outside the Organisation.

The recipients were:

- Dr Graeme Pearman from the Division of Atmospheric Research
- Dr Ken McCracken, Director of COSSA
- Mr John Brooks from the Division of Radiophysics
- Mr Len Taylor (Ballarat College of Advanced Education) and Dr Bill Charters (Melbourne University)

Each award was accompanied by a brief video outlining the outstanding work which led to the awards. These videos were produced by Mr Nick Pitsas of the CSIRO Film and Video Centre.

Dr Pearman has been at the forefront of Australian research into the greenhouse effect, and edited a volume on research to date, the Proceedings of Greenhouse 87. On receiving his award, Dr Pearman gave special mention to the former Chief of his Division, Dr Priestly, and the current Chief, Dr Tucker, and to

Cont. on p.7

Our scientists helped make Australia great

The list of 200 Australians who made Australia great, announced during the Bicentenary year, included five former CSIRO scientists and administrators.

Sir David Rivett, Sir Ian Clunies Ross, Dr A E V Richardson, Dr Joseph Pawsey and Dr Lionel Bull were honoured by inclusion in the list.

For more information about our famous Australians, turn to page six.

Film & Video Centre claims another Silver Mobie

CSIRO's multi-award winning Film and Video Centre has won its third Silver Mobie from the International Television Association (Australia).

This time the award has honoured the training video *New Systems* produced for the Management Information Systems Branch. The video was designed to be screened at the start of training sessions for administrative staff on the new computerised systems which are being implemented throughout the Organisation.

Malcolm Paterson from the Centre wrote and produced the imaginative 12 minute video. From script to screen it took only six weeks to make. But then, it is often said the best creative work is done against the most pressing deadlines.

The script called for an entire circus act, complete with jugglers, fire eaters, flying saw blades and the inevitable master of ceremonies.

New Systems was one of 28 entries in the training category for the ITVA Awards. Competition was stiff, coming from some of the most accomplished production houses in Australia, as well as Film Australia.

Mobie Awards are given to those programs which combine creativity with high production skills, resulting in a program that clearly and successfully communicates its message to the target audience.

Previous Silver Mobies were awarded to CSIRO in 1985 for *Women in Science* and in 1986 for *Connections*, the staff video magazine.

From the Chief Executive

A column by Dr Keith Boardman

1988 was certainly an eventful year for CSIRO, with the operation of the new institutes under the newly appointed directors, the reorganisation of divisions with the appointment of several new chiefs, the large cut in the appropriation budget and the unprecedented protests from CSIRO and other scientists at the continuing decline in Government funding for science and technology.

The cuts in Government support for R&D in CSIRO and other public institutions over the past few years are small in relation to total Government outlays of about $80 billion, but they had considerable impact for the scientific community, and political and national consequences at a time when innovative science and technology of world standard is vital to Australia's international competitiveness.

Australia witnessed for the first time a massive coalition of scientists, professional scientific organisations and scientific staff unions protesting the funding cuts and the generally poor career prospects for research scientists and engineers. There was wide media support and considerable community sympathy for the protests, with some strong statments from industry associations on the essential role of Government support for longer term basic and strategic research.

There seems little doubt that this strong coalition of scientists will now be a permanent feature of the Australian scene and it is very likely that it will play an important role in the formulation of science and technology policy.

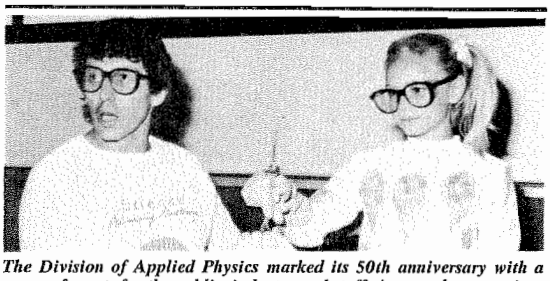
I believe it can influence community attitudes on science and technology and become a not insignificant political influence.

The interdepartmental committee (IDC) set up to review Australia's research capacity reported to Cabinet in December, but any substantive decisions on the report have been deferred until at least the end of January. Minister Barry Jones is required to bring back to Cabinet for immediate consideration proposals which can be implemented in the current financial year. Top priority for CSIRO is the reversal of the previous decision that our appropriation be reduced by one third of additional external earnings up to a target over three years of 30 per cent of total funds. If a recommendation of the IDC is accepted, we would receive some extra funds for major items of equipment. I understand the Minister will be putting forward a strong case for new resources for priority areas, examples of which were presented in our submission to the IDC, with funding to start in 1988/89, but with a commitment for at least 1989/90 and 1990/91. CSIRO also is seeking full funding of the North Ryde building development, estimated to cost $20 million.

Unfortunately for the Organisation, two Board members, Mr Graham Spurling and Mr Bill Mansfield, have tendered their resignations. Mr Spurling will be living in the United States for the next 12 months and Mr Mansfield has joined the Telecom Board. Mr Spurling, who was also on the former Executive, has made a major contribution to policy formulation, particularly relating to our interaction with manufacturing industry, and Mr Mansfield's wise counsel, particularly on Government policy and staff issues, was extremely valuable.

On behalf of the Organisation, I would like to express appreciation for their outstanding contributions, and personally thank them for their strong support.

To all staff, I offer all good wishes for 1989.



The Division of Applied Physics marked its 50th anniversary with a range of events for the public, industry and staff. Among the attractions for the public was a session hosted by science educator Deane Hutton. **Above, Deane and his assistant from the audience show how science can be entertaining as well as enlightening. More photos on p.7**

Photo: Maria Basaglia

Letters to the Editor

Dear Editor,

Recent quotes attributed to the Chairman of CSIRO, Mr Neville Wran, stated that the voices of concern being raised within CSIRO come from malcontents who 'are not doing their jobs' (*The Australian*, 5 December 1988). If this quote is correct, it shows an appalling lack of perception of what is happening at the coal face. This variation on the 'blame the victim' approach is a short sighted attempt to trivialise the genuine concerns of scientists.

As one who helped organise the recent Rally for Science in Canberra, I don't mind the slur on my professional ability and commitment but I could introduce Mr Wran to several eminent scientists who have world class reputations and who also were worried enough to stand in the rain with me and protest.

Scientists are highly motivated and their enthusiasm for their work often gives the appearance to the casual visitor that all is well. But amongst the scientists I work with there is a growing anger at the lack of commitment being shown by the government to Australian science and CSIRO in particular.

I challenge Mr Wran to put his money where his mouth is and visit our Division: not just to speak to chiefs and program leaders, but to meet some of the young research scientists and ask them how they feel about their prospects in Australian science; ask them if they enjoy a total lack of career structure; ask them how much time in their three year contracts is spent looking for the next job.

Young researchers represent a national resource and the cost of training them is about $500 000 each, and yet these people with young families are expected to live their lives in a succession of three year appointments with little security or hope of a permanent job. Because of the lack of career prospects these people are being forced overseas. This was shown in a survey of career prospects of non-tenured research scientists at the Research School of Biological Sciences at ANU and published in *Nature*. This showed that 60 per cent of respondents thought they would have to leave Australian science to find their next jobs. A group of scientists at Plant Industry is repeating this survey among non-tenured scientists (i.e. those on term appointments) in CSIRO and preliminary results confirm that this situation is not isolated to ANU. It is bad economics to subsidise the American and European R&D effort to this extent.

But there is another iceberg looming. Because of the demographic bulge in the population of Australian scientists (most scientists are over 40), universities and research institutes will see a wave of resignations commencing in the mid-1990s. Unless the best of the current generation of young scientists are available to take up senior positions, we may find our R&D effort in further disarray in the future. The government must assume responsibility for reversing the loss of young researchers in the short term by establishing 'holding positions' of, say, five years.

CSIRO is burning, and with it will go the future economic welfare of all Australians. This is not the time to play the fiddle or the politician, it is the time for intelligent and thoughtful strategies. Mr Wran, what are you doing to provide career structures for young non-tenured scientists at CSIRO?

Dr Greg Tanner
Division of Plant Industry

(Editor's Note: Dr Tanner sent a similar letter to Mr Wran)

Dear Editor,

Further to my letter in the September issue of *CoResearch* about the corporate centre staff cuts and associated savings, and Mr Langhorne's response in the November issue.

The pamphlet appearing with the July issue of *CoResearch* provided some statistics on the 45 per cent cut in corporate centre numbers and the claimed $10.6 million saving that was to flow from this. In actual numbers this represents a cut of about 270 positions, from 640 to 360. Below, I will try to be more specific about my concerns in relation to this matter since they have not been resolved by the information I have seen so far.

Firstly, with regard to who is to be cut, we know that of the 270 positions, 140 are accounted for by the abolition of the Regional Administrative Office and 30 by the abolition of the printery. These alone represent nearly two thirds of the total. Now surely the functions of the RAO (to provide certain basic accounting and administrative services to divisions) must be totally replaced elsewhere in the Organisation. Likewise, surely the functions of the printery will now have to be replaced or contracted out.

What about the remaining cuts? The film and video unit will be cut by eight. Will their operations have to be contracted out? Other cuts are not as easy to categorise and it is not as easy to follow the fate of the functions they represent. However, it does appear that several of these functions are to be 'devolved' to the divisions (according to Mr Lumbers' article in the September issue of *CoResearch*, and to an article appearing in the September issue of *Business Review Weekly* which publicises the head office cuts and the resulting savings).

The point of all this is not to question the need for the review and reorganisation of corporate centre activities, or even to question the final decisions taken. What we question is the inference that this restructuring is an effective pruning of the head office bureaucracy, and particularly that it will really save money '...to be available for what we are all about, namely research' (as Mr Langhorne says).

The lingering questions are:

1. Is it true that while the so-called corporate centre is to be cut by 45 per cent by September 1989, the number of corporate centre positions in the Canberra headquarters building at that time will exceed the numbers prior to the PCEK review?
2. How will the abolition of the RAO save money when its functions have to be taken up in the divisions?
3. How much money will be saved by abolishing the printery after the costs of contracting out printing have been taken into account?
4. How many of the remaining pruned functions have been devolved to the institutes or divisions along with the costs of supporting these positions?
5. When the dust settles from all this, will CSIRO be a more effective research organisation?

M D Hatch
Division of Plant Industry

Dear Editor,

In his reply to Dr Hatch and myself (*CoResearch* No. 317, October 1988), Mr Langhorne answered only part of one of my questions. In addition, his data are somewhat misleading since he compared pre- with post-PCEK figures for the numbers of Senior Executive Service (SES) staff. Considerable change towards the corporate structure had been effected by his pre-PCEK date of September 1987. My question had asked for a comparison with the headquarters staff structure.

However, since I asked my three questions, the corporate centre has produced the Implementation Handbook Part 4 which details the structure and classifications of all the positions in the corporate centre. By comparing this information with the old CSIRO staff list 'A', it is possible to ask, and answer, the following revealing questions:

Q: Did the numbers of SES positions change when the corporate centre structure evolved from the old headquarters structure?

A: Yes. In HQ there was one SES4, two SES3, two SES2 and eight SES1, making a total of 13. The corporate centre

Cont. on p.6

A Matter of Opinion

This month's point of view column comes from Jeff Prentice, who takes up a new position as Print Advisory Officer in Sydney this year, based at the Division of Food Processing. For the past three years, Jeff has managed the CSIRO Bookshop, adopting an entrepreneurial approach to achieve successful sales results. He is the co-general editor of two books on Communication Skills in Practice.

In September 1988 the *Implementation Handbook 4* – the *Final Report on the Implementation of Change in the CSIRO Corporate Centre*, was issued to staff, and, with the inclusion of the McKinsey Review Report on restructuring CSIRO's institutes and divisions, the final chapter was closed on the most turbulent period in CSIRO's history. CSIRO had to demonstrate its worth and adopt businesslike practices to meet the challenges of the 1990s. Both reviews received constructive criticism from scientists, politicians and from the rank and file within CSIRO.

Nevertheless, when both reviews were implemented, they caused much upheaval and soul searching among staff, and we witnessed the exit of many professional colleagues who chose redundancy and resignation rather than continue their careers in the new structure. It may be time to reflect on the changes.

As early as 1970, Charles Reich in his thought-provoking book *The Greening of America* warned us about the coming of the Corporate State and how a technology oriented society increasingly would push aside people productivity. He said 'The Corporate State is an immensely powerful machine, ordered, legalistic, rational, yet utterly out of human control, wholly and perfectly indifferent to any human values'. Dressler and Seybold in their book *The Entrepreneurial Age* (1985) went further and commented 'tragically people do not appear anywhere on any corporate balance sheet....Many corporate managers even pride themselves on their abilities to eliminate people. They think machines are productive and people a necessary evil. This mentality permeates much of our business today'. Hopefully, CSIRO will not follow this path.

CSIRO is adopting a corporate culture which exhorts scientists to embrace the user pays principle, to accept the relevance of scientific research for industry and community needs and to take a more businesslike approach to their work. A culture shock indeed for some research scientists and support staff. But will CSIRO staff adjust to this new direction? Will adequate staff training be offered to learn about business systems? Will we see staff still exercising initiative, thinking for themselves and planning ahead, or will they be expected to conform to strategic planning and let corporate minders think and plan for them? After all, strategic planning can be defined as a disciplined effort to produce fundamental decisions and actions that shape and guide what an organisation is, what it does and why it does it. It can't be left to managers to put it into practice – the top-down approach. Scientists working at the 'grass roots' level must be involved at all stages.

To strike the right balance between corporate planning and scientific research, CSIRO will have to look to people with vision to lead the way. I have heard the comment that to consider people productivity in CSIRO is to prefer the 'soft option'. The 'hard' options have been taken with all their ramifications, so why not pursue a 'new' option – people productivity. People productivity is entrepreneurial in nature and revolves around motivation, knowledge and opportunity. Tom Peters and Robert Waterman, two of today's management gurus, espouse the benefits of people productivity in their book *In Search of Excellence*, and in his latest book *Thriving on Chaos*, Tom Peters reminds us that as individuals and as an organisation we have to welcome change and innovation as vigorously as we have fought it in the past. It's people who initiate change and it's change which can breed opportunity.

Success in CSIRO will, to a large degree, depend on people productivity, not on further reviews, task forces and endless working parties. Maybe we should note John Bryson's comment in his book *Strategic Planning for Public and Nonprofit Organisations* (1988) when he says 'while few public and nonprofit organisations have a clear and useful mission statement, fewer still have a clear, succinct and useful vision of success'.

In the new climate, CSIRO will need to address its information, communication and publishing policies to meet new corporate goals. The new institutes, divisions and the corporate centre have yet to agree on what are the cost effective ways of achieving success in these key areas. For instance, can we continue to justify the costs of producing 35 divisional biennial or research reports. Who reads them? What purpose do they serve in disseminating scientific research results and scientific research in progress? There are alternative ways of communication to the scientific community through the print media.

Cont. on p.6

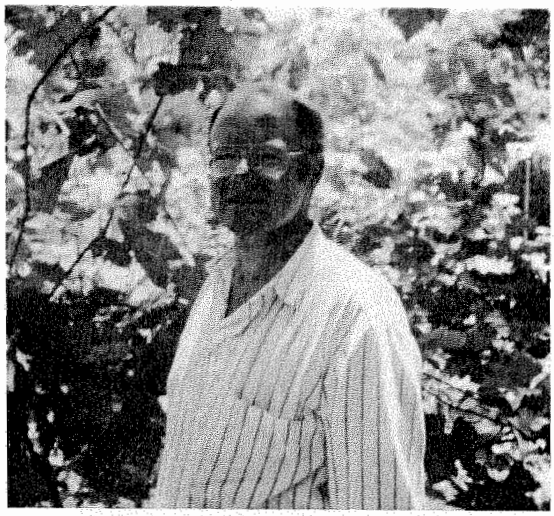
New Animal Production Chief

Dr Mayo looking to ensure protection of strategic research in Division

A genetics expert is to be the next Chief of the Division of Animal Production.

Dr Oliver Mayo is now Reader in Charge of Biometry at the Waite Agricultural Research Institute in South Australia, but will take over as Division Chief from Dr Trevor Scott on 3 April.

Dr Mayo has extensive experience in statistical aspects of evolution, in population and quantitative genetics and their applications in animal and plant breeding, and in human genetics.



Dr Oliver Mayo

Dr Mayo has edited widely-used books on human and biochemical genetics and his book on the theory of plant breeding has been translated into Russian. He has published a series of papers on the analysis and interpretation of responses to selection for clean fleece weight in sheep.

His qualifications in administration include a Diploma in Business Management and a stint as Dean of the Faculty of Agricultural Science at Adelaide University. He also has served on the Council of Roseworthy Agricultural College for a number of years.

He said one of his aims for the Division of Animal Production was to make it 'more flexible and responsive to industry needs. We will work closely with both producers and consumers to ensure the community gets what it wants'.

However, he said, 'strategic research, particularly in high growth, high risk areas such as biotechnology, also must remain a major part of the Division's activities. This requires long term funding.

'The Division already earns 36 per cent of its money from non-government sources. I consider it a personal challenge to attract more industry funds while at the same time maintaining the level of direct government support.'

CSIRO keeping up with the Commodore

Commodore Business Machines Pty Ltd has offered computers for use in CSIRO Science Education Centres in Sydney and Melbourne.

Mr Ross Kingsland, Manager of CSIRO Education Programs, said the programs to be used with these sponsored computers epitomise the role of our Education Centres. The two Commodore Amiga 2000 computers will enable students to experience:

- current CSIRO research;
- the latest technology; and
- their applications in the community.

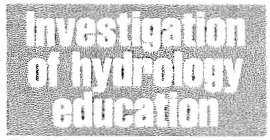
The CSIRO programs also will effectively demonstrate the capacity of the Amigas to well over 16 000 visitors to the Melbourne and Sydney CSIRO Centres each year.

One program produced by the Division of Oceanography in Hobart involves data on the infra-red levels of the oceans surrounding Australia. The data are received by CSIRO from the NOAA polar orbiting environmental satellite and are used for commercial fishing and for ocean yacht racing, as well as for scientific uses in oceanography and marine biology.

Another program developed by the Division of Mathematics and Statistics allows students to use the latest remote sensing technology to zoom in on their own cities, down to street level, to learn about the many uses of this A-Image system. It is now being marketed by Image Tech International. Using Landsat data, this system has many applications in agriculture and forest management, environmental monitoring, mineral exploration and disaster monitoring.

These programs will alert students to a whole new area of Australian activity, space science, and its growing part in our lives. By manipulating data provided, students will be able to understand what information is obtained and how it is used. These future decision makers and scientists will at least know that remote sensing is more than touching an object at arm's length with their eyes closed!

The Division of Human Nutrition in Adelaide has developed a program which will allow students to study the nutritional value of their own diets or any they devise. The Division already has produced 500 disks with an accompanying booklet to sell to schools and interested individuals for approximately $60. Having experienced the program at CSIRO Science Education Centres, schools can buy it for use in the classroom in either Commodore 64 or Amiga format.



Dr John Philip, Chief of the Centre for Environmental Mechanics, is serving on a UNESCO panel investigating the university education of hydrologists.

The panel, sponsored also by the International Association of Scientific Hydrology (IASH), was formed in response to a growing feeling that applied hydrology often suffered from the scant attention given in hydrolic education to its basis in natural science.

In accepting the invitation to serve on the panel, Dr Philip expressed the hope that the group could 'help hydrology towards its rightful place as a serious branch of geophysics'.

'My own view would be that we should try to bring order to chaos by identifying and setting out for all to grasp, the coherent intellectual framework of hydrology which can be built up when we actually use what is known about the physical processes of the hydrological cycle,' he said.

Dr Philip welcomes input from CSIRO and other Australian hydrologists.

30 years on

CoResearch still surviving

As mentioned in the October issue, *CoResearch* started life in December 1958 in a pilot version, but the first regular issue did not appear until April 1959. However, I thought I would cheat a little and celebrate the 30th anniversary now, because that very first issue was important in establishing the idea of a newspaper available to all CSIRO staff members.

A survey of readers carried out in August 1985 showed conclusively that the respondents (about 10 per cent of CSIRO staff) endorsed the idea of a staff newspaper. The overwhelming majority wanted *CoResearch* – they did not want a colour magazine or a staff video. The survey also turned up quite a bit of criticism of *CoResearch* in the form it was published then.

CoResearch issue No.1 of April 1959 had a heading 'Lines of Communication' on page one. In part, the article said 'Our 4000 staff members are scattered over Australia ... and lines of communication between them are tenuous ... many CSIRO happenings never become known to staff. The aim of *CoResearch* is to let all members of staff know what is going on in CSIRO'.

I would extend that rather bland statement of purpose to say that *CoResearch* in 1989 definitely does not exist to relay information from the centre outwards. It is there for all staff to use – to communicate not only information but also opinion, criticism, observation and wit. To those who think *CoResearch* is a management tool, I say flip through some recent issues and think again. There is much material which, I'm sure, has been discomforting to the upper echelons. To the credit of the Board and the office of the Chief Executive, the gag has not been applied.

But *CoResearch* needs to go further. I would dearly love to see more staff involvement, in the form of letters to the editor, contributions to A Matter of Opinion, suggestions for articles and phone calls to me to discuss issues. As the only person working on *CoResearch*, I have difficulty keeping up with all the newsworthy activities and issues in all the divisions. I need some input. I do try to visit divisions when I can, but deadline (and other) pressures limit travel or the amount of time I can spend at divisions even if I can get away. Please ring me and let me know what is going on – I'd love to know. My telephone number is 062-48 4479 and FAX 062-48 4641.

While stressing the importance of staff input, I am very aware of the danger of *CoResearch* becoming too involved in controversy. I don't mean the old chestnut about airing our dirty linen – I personally believe that the frustration caused by a lack of frank discussion about our problems is more damaging in the long run than any danger from bringing issues out into the open. What does concern me is losing sight of the reason CSIRO exists – the scientific research. In *CoResearch* I try to present a cross section of the research being done in CSIRO. Some scientists have asked me 'why bother – if it's important to me then I find out about it through the scientific journals, and if it's not important to me, then I'm not interested'. But it's not just scientists who read *CoResearch*. In fact, most readers are not scientists at all, but other staff members, media, politicians, bureaucrats, retired CSIRO people and even some members of the general public. They *are* interested, and what's more they have a right to know what is going on in this publicly funded Organisation.

CoResearch escaped the axe in the recent turbulent reorganisation of the corporate centre. When so many HQ functions were being chopped, somehow the staff newspaper came through virtually unscathed. Hopefully it will continue to survive, and I like to think it will improve with age, especially now it has left behind its callow 20s and entered the more mature 30s.

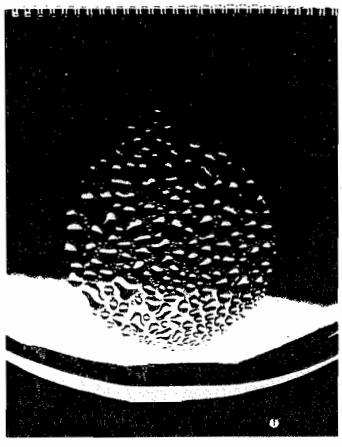
The one and only respondent to my calls for comments on* CoResearch *came from former staff member Mr Guy Gresford. In this case, it is definitely quality not quantity that counts.

Dear Editor,

After 30 years, *CoResearch* remains my favourite journal. I was glad to see the reference in No. 317 (Oct. 1988) to No. 00 (December 1958) as it recalls life at Head Office, 314 Albert Street, in that dim, distant past. No corporate centre then! *CoResearch* was the brainchild of Frank Nicholls who first recognised the need for a staff journal in CSIRO and sought approval from the Executive to launch one. This was not immediately forthcoming, but it was agreed that a specimen issue should be prepared as a first step. The result was No. 00 and it was so well received that regular publication was approved and it has never looked back. Long may it continue!

Guy Gresford (retired)
Hobart

Water Resources second only to beautiful women



The Division of Water Resources 1989 calendar/research highlights is a stunner. With brilliant photography by Bill van Aken, it's already been hailed publicly in Perth. Bob Rummery entered it in ABC radio station 6WF's calendar competition where it was runner up to the calendar produced by the international giant Pirelli. The local radio announcer praised the CSIRO calendar – 'fascinating', he said, having pointed out the magnitude of the competition from Pirelli, which, he said, had obviously spent 'big bucks', with photographs of beautiful women and international settings. Fired with this success, Bill has entered the calendar in Australia's National Print Awards, and* CoResearch *will keep a watch on the results.

The Rivett Medal

New challenges to face in determining recipients

As reported in the October issue of* CoResearch, *Dr Roderick Hill of the Division of Mineral Products received the latest David Rivett Medal. The CSIRO Officers Association makes the award every two years, and in the following article Frank Harrigan of the OA outlines some of its history and raises some important points about the dilemmas increasingly encountered in determining scientific merit.

Sir David Rivett was Chief Executive and later Chairman of the Council for Scientific and Industrial Research (CSIR) which preceded CSIRO.

More than any other person, he was responsible for the distinctive character of CSIR, which is still evident today in CSIRO. His colleagues held him in very high regard.

After his death in 1961, a memorial fund was established to finance the David Rivett Memorial Lecture, which is delivered every two years by an eminent research scientist. In 1962, the Council of the CSIRO Officers Association approved of his further commemoration by the award at the same interval of a medal to a young officer of CSIRO for outstanding research carried out within the Organisation. The award was to be made alternately for work in the biological and the physical sciences.

The medal is usually presented by the President of the OA on the occasion of the Memorial Lecture.

The design of the medal was taken, with the permission of CSIRO, from one prepared for a memorial plaque, designed by the late Andor Meszaros, for the entrance hall of the David Rivett Laboratory at Clayton.

The medal is a bronze disc, 6.4cm diameter, and was struck by the London firm, John Pinches Ltd, medallists for more than 200 years.

The list of Rivett Medallists to date contains some familiar names:

1964 ***Dr C H Gallagher,***
Division of Animal Health
and ***Dr E O P Thompson,***
Protein Chemistry
1966 ***Dr J R Philip,***
Plant Industry
1968 ***Dr J F Bergersen,***
Plant Industry
1970 ***Dr A F Reid,***
Mineral Chemistry
1973 ***Dr J K Raison,***
Plant Physiology Unit,
Macquarie Uni.
1976 ***Dr B M Chapman,***
Textile Physics
1978 ***Dr F J Ballard,***
Human Nutrition
1980 ***Dr T W Cole,***
Radiophysics
1982 ***Dr T J Higgins,***
Plant Industry
1984 ***Dr J S Frederiksen,***
Atmospheric Research
1986 ***Dr P M Room,***
Entomology
1988 ***Dr R J Hill,***
Mineral Products

The 1988 award, for work in the physical sciences, was characterised both by the record number of nominations (16) and the emphasis those entries placed on the extent of industrial orientation and involvement in the research.

The fields covered included: antenna design and coupling, millimetre wave technology, ocean current and wave dynamics, metal and alloy catalysis, physics of adhesion, solid state chemistry, psychophysics, physics of thin films, fluid flow in porous media, theoretical chemistry, physics of reinforced compositions, micrometeorology and ceramic solid state cells.

Many of the entrants were able to claim that commercialisation of their work was either at the negotiation stage or had been successfully implemented. This was for work conducted before the McKinsey inspired restructuring of CSIRO along 'business lines'.

This increased emphasis on industrial application and commercialisation is likely to continue, presenting the OA with some difficulty in establishing appropriate assessment criteria for work of this kind which is likely to be unpublished and may be confidential.

The contradiction between the OA's policy regarding promotion, that 'documentation of performance' is more appropriate than publications or publication record for assessing professional staff reclassification and its application to the Rivett Medal, i.e. that 'the award shall be judged on the basis of published work', already has been pointed out by a member in Adelaide (Ian Sare of Manufacturing Technology), who advocated a broadening of the assessment criteria.

The problem is – how does one evaluate work which by its nature is not open to public scrutiny? The promotion guidelines for research scientists list the quality and number of contributions to the literature as important criteria. The guidelines also state that: 'In research activities, such as industrially-oriented work, computing systems development, or work which is of a confidential nature, the publication record may not adequately reflect research performance and achievements. Therefore *other* relevant measures of a research calibre *will* be taken into account' (*my emphases*).

Cont. on p.5

Sensory Research Centre

Tickling Japanese taste buds could mean big business for Australia

It's estimated that $80 billion is added overseas each year to the value of Australia's raw agricultural commodities. Just 10 per cent of this would wipe out our balance of payments problems, if we could add the value here instead.

Processed foods alone could achieve a turnaround of that magnitude under the right conditions. The enormous potential for the export of Australian processed foods has not even started to be tapped.

A scheme proposed by a group of three scientists, experts in sensory research at the Division of Food Processing, could be the catalyst needed to boost the export of processed food from Australia.

The Sensory Research Centre was established by Drs David Laing, Bob McBride and Graham Bell last year. Its initial work has been purely tactical, designed to raise desperately needed outside income by testing products for companies.

Now, a new proposal could open the way for some pioneering science as well as succeed in raising revenue for the Division and providing vital information for food companies to expand their businesses. Initially, the scientists are looking to Asia, following a concerted effort by Division Chief Dr Des Walker over the past few years to encourage the industry to enter this most lucrative market.

The Asian market is huge. In Japan alone, the population of 125 million consumes $300 billion worth of food each year, and $24 billion of this is imported. But past experience has shown that the Japanese generally find Australian food unacceptable, and consequently only a small proportion of the food imported by Japan comes from Australia. Australian companies have made no real effort to appeal to Japanese taste buds.

The reasons the Japanese, and other Asian people, find our food unpalatable is not really known. The only available data is anecdotal and subjective.

The trio from Food Processing want to establish a scientific basis for food preference in different countries. Armed with this knowledge, primary producers and food companies would be able to tailor their products to suit the export market.

What is not yet known is whether food preferences are purely cultural, purely physiological or a combination of these and other factors. What is known is that what appeals to an average Australian probably does not appeal to an average Japanese. But to break into the big money the product has to be just right for the market. So far attempts to crack the export market have been hit and miss, mainly miss, and few Australian companies have made the attempt.

However, our domestic food market, for which Australian companies provide 93 per cent of the products, is saturated. Companies must look overseas to diversify and increase their profits.

A seminar held at the Division last month, attended by some big guns in the food industry, resulted in tentative pledges of $25 000 for each of three years from several major companies. In all, the 18 food companies at the seminar (held in conjunction with the North Ryde open days), represented a combined annual turnover of $3-$4 billion.

To get started, the scientists will need about $2.5 million – a small amount in comparison with the potential return. In addition to industry funds, the scientists are having talks with both AUSTRADE and the Department of Industry, Technology and Commerce, both of whom have responded favourably.

Hopefully, CSIRO appropriation funding will play a significant part in setting up or operating the project – something the scientists say is the sort of thing that CSIRO funding should support.

It's envisaged the Asia research will generate more product testing work. As advice is provided to companies on desirable sensory characteristics of products for Asian markets, more tactical product testing is likely to result. With the generation of more revenue, the Centre will be able to take on extra staff, thus extending its capacity. The income raised will have 'no strings attached', and a formula will be devised for dividing up the profits within the Division.

Once the project has its funding, the scientists will at last be able to return to the bench, to gather raw data on sensory preferences at different levels of constituents. They said they would need at least 12 months to collect the initial information for a base set of data before specific products could be targeted.

The scientists have perfected precise methods for evaluating sensory perception – methods which they already have employed commercially in product testing.

Each has a different area of expertise within the broad sensory area. Dr Bell has been involved in pinpointing the actual sensory receptors in the nose and the brain itself; Dr McBride is an experimental psychologist who uses the principles of 'psychophysics' to measure perceptions of taste, usually through taste testing experiments; and Dr Laing is an expert in olfaction (sense of smell). Between them, they are probably Australia's leading authorities on sensory perception of smell and taste.

The sort of sophisticated market intelligence they could provide to both primary producers and food companies already is being undertaken in both Europe and the United States. There is no question it is the way food products will be specifically targeted in the future. Australia, unfortunately, has often lagged behind the rest of the world in the adoption of new techniques, but the scientists are confident that Australian companies will get behind this proposal when they realise the potential benefits.

If they don't, they could miss out on the huge market opportunities in the Asia-Pacific region. As the scientists point out, the prize, or the lost opportunities, will be measured in the long term in billions of dollars.

Laing

'...the prize, or the lost opportunities, will in the long-term be measured in billions of dollars...'

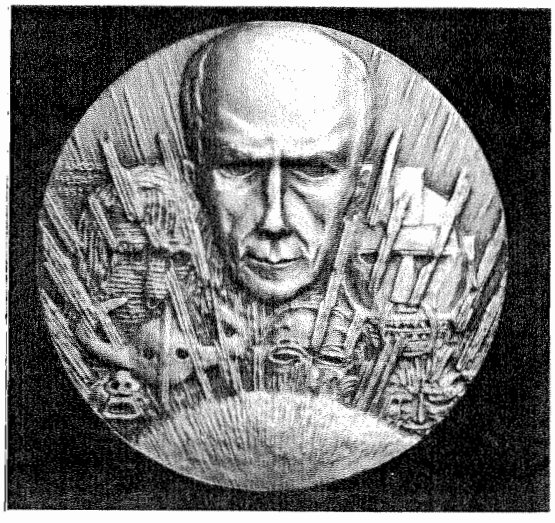
Above, the three sensory experts try to come to grips with the attractions of Vegemite. Even eaten with chopsticks, it seems unlikely to appeal to the Japanese palate. Left to right, Dr David Laing, Dr Bob McBride and Dr Graham Bell.

Rivett Medal
Cont. from p.4

The OA, in reviewing its method of selecting the winner of the David Rivett Medal, is seeking to identify those 'other' relevant measures and determine how they 'will' be taken into account.

This same dilemma is faced by institute committees during the annual review of professional staff classifications, and it seems they too are yet to solve it.

Nevertheless, it is an issue central to the new ethos of CSIRO, and satisfactory solutions must be found if the Organisation is to succeed in fulfilling its objectives and for the David Rivett Medal to continue its role in providing recognition by the Officers Association for outstanding achievement in pursuit of those objectives.



The Rivett Medal

A Matter of Opinion
Cont. from p.3

Finally, Dr Boardman has commented on the future CSIRO when he stated recently in the booklet *Strategic Plan 1988-92*: 'We must continue to attract staff of the highest calibre. This requires a stable and exciting research environment, the provision of adequate financial human resources and a system of incentives which rewards excellence and achievement'. I'm sure CSIRO staff look forward to stable times, new challenges and no further cuts in research funds. But let Robert Waterman in his recent book *The Renewal Factor* (1987) have the last say: 'No organisation can maintain excellence without renewing. No organisation can strive for excellence, or even attempt to improve, without the ability to renew'. CSIRO must be given the opportunity to renew and thus achieve excellence.'

And furthermore...

...a brief comment on another matter from the editor of* CoResearch, *Liz Tynan.

I find it hard to believe there are still those in the bureaucracy who doubt the real benefit of CSIRO research. Anyone who cares to go into it will find a return many times greater than the investment. For those who have difficulty making the effort to find out for themselves, and for all those interested in the value of scientific research, essential reading is the cost benefit analysis report on the Division of Mineral Processing and Engineering.

This independent, external report found that the investment of $133 million on eight specific research projects is creating a return, after allowing for costs, of $365 million over five years.

It is worth remembering that while Government departments are mostly non-productive absorbers of taxpayers' money (often an unavoidable consequence of the nature of the work they do, i.e. in the social security area), CSIRO actually generates revenue as a result of its work. Substantial revenue. Politicians and those senior bureaucrats who have a say in what is happening to CSIRO, should perhaps reflect a little more on this. The facts are there in black and white, in this latest cost benefit report and an earlier one of the Division of Entomology. A list of CSIRO activities 1983-1988, also gives a small taste of the incredible range of research which has come to fruition and is of direct benefit to Australia and to various industries. This report, of which I have copies, lists 175 separate items, but it is by no means complete and after all it only covers five years. CSIRO research is an investment in Australia. I hope that this fact is appreciated when the Cabinet deliberates on a long term science policy.

Letters
Cont. from p.2

composition is one SES5, three SES4, three SES3, six SES2 and 13 SES1, making a total of 26.

Q: How do these figures compare with the Australian Public Service?

A: In the same time period, the APS SES suffered a reduction of 10 per cent in line with the recommendations of the Block Report into the APS.

Q: How were the new SES positions filled in CSIRO?

A: Some were new appointments, but the majority were made from existing HQ staff competing for the positions. Some staff received up to a $13 000 per annum increase as a result of the corporate structure (the research staff should get so lucky).

Q: How would these changes have affected the average cost per staff member?

A: Since the changes took place against an advertised reduction of 46 per cent in HQ staff, and many of the positions below SES level were also reclassified as a result of the structural changes, it is inevitable that this cost must have risen. However, the exact amount of the figure does not warrant the effort necessary to extract the information. One estimate has suggested an increase of $4000 per staff member.

Comment: It is difficult to see how the senior management of CSIRO has managed to implement so many upward classification changes in the light of CSIRO's financial restrictions during the period. Mr Langhorne has failed to address my original question concerning the justification for the reclassifications and it is difficult to see what these could be when, in many cases, there are no apparent changes in job descriptions, only in classification. While it can be argued that there are some apparent savings resulting from the restructure, these are clearly less than should have obtained. It will also be necessary to increase institute and divisional administrative staff to compensate for devolved RAO functions so that total staff administration costs in CSIRO will probably rise. This result will, of course, be at the expense of our real objective, Research Advancing Australia.

David Goodchild
Division of Plant Industry

Dear Editor,

O Landsberg! O mon roy!

Involuntary retirement has informed me that as the slave departs the man returns. And I can see now that he who is anyone's or any department's slave is free from none and his vitality remains suppressed.

Landsberg's remarks in *Co-Research* No. 317 reminded me of John Russell Lowell's famous stanza:

'They are slaves who fear to speak
For the fallen and the weak;
... They are slaves who dare not be
In the right with two or three.'

Freedom, being the obverse of slavery, numbers among her children Creativity, Efficiency and Progress as Mother Russia herself has belatedly begun to proclaim. (See particularly Roald Z Sagdeev's comments in last (northern) summer's *Issues in Science and Technology*. Sagdeev is the Director of the Soviet Space Research Institute and a Member of the Soviet Academy of Science. Some quotes to whet your interest: 'During the past half century, Soviet science has suffered deep and still-bleeding wounds *from ill-conceived government policies*.' 'Today, although the Soviet Union has one of the world's largest scientific workforces, it has only a modest record of achievements and is *contributing too little to the world's scientific knowledge*.' '*...bureaucratic dinosaurs*..have bogged down virtually every facet of the scientific community.'– *my emphases.*)

Speaking with detachment, perforce, my advice to you is to start by rejecting the Line Management Monster. Go on from there to tell the running dogs of government that Science and Slavery do not marry. It is utterly useless being the slave of a slave, even of one who purports to be your champion.

After only a few months of exposure, I can assure you that, at least for intelligent and informed people such as you, there is a rewarding life 'out there'. I have found too that the community of primary industry (farmers, fishermen, foresters, miners) retains Faith, Hope and Charity, the main planks in the platforms supporting all grand endeavours, of which scientific research is one. This community – and no doubt others such as the independent professionals – still stands four-square for freedom, is grateful for past scientific achievements, does not query the system that produced them and will sustain calls for continuing scientific freedom. Do not bother with finance ministers, planners, political scientists, *et al.* They are merely pretentious middlemen. Assert your own primacy or leave. Recall Lucius Annaeus Seneca's words of 2000 long years ago: *Nulla servitus turpior est quam voluntaria* (no servitude is more disgraceful than that which is self-imposed). Surely Shakespeare got it right when he wrote (in *Julius Caesar*):

'So every bondsman in his own hand bears
The power to cancel his captivity'

Pray, think of the next generation. Supineness now will make mudsills of our science undergraduates, destining them to the meanest duties in a social system gone wildly awry. If constrained by personal circumstances from speaking out publicly, whisper to your sons, daughters, nieces, nephews and those of all your acquaintances that the current compact is a covenant with Death and a concordat with Hell, with both parties in an atrocious criminality which should be immediately annulled.

Tell the donzels, the Job's comforters, the know-nothings, i.e. all non-scientists, to take their noses out of science. Follow Landsberg, I say. He has nostrils for nonsense, perspicacity and some guts. Crown him, even while knowing that, of itself, a crown cannot cure a headache. Landsberg! Ay, every inch (cm) a king and a kingdom's bulwark!

John J Lenaghan

(Reflections whilst painting a long picket fence – in heritage colour, of course)

PS Note also that the one federal instrumentality especially ordained to ascertain truth has been the only one to incur serious budgetry decline under the Bob'awke administration.

Our great Australians

Australia owes a lot to its scientists, and CSIR/O scientists figure prominently among those who have contributed in various ways to our high standard of living. This has been recognised by the inclusion of five CSIR/O pioneers in the list of 200 Australians who made Australia great between 1770 and 1970.

The names were announced at Parliament House in Canberra on 14 November last year.

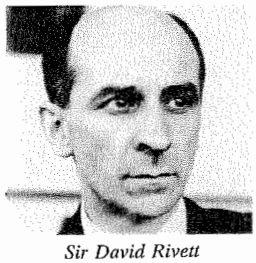
Sir David Rivett was one of the triumvirate of men who led CSIR from its formation and on through the War years (the other two being A E V Richardson and Sir George Julius). He was Chief Executive Officer from January 1927 until June 1946, when he became Chairman until 1949. Sir David, a distinguished researcher in chemistry, is regarded by many contemporaries as having established a strong ethos for CSIRO based on scientific excellence.

Sir Ian Clunies Ross began his career with CSIR as a parasitologist in 1926, working on major problems such as hydatid tapeworm, liver fluke and dog tick. Work begun by Sir Ian is still continuing at the Division of Animal Health. He was the foundation officer in charge of the Division's McMaster Laboratory 1931-1937. He became the first Chairman of the newly-constituted CSIRO from 1949 until his death in 1959.

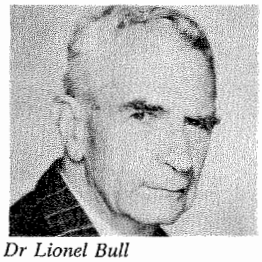
Dr A E V Richardson was an outstanding agricultural scientist who headed the Victorian Department of Agriculture for a number of years, followed by a stint as Director of the Waite Institute in Adelaide. He joined CSIR as Executive Member in 1927, and was Chief Executive Officer from 1946 to 1949. His profound knowledge of agriculture was essential, particularly as the Council was almost exclusively involved with research of assistance to rural industries.

Joseph Pawsey was one of the world leaders in the development of radio astronomy. He joined CSIR in 1940, and throughout World War II played a prominent role in the secret radar research carried out by the Division of Radiophysics. After the war, researchers turned their attention to the high intensity radio waves which apparently came from the sun, and this led to some exciting discoveries which marked the beginning of the new science of radio astronomy. Dr Pawsey's leadership of the radio astronomy project brought Australia to the forefront of this research. In 1961 he became Director of the US National Radio Astronomy Observatory, however he was unable to take up the appointment because of ill health and he died in 1962.

Dr Lionel Bull was a noted expert on animal diseases and was involved in investigation and introduction of myxomatosis into the Australian rabbit population. He also researched a number of other ailments, such as tuberculosis, flystrike, mastitis and copper deficiency. Dr Bull's pioneering work in the study of these and other diseases led to many of the control methods in use today. He served with distinction as Chief of the Division from 1935 to 1954.



Sir David Rivett



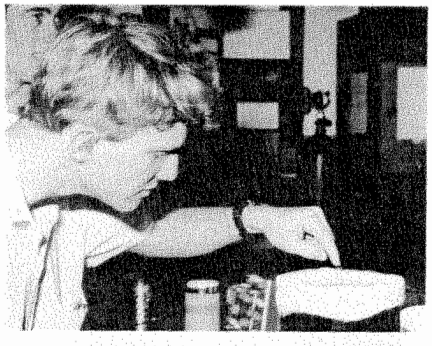
Dr Lionel Bull
Photo: Bob Campbell

Applied Physics' 50th anniversary

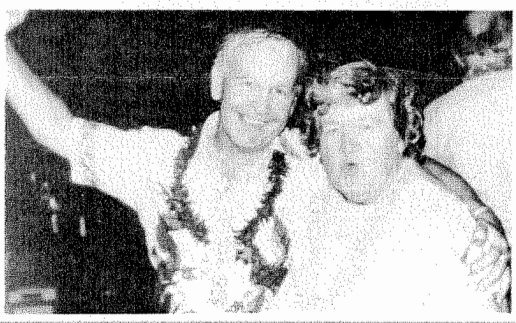
CSIRO marked another milestone in its long history with the 50th anniversary of the Division of Applied Physics. Below left, Division Chief Dr Bill Blevin, blowing out the candles on the birthday cake. Below centre, a visitor poking his finger at a magnet levitated over a high temperature superconductor. Bottom left, Dick Rattle and Doris Colohan. Bottom right, Dr Paul Dean, Director of the British National Physical Laboratory, makes 'A Case for Metrology' at the Symposium held in conjunction with the anniversary celebrations.

Photos: Maria Basaglia

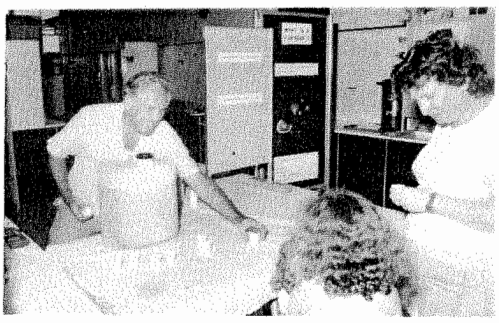
Below, visitors at the Division's supermagnet display during the Applied Physics open day



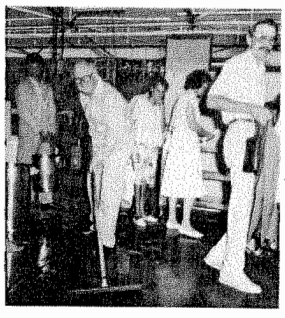
Above, Dr Boardman opened the symposium

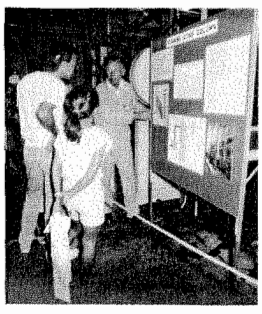


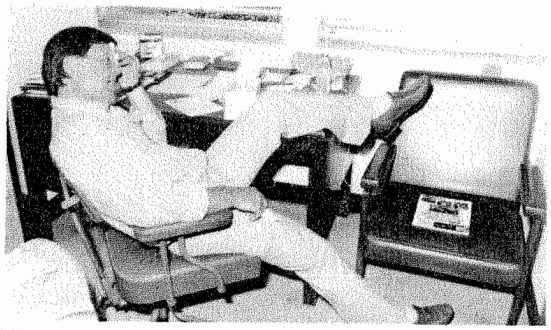
...and the North Ryde open days



Open days at CSIRO sites are major feats of organisation and require a considerable amount of time and money. But the response is usually excellent and the latest open days at North Ryde were no exception. Thousands of people viewed the displays and spoke to the scientists about their work. Photographer Will Rushton of Food Processing recorded some of the images for posterity.

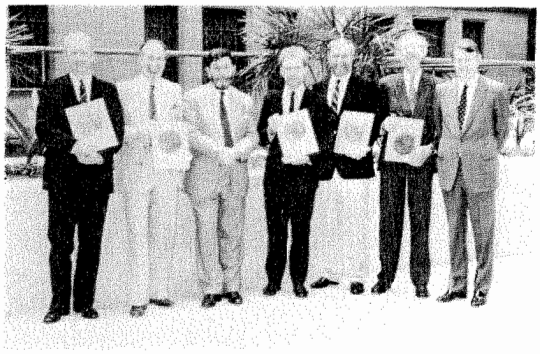






CSIRO Medal winners

Cont. from p.1



Pictured above at the Medal presentation, left to right, Mr Len Taylor, Dr Bill Charters, Science Minister Mr Barry Jones, Dr Graeme Pearman, Mr John Brooks, Dr Ken McCracken and CSIRO Chairman Mr Neville Wran.

CSIRO itself, which, he said, had a 'proud reputation of allowing scientists to undertake high quality research'.

Dr McCracken has been in charge of COSSA since its formation in 1984. He received his award for leadership in space activities and achievement in geophysics research. A NASA veteran who worked for that organisation during its golden years from 1959 to 1970, Dr McCracken went on to become foundation Chief of the Division of Mineral Physics before becoming COSSA Director.

Mr Brooks has had the task of managing the enormous Australia Telescope project. The Telescope, one of Australia's most outstanding engineering feats, was a complicated project, but one Mr Brooks (in conjunction with a highly skilled team) brought in on time. Technological spinoffs to industry from the AT project have been significant. At the Medal ceremony, Mr Brooks said he was accepting the award on behalf of a number of people, including the participating private firms and Divisional staff, the Institute Director Dr Bob Frater and Division Chief Dr Dennis Cooper.

Dr Charters and **Mr Taylor** have had a great deal of success with their solar boosted heat pump. The pump is manufactured by Siddons Industries Ltd and marketed as the Solar Plus domestic water heater. It operates on less than 25 per cent of the energy normally used to run an off-peak electric water heater.

Previous winners of the CSIRO Medal have included Dr David Solomon, Dr Hugh Tyndale-Biscoe, Dr David Jupp, Mr John Coleman, Dr Dieter Plate, Dr Myles Harding, Dr Peter Colman, Dr Ray Jones and Dr Graeme Ogilvie. The Medals were inaugurated in 1985.

Retirements

'Last of the CSIR photographers...'

Ted Lawton from Merbein has seen a great deal of change during his long career with the Organisation.

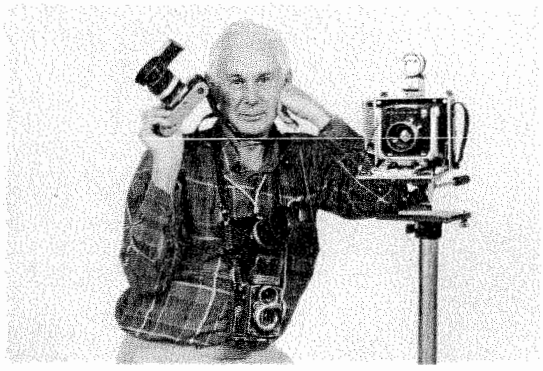
Ted, a photographer with the Division of Horticulture, retired on 2 December after more than 42 years. He started with CSIR in March 1946, three years before the Act which established CSIRO. There must be few people still in CSIRO who can trace their involvement with the Organisation back that far.

His early work at the Commonwealth Research Station (CRS) at Merbein was as a laboratory assistant to E C Orton, working on dried fruits processing. At that time A V Lyon was the Officer in Charge, and staff numbers were being built up after the wartime decline.

It wasn't long before Ted started using his talents in basic specimen photography, using the rather primitive equipment and materials available at the time. He remembers having to use a 1933 Trona camera, with the old fashioned bellows, and as he and others at the lab had little experience of photography, the early efforts were rather hit and miss.

In 1948/49, he spent about four months at the photographic section of the Division of Forest Products under Wallace Hastie. This work extended his photographic experience, and on his return to Merbein the photographic activity increased and became full time.

Ted Lawton on 4 October 1951



Ted Lawton this year *Photo: Liz Dare*

Ted remembers that during this time more money became available for better equipment and new techniques were developed for routine specimen photography using a custom built lightbox for colour photomacrography of living insects and for light microscopy.

During the 1960s the CRS evolved into the Horticultural Research Station and later the Division of Horticultural Research, and with these changes came a substantial expansion of the research programs. They now included vine virus studies, grape breeding, new crops such as apples, avocado and pistachio. At the same time came the need to provide some photographic services to the staff of the new Adelaide laboratory.

It was during this time that Ted did some time lapse cinematography of plant growth on avocado flowers and vine roots, using the novel flash synchronised 16mm cinecamera.

The work was becoming diversified in other ways too, with the greater use of photography for static displays and colour slides for research presentations.

Despite all this new activity, however, the photographic section was still housed in an old wartime hut.

But then came the 1970s and a new studio and photo lab, and the start of colour photography for the Division's fruit variety booklets.

Ted's reputation as a top rate scientific photographer was well established. He presented a paper on photographic work for the Division at the first ANZAAS/AIST Conference on Science Technology at Flinders University in 1973 and went on to develop a photographic system for the Philip Scanning Electron Microscope 500.

In 1980 Ted became the first CSIRO photographer and only the second Australian to receive the certificate of Registered Biological Photographer from the Biological Photographic Association Inc. in the United States.

Ted successfully completed the rigorous examination and assignment requirements and received his certificate in Boston at the 50th Annual Meeting of the Association, during which he gave an illustrated paper on techniques and applications of photography in Australian horticultural research.

In the 1980s Ted has continued his work on the Division's varietal books, and has consolidated and refined his techniques in scientific photography.

At this time he was made a Registered Biological Illustrator by the Australian Institute of Medical and Biological Illustrators, and has helped organise seminars for photographers at Merbein in 1983, 1985 and 1987.

With his retirement, CSIRO loses one of the last of the CSIR photographers and one of its most experienced practitioners in the field.

For his part, Ted is looking forward to a retirement full of travel and, of course, more photography.

Ted Radoslovich retires after diverse career

Dr Ted Radoslovich has retired from the Division of Soils after nearly 39 years and a diverse career which has ranged from crystallography to politics.

Ted's major professional achievements have been in the study of crystal structures of micas and other layer silicate minerals, and he received international recognition for this work in the 1960s and 70s.

Also, Ted has long been active in the CSIRO Officers Association, and was Federal Vice President and President between 1972 and 1977 and was made an honorary life member in 1979.

Ted received a BSc Hons from the University of Adelaide in 1949, and immediately joined the Division of Soils, located at the Waite Institute, to oversee the x-ray powder diffraction project while research leader Keith Norvish undertook a CSIRO studentship. Upon Keith's return, Ted received a studentship himself and went to Cambridge to study x-ray crystallography.

His design of a curved crystal fluorescent x-ray spectrograph for routine elemental analysis gained him his MSc. This design became the basis of the extraordinary development of this analytical tool over the next 30 years by Keith Norvish.

Following his PhD at Cambridge and some post doctoral work Ted embarked on a decade of crystallographic studies on layer silicate structures which led to a DSc in 1968.

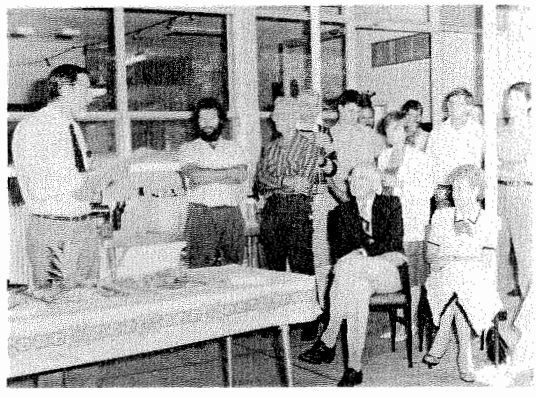
Dr Ted Radoslovich

A year at the Geophysical Laboratory in Washington DC triggered a sustained interest in the interactions between science and politics. By 1970, Ted had completed a BA in politics, studying at night, and in 1983 he was a candidate for the Australian Senate, polling well though not successfully.

Ted also served on the Mitcham City Council for seven years, eventually as Deputy Mayor.

For the past three years he has worked for Soils in Canberra as Divisional Secretary (Scientific). On his retirement he was co-opted to the Executive of the Federation of Australian Scientific & Technological Societies (FASTS).

Farewell for Dr McGlasson



Above, Dr Doug Graham, officer in charge of the Food Research Laboratory in Sydney, gives the farewell speech for our 'Tomato man', Dr Barry McGlasson, seated right. News of Dr McGlasson's departure was reported in the November/December issue of CoResearch.

CoResearch **is produced by the Public Affairs Unit for CSIRO staff. Readers are invited to contribute or offer suggestions for articles. The deadline is the last Monday before the issue month. Editor: Liz Tynan, PO Box 225, Dickson ACT 2602. PH:062-48 4479.**

CoResearch
No. 320 February 1989 CSIRO's staff newspaper
CSIRO AUSTRALIA

CSIRO gets its share of equity

CSIRO is making its first forays into the hectic world of the stock market by obtaining equity in commercial ventures based on research projects.

Two landmark equity deals have been signed in the past six months, opening new avenues for closer ties with industry and for earning outside revenue.

The shares that CSIRO is acquiring are the kind bought and sold on the Australian Stock Exchange. By taking shares in a company that agrees to manufacture and market the products of research, CSIRO (through Sirotech) effectively is investing in its own work. It is a very real way for CSIRO to share the risks and rewards of individual projects once they reach the commercial stage.

It also is an effective way of linking CSIRO and a manufacturer while the R&D process is underway. This is a common component of CSIRO's new equity deals.

It usually is expressed in an agreement by which the company undertakes to issue a number of shares to CSIRO in the first instance and follow this with further issues as the project passes through defined stages.

The two recent equity deals CSIRO has entered into both involve the Institute of Minerals, Energy and Construction.

The Division of Coal Technology has developed an instrument, AIRSCAN, for analysing photochemical smog, forecasting its development by interpolating weather data. It also can pinpoint the sources of pollutants in a metropolitan area.

Under an agreement announced last September, CSIRO and Adelaide-based MCI Ltd are developing AIRSCAN into a commercial product for release later this year.

AIRSCAN is unique technology, almost totally aimed at the export market which MCI estimates is worth up to $100 million over the next 10 years. CSIRO will be issued with 650 000 shares in MCI in stages over coming years. This is equal to 10 per cent of MCI's issued capital.

Last November, the Division of Mineral Products and Queensland Metals Corporation (QMC) announced an agreement following on from a $1.9 million two and a half year joint research program. Under this deal, CSIRO will continue research into applications of what is believed to be the world's largest magnesite deposit at Kunwarra near Gladstone.

QMC will issue 650 000 shares to CSIRO and has agreed to fund continuing research until 2001. At current share values, this initial QMC placement to CSIRO is worth at least $1 million. Funding will be in the form of shares and cash or cash alone. In return, QMC will acquire full ownership of all intellectual property, patents and the like resulting from the research over the life of the agreement.

Equity ownership in its own research results is a step beyond CSIRO's past arrangements with industry which involved licensing arrangements or one-off payments. Once a company issues CSIRO with its shares, that company becomes involved with research as much as CSIRO becomes involved with business.

It is another sign that Australian industry is becoming increasingly aware of the necessity to invest in science and technology, especially in CSIRO science and technology. Through Sirotech, CSIRO has created the right conditions for this development.

The festive season brought another reason for celebration to the Marine Laboratories in Hobart. Three research vessels – the ORV* Franklin, *the FRV* Soela *and the MS* Southern Surveyor *– were docked at the CSIRO wharf. With CSIRO's vessels operating for extended periods in different regions of Australia, the presence of all three ships in one port at the same time is a rare event.* Franklin *had just returned to Hobart after an absence of 18 months.* Southern Surveyor *arrived in Australia in mid-November following her delivery voyage from Norway. She will soon leave to be refitted as a fisheries research vessel.* Soela's *charter will end when* Souther Surveyor *comes into service. On 5 January* Franklin *left Hobart to research wind-driven upwelling events in South Australian waters.* Franklin *was followed by* Soela *which departed on 19 January to conduct a depth stratified random trawl survey of orange roughy off the east coast of Tasmania and in south eastern Australian waters.

Internal survey

Non-tenured scientists cite 'poor' career prospects

A survey of a number of non-tenured research scientists in CSIRO has revealed a high level of dissatisfaction about job prospects both within the Organisation and in science generally.

The survey, conducted by a scientist from the Division of Plant Industry, Dr Greg Tanner, follows an earlier one at the Australian National University which yielded even more disturbing results.

Dr Tanner is a member of the new science lobby group, Australian Science Action, which was formed in response to the ANU survey and the growing concern among researchers about the direction of Australian science.

The main finding of the ANU study was that all respondents (i.e. middle level scientists with an average of five years' post doctoral experience) were dissatisfied with their career prospects in Australian science and 60 per cent thought they would have to leave either Australia or science to find their next position.

The CSIRO survey, sent to 208 scientists around the Organisation, elicited 145 responses (70 per cent). The key results are indicated in the tables below. Although not as dramatic as trends revealed at the ANU, the fact that 32 per cent of non-tenured staff surveyed believed their career prospects were poor was cause for concern, said Dr Tanner. Forty-three per cent said their prospects were 'fair', while only 25 per cent rated their prospects as 'good'.

'It's important to realise, too, that these results cut across disciplines,' he said. 'The dissatisfaction is not confined to those working in the biological sciences, which have had a particularly tough time lately.'

Also, the results showed that the number of years of post doctoral experience was not a significant factor, and problems concerning lack of security and difficulty ensuring reappointment were evident even among those scientists – some at PRS level – who had 20 or more years post doctoral experience, as well as more junior scientists.

Those in the chemistry discipline had the worst result, with 35 per cent indicating they had no or poor prospects in Australian science and only six per cent saying prospects were good or excellent. Next was biology, with 33 per cent believing they had poor prospects and 17 per cent good/excellent, while those in the physical sciences fared rather better, with 22 per cent indicating no or poor prospects and 57 per cent good or excellent.

A total of 39 per cent of those surveyed indicated they would probably have to leave Australia (28 per cent) or leave science (11 per cent).

'The lack of career prospects for middle level scientists is a symptom of a larger problem – the neglect of the Australian research and education industry,' said Dr Tanner. 'The Government is stressing that we need a competitive science based economy yet with its other hand it's busy gutting CSIRO and the university based research system and seriously impairing the means to create an internationally competitive technological capacity.'

One of the consequences of poor prospects for Australian science graduates, he said, was the lack of incentive for young people to enter into science careers. As one CSIRO Chief puts it, the problem in the future will not so much be a brain drain, but a brain drought.

About one third of respondents approved of the idea of a system of five year rolling tenure, and many also noted that a major problem for non tenured scientists was the lack of portability of employment benefits (e.g. superannuation), particularly when moving from CSIRO in universities.

CAREER PROSPECTS IN AUSTRALIAN SCIENCE

1. Responses as % of total

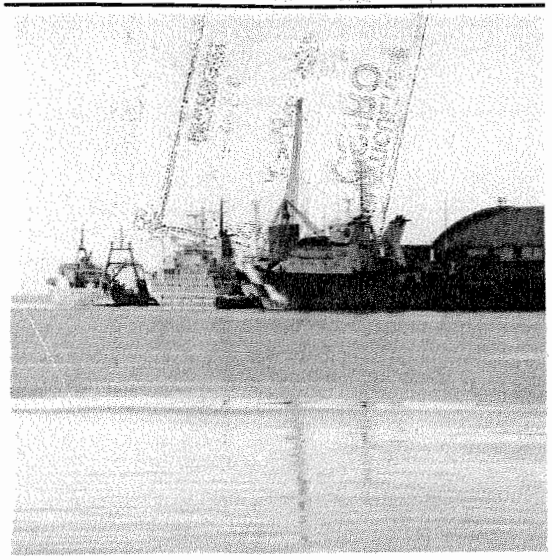
Prospect	Respondents
Poor	46 (32%)
Fair	64 (44%)
Good	36 (25%)

2. Responses by discipline

Prospect	Biology	Phys. Sciences	Chemistry
None/Poor	33%	22%	35%
Good/excellent	17%	57%	6%

3. Do you think you will...

Option	%Respondents
Pursue career overseas?	40 (28%)
Remain non-tenured in Australia?	78 (55%)
Remain in Australia but leave science?	15 (11%)



Left to right, FRV Soela, *RV* Franklin *and* Southern Surveyor *at the Marine Laboratories in Hobart.*

Cont. on p.5

From the Chief Executive

A column by Dr Keith Boardman

A feature article in the July issue of the journal *Science* by the president of the US high tech company Thermo Electron Corporation, and two professors of economics from Harvard University and Massachusetts Institute of Technology, analysed the cause of their country's falling competitiveness, which has resulted in the large rise in the US trade deficit in recent years.

The authors concluded that the US problem was caused largely by inadequate levels of investment, particularly in plant and equipment and R&D, which they attributed to low savings rates and high costs of capital. In their view, R&D is an invisible capital investment.

The Australian economy is faced with similar problems with the future being mortgaged by ever-increasing overseas borrowings, high consumer spending, inadequate investment in the future and high cost of capital.

This high cost of capital in Australia has major implications for the future of Australian scientific and technological development. Our Minister, Barry Jones, has stressed the need for patient money in Australia to fund longer term R&D, but high interest rates and the high cost of capital are major inhibitors of such an investment in the future.

Higher levels of domestic savings would foster a more favourable investment climate for the application of new technology in Australia. In a recent letter to the Editor of the *Australian Financial Review*, I supported the call of the Chief Executive of the National Australia Bank, Mr Nobby Clark, for inflation indexing of tax on interest earnings on savings accounts, in line with inflation indexing of capital gains.

The low levels of investment in R&D in Australia make it imperative that the Government, at the very least, maintains its commitment to R&D at a time when the high cost of capital is inhibiting the rise in private sector spending. By example, the Government must provide a strong message to the private sector of the vital importance of R&D for the future competitiveness of Australian industry. Increased support for CSIRO is an essential component of that commitment.

In his submission to Government on Australia's research capacity, Barry Jones makes a strong case for enhanced funding for CSIRO, and I am optimistic that he will receive the support from his Cabinet colleagues that his case thoroughly deserves.

Important issues for CSIRO are the retention of outside earnings without loss of appropriation funds, including the retention of revenue from asset sales, and substantial extra funds for the replacement of obsolete equipment, the provision of opportunities to employ additional younger scientists and for areas of great importance to Australia's future.

I hope to be able to comment favourably on Cabinet's decisions in my column in the next issue of *CoResearch*.

A Keith Boardman

Pioneer in venture capital field joins CSIRO Board

The former Chairman of the Management and Investment Companies Licencing Board, Mr Ralph Ward-Ambler, has been appointed to the Board of CSIRO.

His appointment follows the resignation of Mr Graham Spurling, who recently took up an overseas posting with Pacific Dunlop.

Mr Ward-Ambler will bring to the Board a wealth of experience with both industry and government authorities, including a long list of company directorships and chairman positions.

Well known for his pioneering work in the venture capital field, Mr Ward-Ambler also has served as Chairman of the Victorian Education Foundation and the Business Council of the National Gallery of Victoria.

In announcing his appointment, the Minister for Science, Customs and Small Business, Mr Barry Jones, said Mr Ward-Ambler's experience in industry, particularly in the venture capital market, would prove a great asset to CSIRO in its continuing efforts for closer ties with industry.

Letters to the Editor

Dear Editor,
I was very sorry to learn from your September issue of the death of Sir Leonard Huxley, as I worked closely with him for a few years and as a personal friend in years past.

In 1929 I was working at the UK Radio Research Station under R A Watson Watt when Professor Madsen came there looking for recruits for the (newly established) Australian Radio Research Board under CSIR. One of the proposed projects was the study of 'atmospherics' and their effect on radio broadcasting, and as this was a main subject of the Watson Watt team, he agreed to train two men in his techniques and also supply some special equipment for their use.

I was offered and accepted one of the positions and Len Huxley also joined us at RRS.

The main equipment provided by Watson Watt was a cathode ray direction finder. This was a very advanced equipment using newly developed cathode-ray tubes (which were the forerunners of television tubes). By using directional aerials, the atmospherics were made to manifest themselves as bright lines across the tube face, indicating direction and intensity and therefore distance of the disturbance.

This had to be shipped to Australia so we found it possible to set it up on the ship and travel with it, taking observations all the way.

As we were soon convinced that practically all atmospherics came from thunderstorms, we arrived in Australia with a thunderstorm map for about half the world.

The immediate reason for this research in Australia was that the Post Office had to develop a plan for a radio broadcasting system in Australia and interference from atmospherics was one of the important factors to consider.

In the UK, broadcasting started on what were called 'long waves' but later moved more to 'medium' waves (i.e. higher frequencies). We set up a comprehensive survey which showed that interference from atmospherics in summer was much worse in most of Australia than in Europe and that it was more serious on lower frequencies. This helped the decision to set up the initial network on medium wavelengths with the possibility of some extension to shorter waves now better known as high frequencies.

One interesting sideline of our work was that we supplied a thunderstorm report on the Tasman Sea to Kingsford-Smith before his initial flight to New Zealand. There actually was a thunderstorm area in the Tasman but it was a little south of his path. He set us a personal letter of thanks.

Len Huxley left us after a couple of years and was replaced by Dr Hugh Webster.

George H Munro
DSc, FInstP

P.S. My personal record with CSIR and CSIRO appears in *Who's Who in Australia*.

Dear Editor,
Ben Longden's assumption (*CoResearch* November/December 1988) that CSIRO represents an acronym for the 'Commonwealth Scientific and Industrial Research Organisation' would appear to be astray.

Like Ben, we 'did time' at the Travelling Bicentennial Exhibition both in Rockhampton and Maryborough. Only one person among the 40 000 odd who passed through these two sites came close to giving the correct meaning of 'those funny little letters'.

A female student from the Maryborough area unhesitatingly declared that CSIRO stood for 'Cuddly, Sexy and Irresistible Research Officers'.

While we both have some features in common with Mick Dundee and Harrison Ford, we are surprised that our Southern colleagues failed to evoke any similar response.

Rex Holmes
Ken Bean
Tropical Animal Production
Rockhampton

Dear Editor,
Ben Longden (*CoResearch* No. 318) asks if the 'CSIRO Australia' part of our logo still represents an acronym for the 'Commonwealth Scientific and Industrial Research Organisation'.

The answer is yes – the full version is how we are described in our Act and is therefore our name for strictly legal matters.

However, the full version is rather a mouthful for the new, reorganised, leader body that emerged in 1988. So for general purposes, we have adopted the crisper name 'CSIRO Australia', based on the acronym. The previous Executive, in 1986, had recognised the importance of identifying us as belonging to Australia and had requested this addition to the bare acronym on corporate documents.

So:

. Commonwealth Scientific and Industrial Research Organisation is our legal name.
. CSIRO Australia is our general 'working' name.
. Research Advancing Australia is our slogan.

Perhaps one of our mathematicians can work out how many trees we will save by using two words where six went before!

Jenifer North
Manager
Corporate Communications

Dear Editor,
Since my letter concerning 'those funny little letters lurking underneath the never-to-be-discussed-again logo' was published in the November/December issue of *CoResearch*, the feedback has been phenomenal.

The possible derivations and their contributors have been too numerous to list. However, one person residing somewhere in the eastern states offered this absolute gem:

CSIRO
Chronically
Soporific &
Ineffective
Raison d'etre
Office

Ben Longden
Astronomy Education and
Visitors Centre
Parkes

Dear Editor
Dr Tanner's letter (*CoResearch* No.319) serves to perpetuate the myth that expensively trained Australian researchers are deserting the country in droves in search of secure appointments overseas. This is not the case.

What is happening, as it has for decades, is the orderly two-way flow of researchers in and out of Australia, reflecting the position of science as an international discipline. Figures released last year by DITAC, based on immigration statistics, show that as a nation we are experiencing a net inflow of engineers and scientists to these shores. Only in mathematics does there appear to be a slight outflow.

Whether these figures are 100 per cent accurate does not matter. They illustrate the magnitude of the two-way trade in brains – a trade that benefits the country enormously by attracting the best of the world to our laboratories and gives our indigenous researchers an invaluable overseas experience which stands us in good stead when they return.

The problems of Australian science stem not so much from the inability of the marketplace to absorb the scientists we produce, but from the potential shortage of young people taking on postgraduate research in the technological disciplines and the perennial problem of exploiting the results of research activity for the maximum benefit of the nation.

The mid-1990s will witness a demographic trough in the numbers of 15 to 19 year olds. Unless governments can increase the student retention rate to Year 12 beyond the present 57 per cent national average, undergraduate enrolments will drop. Coupled with disincentives to postgraduate

Cont. on p.6

A Matter of Opinion

The following is the edited text of a paper presented to the National Agricultural Outlook conference last month by CSIRO Board Member Dr Tony Gregson.

Australia compares poorly with other countries in its level of investment in R&D: while most have gone up, we are one of the few countries to have gone down. Nevertheless, there is a strong view in some corridors that Australia is doing the right thing and that other countries have got it wrong! Admittedly, we compare better in respect of agriculture but that is hardly surprising, considering the importance of agriculture to the Australian economy.

Even so, we all recognise that Australia is now very much a part of the global scene and to survive we must be internationally competitive in everything we do. This is critical for our export performance and means in the agricultural sector we must compete on world markets, however unfair they may be.

It also is quite clear that Australia's dependence on agricultural and mineral exports is going to continue for several decades at least, so the nation's prosperity for the foreseeable future will remain intimately connected with its primary industries. If this is true, then how are we going to maintain and enhance our international competitive edge? We have little or no control over our climate and geography but we *do* have control over the level of R&D invested in our industries. We must take advantage of this if we are to remain in business and compete on world markets.

Research carried out in Australia has made a vital contribution to the superb track record of farmers in improving the efficiency of production. For example, ABARE survey data show productivity growth of between 1.5 and 2.5 per cent over the past 30 years on Australian sheep farms.

Overall agricultural productivity growth over the past 20 years has been 2.8 per cent per annum compared with 2.0 percent for manufacturing and 1 per cent for the economy as a whole. However, these productivity gains have to be weighed against the negative impacts of land degradation, including increasing soil acidity and salinity and the general decline in the social fabric of the smaller country communities.

CSIRO research over 60 years has contributed to greatly improved agricultural productivity. There are numerous examples which show that investment in agricultural research pays handsome dividends, such as the role of research in revolutionising wool marketing and in developing new processing methods and new wool products – all of which have enabled the industry to withstand the onslaught from synthetics.

Other examples include the development of new tropical pasture plants, the overcoming of trace element deficiencies, the development of disease resistant crop varieties, biological control of weeds and pests and the development of residue-free methods of grain storage.

The benefit to the nation far outweighs the cost of R&D. In addition to outstanding historical examples like the productivity gains following the control of rabbits by myxomatosis, examination of the achievements over the past decade of CSIRO rural research shows that highly favourable outcomes in cost benefit terms continue. Australians underestimate the technological sophistication of our rural industries; the need for this traditional support is greater than ever.

We have heard much in recent times of Australia's over-dependence on commodities (especially rural based ones) and the need to establish new high tech industries to rescue the country's terms of trade. In some strange way agriculture is copping the blame for the inefficiencies in the rest of the economy. The reality is that there is a great deal of interdependence between the economic sectors. For example, 30 per cent of manufacturing involves processing of rural commodities (including forest products). What we should be doing, of course, is to think of industries as having production, processing and marketing components, instead of seeing these as separate entities.

The Government is quite correct in its strategy of developing industries which are internationally competitive, have the capacity to contribute to improving Australia's trade balance and require minimum support. In times of rapidly increasing global competition it's clear that we cannot do everything – we must be selective. Is it too simple to say we should concentrate on building on our strengths? Surely we need to focus on developing industries where we have a comparative advantage. And isn't it obvious that these are the industries where we have the required resource base – the primary industries?

On the other hand it also is essential that in the future the country should expand its export base because world trade in manufactured goods is growing much more rapidly than that in agricultural and mining commodities. However this should not be done at the expense of the current export commodities that will continue to 'bring home the bacon' for the foreseeable future.

Cont. on p.4

Following 'moth hunt' success...

Double Helix seeking experiments for members to help with

CSIRO's Double Helix Science Club wants to get in touch with scientists who can suggest suitable national scale experiments for which Club members could provide data.

This follows the successful conclusion of the 'Great Moth Hunt' which provided researchers with new information on the distribution of the Lightbrown Apple moth (*Epiphyas postvittana*).

The experiment, conducted in the first two weeks of October last year, involved Double Helix members (who are aged 10-18) all around Australia hanging sticky moth traps with pheromone lures. Apart from checking the traps for moths, members also recorded other useful data such as daily weather conditions and habitat.

The moth, a native insect, is a pest of fruit trees and vines and is found throughout Australia. It has natural predators, and so isn't a major economic problem, however scientists are concerned about its spread to countries without this natural protection (it has become a major pest in New Zealand, for example). The tendency of the moth pupa to attach to plants makes it a problem when exporting produce such as apples.

Researchers at the Division of Entomology, Dr Tom Bellas and Dr Chris Whittle, have studied the moth for 20 years. The work started in the mid 1960s when it was chosen as a 'model pest' for experiments in the use of pheromones.

Dr Bellas said the Double Helix National Moth Hunt was interesting as 'a snapshot of the distribution of the moth during the first two weeks of October 1988' – a glimpse which showed the moth had reached some areas where it had previously not been reported.

The participating Double Helix members hung a total of 180 of the triangular cardboard moth traps. At the end of the two weeks, the members sent the traps to the Division of Entomology where the collected moths were examined.

It was the first time an experiment of this scale had been performed by amateurs in Australia. Among the new data included evidence that:

- the moth had spread to outback NSW (Broken Hill), Kangaroo Island and further west to Streaky Bay, most likely attached to pot plants or seedlings said Dr Bellas;
- the areas with the greatest number of the moths are the Southern Tablelands of NSW extending into Victoria, and that in southern NSW the moths had pushed further west;
- populations of the moths were thriving in Perth;
- several other moth species were attracted by the lures. At least one of these is in the same family as the Lightbrown Apple moth and identification of the others is continuing.

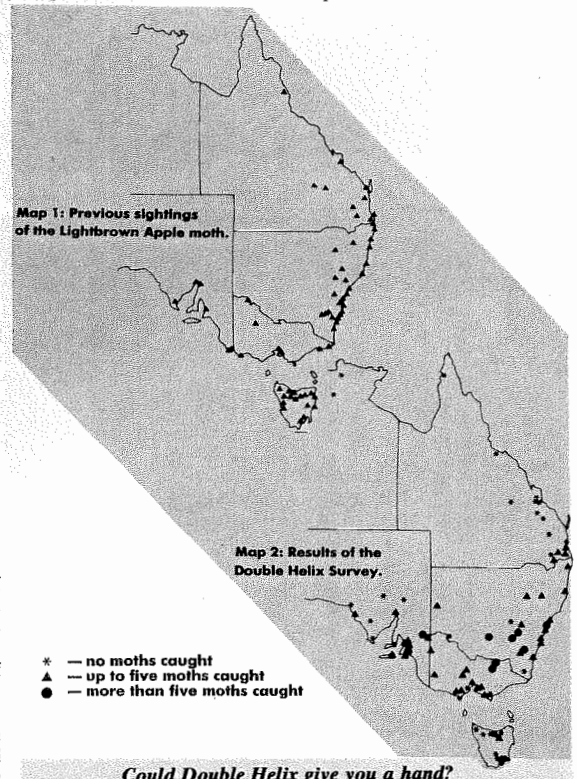
The first of the two maps below shows where the moth previously had been found, while the second map pinpoints the Double Helix findings. Interestingly, while Map 1 indicated the moth was widespread in Tasmania, the experiment only found it in a few places though lots of traps were set. However, during the time of the experiment, Tasmania had considerable rain, wind and storms, preventing the moths from flying.

As one Double Helix member, David Reilly, wrote on his data sheet, 'no moth in its right mind would have been out in the past two weeks!'

According to a Double Helix co-ordinator, education officer David Salt, 'while the experiment didn't come up with any earth shattering conclusions, it was a success.

'The experiment serves as a good example of how real science is performed. A lot of planning and effort, a lot of number crunching, analysis and collation and a few hard pieces of information to show for it at the end. But the few pieces of information are added to a growing pool of information and slowly a picture begins to appear on which the scientist can base his or her future investigations,' he said.

'Possibly the most significant thing arising from the ... experiment is that an experiment on a national scale, using the help of motivated amateurs, can work well and ... produce important scientific data.'



Could Double Helix give you a hand?

The Double Helix Club is eager to hear from anyone with ideas on further national experiments.

The Club has members all across Australia, from Alice Springs to Albany and from Weipa to Warrnambol – all highly motivated young Australians with a strong interest in science. Do you have some task or project that could make use of this keen work force?

It could be anything from rock collecting, recording specific weather details over time, sampling local flora and fauna or trapping a specific organism. All you have to do is provide us with information about what needs to be done and how we can best explain it to our members.

All mail and material costs (within reason) will be met by the Club, so all you have to worry about is what to do with all the results you'll get at the end of the project.

Help us to help you. For more information, contact David Salt on 062-48 4472.

We have heard much in recent times of Australia's over-dependence on commodities (especially rural based ones) and the need to establish new high tech industries to rescue the country's terms of trade. In some strange way agriculture is copping the blame for the inefficiencies in the rest of the economy. The reality is that there is a great deal of inter-dependence between the economic sectors. For example, 30 per cent of manufacturing involves processing of rural commodities (including forest products). What we should be doing, of course, is to think of industries as having production, processing and marketing components, instead of seeing these as separate entities.

The Government is quite correct in its strategy of developing industries which are internationally competitive, have the capacity to contribute to improving Australia's trade balance and require minimum support. In times of rapidly increasing global competition it's clear that we cannot do everything – we must be selective. Is it too simple to say we should concentrate on building on our strengths? Surely we need to focus on developing industries where we have a comparative advantage. And isn't it obvious that these are the industries where we have the required resource base – the primary industries?

On the other hand it also is essential that in the future the country should expand its export base because world trade in manufactured goods is growing much more rapidly than that in agricultural and mining commodities. However this should not be done at the expense of the current export commodities that will continue to 'bring home the bacon' for the foreseeable future.

'...it is essential that [CSIRO] be positively encouraged in developing a strong core of basic knowledge on which to base its interactions with industry...'

For an organisation like CSIRO, charged with the responsibility 'to carry out strategic research which can be applied to industry...', it is essential that it be positively encouraged in developing a strong core of basic knowledge on which to base its interactions with industry.

One of the best ways to achieve this is by having first rate scientists who are recognised, appreciated and encouraged to be at the cutting edge of their disciplines so they are part of international developments and breakthroughs. Only by doing this can we in Australia hope to be able to take part in the rapidly changing technological revolution in all areas of science, and from our immediate point of view, in agriculture.

An often neglected feature of shorter term projects also should be appreciated. Their objectives normally can only be achieved by utilising at least some background material, methods or principles determined in the past. If this is not the case then either the project is trivial or it requires new techniques or principles which history shows probably will need a much more sustained effort.

Exceptions may be found but I think these are the facts of research life. And from personal observation within CSIRO the significant breakthroughs seem to take about 10 years or so to come to fruition; some will take much longer.

So if we are to accept short term funding to solve specific industry problems, which is the current trend, then we have to back this with solid longer term research. If we don't, the basic research that should be done now will not be available to provide answers to the short term problems of the 21st century.

An increasingly difficult problem for research managers is to decide on the spread of research projects: whether to continue on a wide front spreading resources ever more thinly or to contract to fewer, better resourced but more isolated lines of work.

We have to take into account the need to retain key disciplinary skills, by keeping abreast of and exploiting advances elsewhere in the world. Once lost, such skills are not easily replaced. Recent figures show we have about 4 per cent of the world's agricultural scientists; they have a vital role to play in keeping up with advances made by the other 96 per cent. Also, it must be recognised that scientific research is unpredictable: often advances are made in unexpected ways and draw on a wide range of quite unrelated areas or projects. The ability to do this has been one of the key strengths of CSIRO. So while I am happy to see the consolidation of many of the current CSIRO projects into better managed and better resourced programs to attack particular industry problems, we must be mindful of the history of scientific achievement. As wide a research front as possible is desirable, concomitant with priorities, resources and judgement.

The debate on investment in research is intimately connected with the question of how much the market or industry should influence the nature and direction of research. It's very fashionable these days to have everything driven by the market because the market knows best. In economic matters this may be true but in research I think there are great dangers in allowing this attitude to dominate the thinking of bureaucrats and politicians.

Again, history shows that many of the great advances in new products and processes, or solutions to industrial problems, were made well before the market recognised them. A topical example is to be seen in recent basic research into grain quality, which has indicated that barley has considerable cholesterol reducing properties. This promises exciting prospects for barley in the lucrative breakfast cereal market.

However, I do recognise that there has to be much greater interaction between scientists and industry so each has an understanding of what is involved. This also will lead to a much better and realistic setting of priorities. In this way the results of both short and long term research can be applied much more quickly and effectively.

In the past CSIRO has not been good at this but since the recent restructuring there has been a new emphasis on interacting with industry and this will increase still further in the future.

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What if we reduce the level of agricultural research? To me it is like removing money from a high interest account and putting it in a low interest one. It defies logic.

Reductions clearly have taken place. For example, in CSIRO funding for the animal and food sciences has fallen by 10 per cent over the past five years. That amounts to a net drop of $7 million in real terms despite a 68 per cent increase in external funding during the same period. As well, money is one thing, research capacity is another – inflation for scientific equipment, reagents, etc, is well above the CPI.

The reduction in resources has shaken the entire research infrastructure. People have been moved away from some areas, allowing a skills vacuum to develop. For example, there are now severe shortages of pasture breeders and pasture agronomists and ecologists in southern Australia.

Our rural resource base is fragile and easily degraded; unless we develop land use systems and farming practices which restore and sustain the ability to produce, we will lose our capacity to be an efficient long term earner of export income. Yet there is now a lack of soil chemists and scientists with an understanding of the physical characteristics of soil. These are the very people needed to address some of the main problems identified by industry in relation to sustainable agriculture and rural productivity.

To add to their frustrations, scientists in Australian agricultural research are faced with poor facilities and obsolete equipment, making them the disadvantaged cousins of the international research community. In CSIRO alone, a sum of, say, $20 million would go only part way to making good the deterioration resulting from years of belt tightening and penny pinching.

Australian agricultural research managers now have a serious dilemma. With existing resource levels they face the prospect of either making do with grossly inadequate operating funds or slashing research capacity by 15-20 per cent to free up resources for remaining projects. Reducing research capacity is clearly the worst thing we could be doing for the country.

Further, managers must treat their staff in accordance with proper industrial practice, so removing staff is a costly and lengthy exercise. The result so far is that staff cuts have been kept to the minimum needed for survival, leaving operating funds per professional at a perilously low level.

A negative attitude towards science has developed in schools, and agricultural science particularly is not in favour with students entering universities and other training institutions. Consequently the best brains who should lead tomorrow's research often have turned towards more rewarding and secure professions. As well, from among the established scientific ranks we have witnessed an exodus of some top people to greener pastures overseas. However the real danger is not the brain drain but the prospect of a brain drought in agricultural research in 10-15 years because bright young people are not entering the training pipeline in sufficient numbers.

It is not exaggerating to say that funding levels have reached a crisis point. We have to decide whether to prune R&D capacity and concentrate on a few isolated lines of work or to continue on a relatively wide front, spreading resources even more thinly.

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The traditional providers of research in Australia have been the universities, state departments of agriculture and CSIRO. CSIRO, as a single multidisciplinary organisation, combines efficiency achieved by pooling of research management experience and expertise, with ability to address the whole range of research sectors with flexibility and multi-disciplinary co-operation.

The scope of CSIRO's research effort acknowledges the fact that many technologies are important to several industry sectors. For example, information technology and biotechnology have applications in rural industries as well as being important to emerging manufacturing industries. As the distinctions between technologies used in different sectors decreases, CSIRO will continue to be uniquely placed to respond to scientific and technological opportunities arising internationally and assist in their application in Australia.

The recent changes in CSIRO's structure have reinforced relationships with users of CSIRO research and enhanced the transfer of research results. CSIRO is strengthening its management systems to give greater authority, autonomy and support to research managers at all levels, and research is being evaluated in terms of scientific and technological merit and market potential.

The two institutes of major relevance to agriculture, Animal Production and Processing and Plant Production and Processing, both recognise that agriculture does not stop at the farm gate and that processing and marketing of agricultural products are integral parts of the industry.

In setting priorities and developing strategies to meet the goal of CSIRO's research for rural industries, close co-operation with industry groups, relevant state and federal government agencies and particularly the rural industry research councils and corporations will be essential.

CSIRO complements the work done by state departments of agriculture and universities and will place much more emphasis on the need for greater integration and co-operation in delivering more effective rural research for Australia.

To complete this range of consultation mechanisms, a single agricultural advisory committee will provide links to both rurally based institutes and will be the joint responsibility of the two directors. The main role of the committee will be to provide a high level perspective, from users, on policy and priorities for research. The committee will make it easier for communication between CSIRO and the state and territory governments and industry and community leaders. It also will play a part in making the community aware of CSIRO's research.

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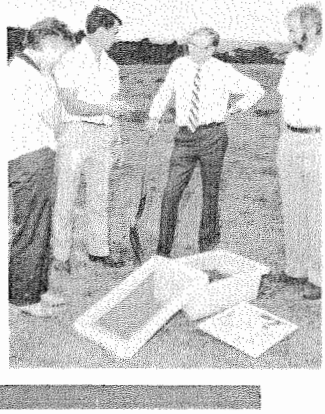

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CSIRO has the important task of supporting the government's strategies for improving international competitiveness in all sectors. In doing this, CSIRO's main role should be, as it has been in the past, to undertake longer term strategic research and actively transfer the results for economic and community benefit. We must also recognise that there exists a pre-competitive phase in the research process, and the nation neglects this phase at its peril.

The private sector is reluctant to perform or fund such research because of the high risks associated with it. CSIRO provides the best practical mechanism to order priorities and focus research so Australia can derive the greatest competitive advantage from its intellectual wealth.

The 1988 OECD report on science and technology policy disagrees with governments that believe their expenditure on research can be reduced by encouraging industry to support research in public institutions. The reductions in CSIRO's appropriation over the past five years (18.9 per cent) have reduced its flexibility to respond to government policy and industry needs and its ability to update research equipment and employ new young staff. They also are jeopardising its strategic research base. To the extent that CSIRO is expected to conduct not only research but also development, the problems are even greater.

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The main industry contributions to research come via the Rural Industry Research Funds (RIRFS) which comprise levies against producers on a commodity basis, matched dollar for dollar by the Federal Government up to a limit of 0.5 per cent of GVP. A number of small production units united into a cohesive force pursuing solutions to common problems has guaranteed the success of the system. However, the current debate on deregulating a great deal of the rural marketing and research bodies may have long term implications for the continued viability of the RIRFS. Although they provide only a small percentage of the total agricultural R&D effort they do provide a powerful focus for industry consultation and priority setting as well as flexible money for specific and usually shorter term industry problems.

A major drawback of external funding is that very little is channelled into strategic research. External funds tend to be marginal, providing no support for infrastructure costs. Some RIRFS are specifically excluded from doing this, others do not have the resources, whereas some of the larger ones do and we applaud this attitude.

Other deficiencies in external funding include the lack of job security for mainly younger scientists, the problem of redeploying scientists from one short term project to another (even if this is allowed by the funding agency) and the difficulty of funding research across several commodity boundaries.

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The Government has responded to Australia's debt with policies to make industries more internationally competitive. For this policy to work, one of the best moves would be to increase R&D across the full range of economic activity. We should be focusing on how to increase the whole R&D cake within the nation's priorities, not on transferring parts of it from one area to another.

The 1987/88 and 88/89 funding for the six institutes is clouded by several factors – for example, funding the Australia Telescope, the acquisition of the National Building Technology Centre, royalties from the bank note and the transfer of the manufacturing industry collaborative scheme.

However, even over the past two years, each institute has suffered an effective further reduction of 4-5 per cent in appropriation funding; this process has been going on for 5-6 years. Some resources have been directed towards new priorities supporting manufacturing and information industries. This process cannot continue without harming primary industries and their export earnings.

On the other hand the total level of support for each institute, except one, over the same two years has been maintained or even increased if external funds are included. In the case of the two rurally based institutes, the increase is about 0.5 per cent!

Given the current funding situation, are there still ways we can make R&D more productive? Of course there are, and the most important will be for all research organisations to get a lot better at transferring technology. CSIRO and the state departments, and the RIRFS that fund them, need to treat the transfer process as part of the research program, not as a separate activity. The days when the endpoint of a program was usually a paper or two in a scientific journal are over. Nor is it sufficient merely to sum up the results in an annual report or even in a rural newspaper.

Other areas where a redirection of resources may increase the effectiveness of our R&D will be in tackling more problems which cross commodity boundaries and also in developing cross institutional teams to tackle problems on a regional basis. Both areas are being explored within CSIRO after extensive consultation with industry.

The current controversy over the predicted climate changes in Australia has to be explored more thoroughly so impacts on rural industries can be identified and assessed. The problem of producing contaminant free agricultural products is another area that has to be addressed quickly. Similarly, the newer biological technologies have to be exploited as rapidly as possible.

However, if new/extra funding is not forthcoming then many of these newer initiatives to lift the sustainable productivity of our rural industries may have to be curtailed.

CSIRO renews commitment to the West

CSIRO's presence in the West was upgraded with the opening of the Laboratory for Rural Research and extended facilities at Floreat Park, near Perth.

The Laboratories were officially opened by the Western Australian Premier, the Hon Peter Dowding, on 8 December. The complex houses not only the Rural Research laboratories but also laboratories for minerals and geochemistry research. As well, there is a new canteen and library and a general upgrade of the existing laboratories.

CSIRO research at the WA laboratories is geared to the particular problems in that state, such as:

- The Division of Forestry and Forest Products WA Regional Research Group is undertaking research associated with the recent upsurge in development of eucalypt plantations. For example, superior fungi capable of modifying tree roots to increase growth rates are being developed to inoculate seedlings for plantations. It is important to conduct this kind of work in the south west of WA because the regional and local differences in soils and climate may be crucial to the economics of production in the state.
- The divisions of Plant Industry and Soils' Dryland Crops and Soils Research Unit aims to provide management options for crop production in the mediterranean climatic regions of Australia, with emphasis on wheat and lupins growing in duplex soils of sand over clay. Water shortage is one of the major limitations to crop production in these regions and about half the resources of the unit are devoted to improving water use efficiency. The other half is applied to improving the efficiency of nitrogen fertiliser use.
- The Division of Animal Production's work is predicated on the fact that the mediterranean environment provides animals with low quality roughage for 5-9 months of the year – a fact which has major implications for animal production. Much of the research centres around the relationship between feed quality and use, mineral nutrition and the reproductive rate. Also important is the animal's productivity, and many of the DAP team's projects look at methods of ensuring the best use is made of the available feed, improving the quality of the feed, etc.
- The Division of Entomology, with the WA Department of Agriculture, is working on an integrated pest management package designed to reduce dependence on persistent insecticides, which can pose a threat to our agricultural exports. Another project is examining the basis of resistance in annual legumes to red legged earth mite. The use of plant resistance offers substantial benefits to pasture production and persistence, while reducing the need for chemicals.

Expressions of interest are now being sought for a Western Australian Remote Sensing Industry Development and Education Centre, under the provisions of a Memorandum of Understanding signed by CSIRO Chairman Mr Wran and WA Premier Mr Dowding. The aim of the MOU is to foster scientific and technological co-operation between WA and CSIRO. The agreement, among other objectives, will enable the development of a detailed proposal for construction of a joint Australian chemistry centre for minerals and advanced materials on a site adjacent to Curtin University.

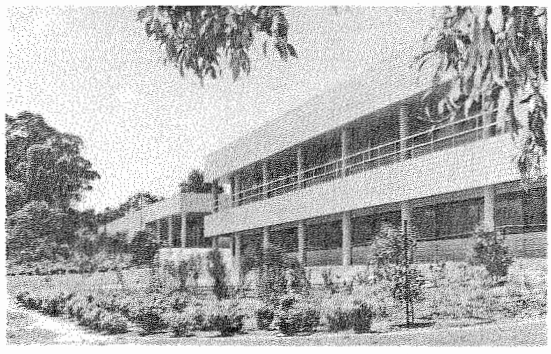

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Photo: W van Aken

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Survey
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Dr Boardman said the success of the dung beetle had been uneven over the years. There were no doubts, he said, that in distinct areas it had been successful, but it was 'patchy'.

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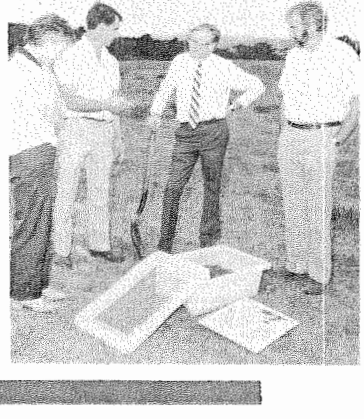

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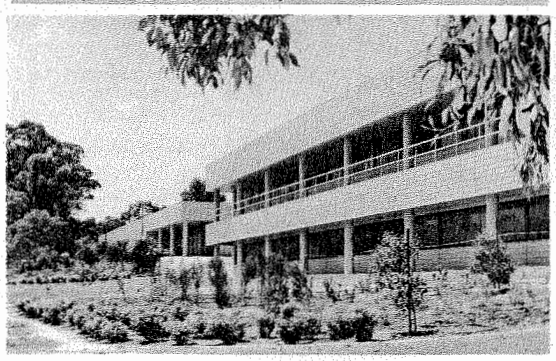

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Photo: W van Aken

Above left, Dr Neil Turner, Chairman of the Laboratory for Rural Research and, right, Hon. Peter Dowding, Premier of Western Australia.

Photo: W van Aken

Survey
Cont. from p.1

Dr Tanner discussed his findings at a staff seminar at Plant Industry this month, followed by an appearance at the National Science Forum. He has formally presented the findings to the Chairman, Mr Wran, the Chief Executive, Dr Boardman, and the Science Minister, Mr Jones.

Following are a selection of the written comments from survey respondents:

- (agricultural scientist): *'...the present system involves so much uncertainty that it (i) makes a career in science in this country very unattractive, especially when coupled with the pressure to work in short term, applications oriented research, and (ii) makes achieving a tenured position appear as an end in itself rather than the means by which good science is encouraged.'*
- (physical scientist): *'...longer term appointments would be useful as it takes 6-8 months at the end of each term position to obtain another job. This reduces the amount of research you can do during this time as it is very time consuming job hunting, writing QEII fellowship applications, National Research Fellowship and CSIRO postdoc applications. It is not just a matter of sending off your CV. Rather, it is a whole "research project" outline and proposal. You need to do this as you cannot guarantee you will be able to just apply for an advertised position.'*
- (agricultural scientist): *'...tenure problem is related to problems of obtaining industry /funding body commitment to long term research. A system of five year rolling tenure can apply only scientists employed on [appropriation] funds.'*
- (physical scientist): *'...more part time positions (tenured) are very important for increasing the participation of women with families in science.'*
- (chemist): *'...I feel that a five yearly review of tenure is the most appropriate, as long as the review is carried out by qualified impartial decision makers.'*
- (information scientist): *'...permanent positions encourage non-performers to maintain a position beyond their ability, obstructing the career path for those below. ...salaries for term positions should exceed those for tenured positions in order to provide comparable value in view of lack of: security, long service leave, ability to undertake long term commitments (such as buying a house), etc, suffered on a term position.'*
- (chemist): *'the career structure for non-tenured post doctoral/ academic/research staff could be improved by providing a limited number of positions (with adequate resources) where these scientists can pursue their onw research rather than work under someone. This would enable gifted young scientists to establish a reputation for themselves before going into tenured positions.*
- (biologist): *'...no post-doc should be entitled to tenure at public expense without some objective measure of productivity. I think the productivity analysis problem needs a solution before you talk about upgrading career structure.'*
- (biologist): *'...my own experience of two-three year positions is that even three years is an unrealistic time scale in which to complete any worthwhile research. ...too many scientific grants are "one off" and you know when you take up the appointment that you have it only for a finite period ...the pressure is on scientists to be seeking further employment while they are still establishing themselves in their present job – this can only be distractive and counter productive. However, a realistic possibility of further extension is a good motivation element and brings out the best in a scientist (whilst being a chance to weed out "dead wood".'*

Dr Boardman views dung beetle research

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Pictured at the demonstration of dung beetle research last month, left to right, Dr Marina Tyndale-Biscoe, Mr John Feehan, Dr Keith Boardman and Dr Max Whitten.

Letters
Cont. from p.2

studies such as the higher education tax and the low Commonwealth Postgraduate Award, the nation may well experience an under-supply of scientists.

In the engineering profession, this shortage is already occurring, with nearly 2000 migrant engineers a year being required to fill the shortfall.

At the other end of the research spectrum, the Federal Government is pushing hard to squeeze the most out of the taxpayers' dollars and no-one should blame them for that. However, the Government must sit down with research organisations and industry, as a matter of urgency, to develop a mutually acceptable National Science and Engineering Strategy. Anything less will prolong the present confrontation between science and its political masters.

Dr Michael Dack
Institution of Engineers

Dear Editor,

I would like to submit for consideration a problem which has been worrying me.

There have recently been a number of cases of whales beaching themselves, and the latest case is a group of dolphins in Western Australia.

It is known that whales and dolphins have an advanced form of radar, or rather sonar, for forward observation. When approaching a slowly shelving beach they would not get any reflection and they would think it was still open water. This would confuse them very much. It seems, therefore, that where these beaches occur, the solution would be to provide some sort of reflecting screen. Perhaps a few boats anchored beyond the beach would suffice.

Have you anyone in CSIRO who might look into this?

George H Munro

Dear Editor,

I notice from your columns that the corporate centre continues to attract quite a bit of column space from particular quarters. Although I am sure there is still considerable general interest throughout CSIRO on the corporate centre review, I have some reservations about continuing the debate *ad infinitum* in *CoResearch*. However, in the interests of completeness I have responded to the questions raised by Drs Hal Hatch and David Goodchild.

As stated in the implementation reports, many of the functions previously undertaken in the corporate centre are either being devolved to divisions via new management information systems or discontinued. Overall, the new arrangements will require considerably less staff, but to cover the additional administrative staffing needs at division and site level, supplementation amounting to $1.5 million is being provided.

It is true that the functions of the printery will be contracted out, as will some of the work of the film and video unit (the latter was cut by four staff, not eight). It remains our view that overall there will be considerable savings in both these areas through the changes implemented.

In response to Dr Hatch's specific questions:

1. Despite bringing some groups from high rental accommodation onto the Limestone Avenue site, the number of positions has decreased.
2. The abolition of RAOs, together with changes at the corporate centre, will save money through the discontinuation of a number of now unnecessary functions, automation of others, removal of double checking and duplication and considerable savings for rental accommodation.
3. Concerning the printery: in assessing the benefits of the change, it is necessary to take into account not only the day to day running costs, but also the cost of re-equipping the printery, estimated at $1.0 million, and the ongoing ability cost wise of an in-house printery to keep up with most modern technology. Funds to re-equip the printery could only be found by diverting funds from research. It is very difficult to provide a reasonable estimate of savings the change will bring.
4. A list of administrative functions devolved to the institutes or divisions is shown in the attached table. $1.5 million is being provided to support this, together with new management information systems including accounts payable, assets control, accounts receivable, etc.
5. There is absolutely no doubt in my mind that the devolution of functions to line managers who are involved in the day to day decisions making, with retention of organisation wide policy and advising at the corporate level, will make CSIRO a more effective research organisation.

Dr Goodchild also raised a number of points.

I am not too sure how old the 'old staff list' was, but the datum for the PCEK review as it involved SES positions was as quoted in my previous letter to the editor [*CoResearch* 318, Nov/Dec 1988], that is, there has been an increase of one SES position as a result of the reorganisation.

It is of little value to compare the situation within CSIRO with that of the APS, where major departmental amalgamations took place, and in particular corporate services departments were merged. However, as little relevance as it may be, the percentage of SES in the APS is about 0.01 per cent. This is the same as in CSIRO. SES positions were filled either by internal or external advertisement, with selections made by interview committees comprising at least one director, chief or senior person from outside CSIRO, and me. Successful candidates were selected not on the basis of how much additional salary they would get, but on their merits. I trust Dr Goodchild is not suggesting that we should select people who may be at or one level below the position being filled but who are not considered satisfactory, over more able applicants who are at a lower salary level in the Organisation or outside.

I take issue with Dr Goodchild's comments in regard to upward classification changes. As previously stated, the average cost per position in the corporate centre has increased by about $3600, but the work has changed. This has been the result of the combination of the clerical/administrative officers restructure which was Public Service wide, and the change in work being carried out at the corporate centre which removed the requirement for many staff at the lower classification levels. There have been major changes in the work being performed where classifications have changed. It is quite incorrect to suggest otherwise.

I note with interest that a reduction of *$10.6* million in the operating cost of the corporate centre, with *$1.5* being required to supplement administrative arrangements in divisions or at sites, is only referred to as '*some apparent savings*'. As a matter of interest, if classifications had remained the same as before the corporate centre review, then on my calculation we would not have reduced the cost of the centre by any more than the $10.6 million.

I would also point out that as the corporate services department meets the objectives in its operational plan (which has been distributed to divisions), it will contribute considerably to the overall effectiveness of CSIRO through its facilitating role.

I extend an invitation for Hal and David to visit the corporate centre to have a look at the information and discuss the matter. I would also make the point that there is nothing secretive in what we are doing. If anyone has any queries, they will be addressed openly. However, there is the question as to how long the same debate should continue.

P H Langhorne
Director
Corporate Services

TASKS DEVOLVED TO DIVISIONS
(Not in any particular order)

PERSONNEL
- Personnel details records
- Salary & allowance processing
- NGEN leave system
- Staff appointments, appointment letters
- Leave records, LWOP, LASA preparation & checking
- Approval of reclassifications to ES3
- Accelerated promotions in non-prof. grades, classification of admin staff levels
- Advertising external vacancies
- Removal of appointees, compulsory transfers/relocations
- Compensation
- Process/administer matters arising from official vehicle accidents
- Overseas travel arrangements including calculating advances
- Overseas visitor payments
- Immigration approvals
- Approval of private telephones as official telephones
- Apprenticeships, scholarships, fellowships, trainee schemes & school students
- Payment of local travel claims
- Approval T&C Para 102 claims
- Salary variation inputs
- Freedom of information
- Divisional staff reports
- Grievances
- Industrial democracy
- SLC translation
- Occupational health & safety audits

FINANCE/PURCHASING/ASSETS
- Establishment of external accounts
- Accounts payable processing
- Accounts receivable processing
- IDCs/IFCs
- Overseas purchase orders and customs clearance
- Completion of financial statements
- Tenders and contracts to $100 000
- Advertising tenders
- Assets/management/system
- Stocktakes
- Applications for external funds
- Provision system
- Invoicing
- Journal entry system
- Accounts payable enquires
- Responsibility for management of external funds & liaison with funding agencies
- Collaborative/contractual agreements
- Purchase of vehicles
- Ministerial submissions for acceptance of grants & commercial agreements
- Administration of Northern Territory houses
- Calculation of motor spirit accounts

NEW SYSTEMS & PROCEDURES INTRODUCED
- Accrual accounting
- Fringe benefits tax
- Project data base
- New account code & finance system
- EEO
- Enhanced safety procedures & reporting
- Demise of building & property section advice
- Department of Housing & Construction for maintenance
- Staff reporting and review/PRD
- Increased emphasis on communications
- Program/project budgeting
- Commercialisation/industry liaison
- Advance in industrial democracy involvement/issues

Dear Editor,

At last we have a Corporate Identity Manual. I would like to make a few comments before we start implementing it.

1. The letters 'CSIRO' are visually not spaced properly.
2. An alternative logo has been developed for use only when the logo must appear in reverse as I understand it. The only proper reversed method is when you reverse the positive shape (1) into a negative shape (2), not creating outlines and confusing the issue as in (3), illustrated.
3. Business cards: the choice of light typeface is another problem. I have seen business cards printed where you need a microscope to read telephone numbers. As we are a scientific organisaition, this is not a problem I guess.

These are only a few comments at a glance. Before this manual was printed, Mr Dunstan should have checked this very carefully, so we who have to use it can do so without any problems.

After all, wasn't that the idea: to make it simple, effective and cost effective???

Vlad Mosmondor
Graphic Designer
Division of Forestry & Forest Products

(1)

(2)

(3)

Chemical Committee

The Senate Select Committee on Agricultural and Veterinary Chemicals is inviting interested people or organisations to lodge submissions now.

The Committee was established last November to examine a range of legislative, economic, social, environmental and other matters relating to the use of such chemicals in Australia.

Anyone interested should contact the Secretary of the Committee, C/- Parliament House, Canberra ACT 2600. Submissions must be in by 31 March.

Employee training program receives boost with launch of booklet

Increased management commitment to employee training is demonstrated by the *Directory of Employee Development Programs 1989*, according to Dr Keith Boardman who launched the booklet late last month.

Dr Boardman said employee development had caused concern among CSIRO management for some time, as it has tended to be undertaken in a piecemeal fashion.

Funds for the activities covered by the new directory have increased from about $250 000 to to almost $1.2 million in one year, he said. The programs are based on a three year corporate strategy for employee development endorsed by the Executive Committee last year.

'For the first time in CSIRO's history, I think we now have strong management commitment to staff development, a realistic level of resources and a competent and enthusiastic team of people to make it happen,' said Dr Boardman. 'We've had some of those elements in the past, but this is the first time we've been able to get it all together.'

The booklet, intended to assist staff and supervisors to identify their development needs, has been distributed to all staff members. It clearly outlines the individual courses, indicating course content, recommended participants, duration, location and timing.

The Employee Development Unit team pictured with the CSIRO Chief Executive Dr Keith Boardman at the official launch of the training booklet. Left to right (standing), Helen Pik, Phil Priddy, Bob Marshall, Kerry Habel, Dr Boardman, Margaret Atcherley and Martin Smith. Seated, Maureen Grear and Leanne Post.

Qld Education Centre 'on target'

The Queensland CSIRO Science Education Centre is on target for opening in July or August this year.

The centre is located at the Long Pocket Laboratories in Brisbane.

Like similar centres in other states, it aims to relate the school science curriculum to interesting aspects of research, industry and the student's daily life.

The Queensland centre is jointly funded by the CSIRO Public Affairs Unit and the State Education Department, with expected sponsorships from private enterprise.

Students from Year 6 to Year 12 will attend the centre, usually for a morning or afternoon session.

An increasing challenge is being experienced in allocating sufficient time to acquiring sponsorship, setting up experiments as equipment arrives, publicising the centre and organising Double Helix Science Club events.

Assistance in setting up the 'hands on' experiments will be welcomed from retired CSIRO staff or other people with a broad interest in science and education.

Also, some of the obsolete or surplus equipment lying around laboratories or store rooms may be useful to the centre. New ideas for interesting experiments and Double Helix events also are being sought.

Please contact David Maynard at Long Pocket, PH: 07-377 0860 if you are able to assist in any way, or if you would like more information.

###

CoResearch Survey

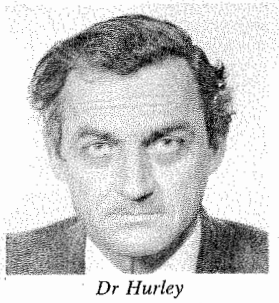
This issue of* CoResearch *contains a survey form, inviting all readers to make their views known about the CSIRO newspaper. Your early response would be appreciated and the return address is noted on page one of the form.

Obituary

Dr Andrew Hurley 1926-1988

Dr Andrew Hurley, an internationally recognised theoretician who retired from full time employment as a CRS at the Division of Chemical Physics in 1987, died peacefully in his sleep on 14 October after a long struggle with emphysema.

Dr Hurley was born in Melbourne on 11 July 1926 and educated at Melbourne Grammar and Melbourne University, from which he graduated with honours in mathematics in 1947 and in physics in 1948; this was followed by an MA in mathematics under Dr Hans Schwertfeger.



Dr Hurley

The main themes of his long and distinguished research career were established while he was on a CSIRO studentship at Trinity College, Cambridge. His first paper on point groups and crystal classes in four dimensions arose as an extension of his MA thesis and was completed under the supervision of P A M Dirac. It was only when he joined the research group led by Sir John Lennard-Jones that he turned his attention to problems in theoretical chemistry and, in particular, to improving the corrections for correlation between electrons in the same space orbital.

On his return to Australia in 1953 he joined the Section (Division after 1958) of Chemical Physics where he set out to calculate molecular properties with 'chemical accuracy' (0.1eV) based on improvements to Moffitt's method of atoms in molecules. In the same period (up to about 1963), Andrew developed virial and electrostatic methods which provide alternative and computationally simpler paths for calculating molecular energies.

Andrew's reputation in the field of small molecule calculations elicited an invitation to write two books which were published in 1976. More recently, this strand of Andrew's work has continued with a very fruitful collaboration with Peter R Taylor, his former student.

Clear thinking and a good memory were two of Andrew's many attributes. He had the ability to detect inconsistencies in the scientific literature and to quickly recognise the essentials of problems posed to him, both within and beyond his chosen fields of research. He introduced approximations into his work only when necessary and then explored their consequences with the help of well chosen examples; his papers are noted for their helpful examples and valuable insights.

When Andrew first joined Chemical Physics, many of his experimental colleagues thought him reserved and unapproachable and held him in awe. However, he was in fact the most approachable and congenial of men and his advice was widely sought on an extraordinary range of subjects.

He was extremely generous with his time and many of the consultations with him produced valuable publications. When a friend described a scheduling problem which had long exercised match comittees of the Royal and Ancient game of golf, Andrew – himself a better than average player – saw that the problem was nontrivial, invoked one of the central theorems of graph theory, established the solution now used throughout the world and illustrated it with an elegant diagram.

He enjoyed taking guided tours around the Division as a means of keeping himself well informed on its experimental activities.

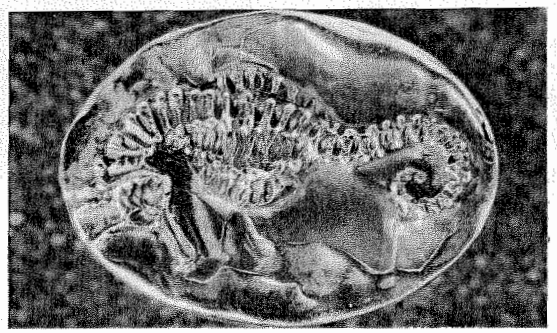
Andrew's eminence in science was recognised by CSIRO, where he was rapidly promoted to CRS. He was elected a Fellow of the Australian Academy of Science in 1972 and was a member of the Advisory Editorial Board of the International Journal of Quantum Chemistry from 1967 to 1984. He was leader of the theoretical chemistry section of Chemical Physics and handled his administrative responsibilities with admirable despatch and efficiency.

Andrew was a good companion with a dry wit, widely read and with an extraordinary memory from which he would quote Shakespeare, Wodehouse or Wittgenstein to the enlightenment of all around. He was compassionate and fair in his infrequent judgement of others.

He will be sorely missed by his friends and colleagues and we extend our deepest sympathy and understanding to his wife Yvonne, and all his family.

V W Maslen
J K Mackenzie

Marine award for Dr Jeffrey



Above, the silver pin awarded to Dr Shirley Jeffrey for excellence in marine science

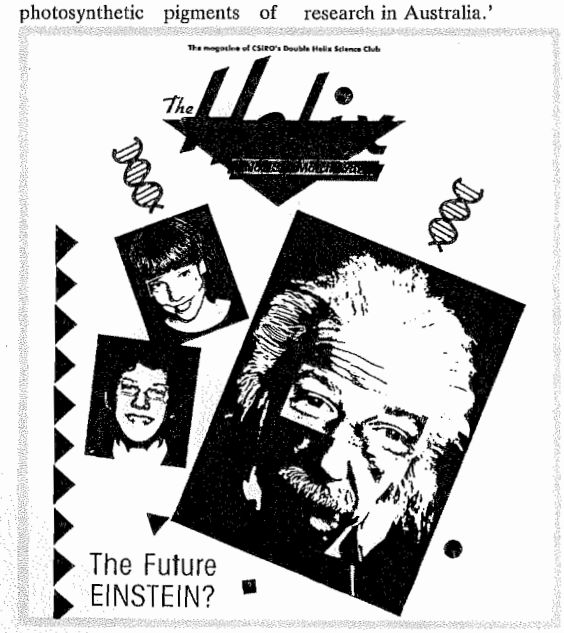
The Australian Marine Sciences Association (AMSA) celebrated its Jubilee year by the inauguration of the Jubilee Award for Excellence in Marine Science. The first recipient was Dr Shirley Jeffrey of the Division of Fisheries.

A citation and a silver pin, specially commissioned for the award and bearing the AMSA sea horse motif, was presented by the Science Minister Mr Barry Jones at the opening of the AMSA conference at Sydney University in December.

The presentation was followed by a scientific address by Dr Jeffrey.

The citation recognised that 'Dr Shirley Jeffrey's international eminence in marine science resulted from her detailed and innovative studies of the photosynthetic pigments of plants, particularly of planktonic micro-algae, which had major implications not only for biochemistry and physiology, but also for classifying and defining relationships among plants.

'Great practical significance also attached to her group's recent work on toxic phytoplankton blooms and her pioneering efforts in the culture of micro-algae for mariculture. All these give Dr Shirley Jeffrey an outstanding record of achievement in marine research in Australia.'



Following three successful years since the start of the Double Helix Science Club, CSIRO's education programs unit is about to launch a bold new venture. It's an educational magazine called* The Helix.** ***As well as going to 3000 Double Helix members, it also will be going into ever secondary school across Australia and some 5000 members of the Australian Science Teachers Association.* The Helix *will incorporate* Scifile, *CSIRO's research report for teachers and students, and will include contributions from around Australia. It also will have all the regular Club features that made its predecessor,* Double Helix News, *so popular. The cover of the first edition is represented above, although of course the real thing will have full colour. For more information contact David Salt on 062-48 4472.

Jack Cummins retires from Foundation after distinguished service

Mr Jack Cummins retired from the Board of Governors of the Ian Clunies Ross Memorial Foundation-National Science Centre at its 26th Annual General Meeting in November.

Mr H C Morgan, Chairman of the Board, and Sir Ian McLennan, the previous Chairman, both praised the long and valuable contribution made by Mr Cummins since the origins of Clunies Ross House.

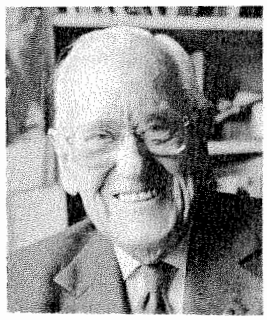
Sir Ian McLennan told Governors that without Jack Cummins there would have been no concept as developed today and no money for the purchase of the land and building.

Following his resignation from CSIRO in 1962 and until his appointment as Governor of the Foundation in 1971, Mr Cummins was successively Treasurer, Secretary and Chief Executive Officer.

Since the official opening of the building by HRH Prince Philip in 1968, the Foundation has continued to progress and, by 1988, the number of societies accredited to the Foundation had risen from 25 to 130.

There also are 80 associate company members who have joined in the past 10 years. They contribute financially to the Foundation in appreciation of the assistance they receive through members of their staff who belong to one or more of the accredited societies.

In acknowledging the tribute from the Governors, Mr Cummins said there was much still to be done, including increased use of the first class conference facilities, encouragement of and provision for interdisciplinary seminars and lectures and the development of a closer and more active spirit of cooperation and service to the community.



Mr Jack Cummins

CoResearch **is produced by the Public Affairs Unit for CSIRO staff. Readers are invited to contribute or offer suggestions for articles. The deadline is the last Monday before the issue month. Editor: Liz Tynan, PO Box 225, Dickson ACT 2602. PH: 062-484479.**

CoResearch

No.321 March 1989 CSIRO's staff newspaper

CSIRO AUSTRALIA

Chiefs question Minister's data suggesting R&D boost

Is there a crisis in Australian science or isn't there? Senator John Button says the picture is bright and improving all the time, but data he uses to back up this claim is being disputed by several CSIRO chiefs.

Senator Button, Minister for Industry, Technology and Commerce, addressed about 170 CSIRO staff at Clayton on 16 March, at the invitation of the CSIRO Consultative Council.

As a result of this address, the Chairman of the Chief's Committee, Dr Brian Embleton, sent a letter to the Minister, and issued a press statement, questioning his claims that R&D in Australia had increased by 39 per cent since 1981 and that thousands of new jobs had been created.

In his speech, Senator Button said the climate for R&D had never been better and '...Australia's overall science capacity has steadily improved under the present Government'. He said last year alone the number of people in Australia employed to do R&D rose by eight per cent, and that between 1981/82 and 86/87 over 12 500 R&D jobs were created – 7500 in private industry and 5000 in government institutions.

Staff present at the forum questioned Senator Button, although several observers commented that the Senator had got off lightly.

The questions ranged from concerns about the imminent abolishment of the 150 per cent tax incentive for R&D, to the possibility of compulsory R&D levies on companies, to the expression of doubts that the 150 per cent incentive had really been worth the money, to the decline in science career prospects, to concerns from the Technical Officers Association about staff employment conditions, to Wesley Vale, and more.

Senator Button fielded the questions with charm and humour, but continued to maintain that there was no real problem in Australian science. He suggested questions on staff conditions should be referred to senior CSIRO management, which was well represented at the forum.

Dr Embleton's letter, sent several days after the forum and endorsed by Dr Max Whitten, Dr Angus McEwan and Dr Dennis Cooper, said it appeared 'creative accounting' had been employed by certain companies intent on taking advantage of the 150 per cent tax incentive. Was it possible, asked the chiefs, that companies had simply reclassified existing jobs to fit into the incentive criteria, and that the Government was foregoing several million dollars each year to subsidise many jobs which were not contributing to new private sector R&D? The letter asked, among other things, for information about where the new jobs were, whether the positions were for professional scientists, what the research problems were being tackled under the scheme and what identifiable public benefits had so far emerged.

Senator Button has replied to the chiefs although this was not available to *CoResearch* at presstime.

• Meanwhile, a document has been issued to divisions outlining measures being taken to make up budget deficits in the current and next financial years. The addition of a number of unbudgeted items, poor internal communication and some apparent miscalculations seem to be the major factors leading to the deficits.

Staff should have access to the document through their chiefs.

Divisions will have to hand back money this year, and will forego even more next year. This has resulted from a shortfall in projected revenue of $8.3 million in 88/89 and $14.2 million in 89/90.

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Health & safety agreement

CSIRO management and unions signed an historic occupational health and safety agreement at the recent Consultative Council meeting in Melbourne.

The agreement, which is interim pending proposed OHS legislation covering Commonwealth employees, was negotiated under the close watch of the CSIRO Health & Safety Committee.

Mr Gary Knobel, Manager OHS, said the agreement formalised the existing OHS committee network and made provision for staff associations to appoint health and safety representatives in the workplace. These reps would normally be the Association members of local OHS committees.

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Problems in PDR program examined in report

The implementation of the Performance Review and Development (PRD) program has been reviewed.

A report has been drafted which summarises the extent of implementation, identifies a number of problems and proposes solutions.

Anyone who might be interested in commenting on the report and has not already had the opportunity to do so may obtain a copy by phoning Sarah Ryan on 062-48 4223.

Any comments should be returned through your personnel office by Monday 24 April. The report will then be finalised and submitted to the Executive Committee in May.

A summary of the final report and the Executive Committee decisions will be published in a later edition of *CoResearch*.

Nominees now sought for McLennan Award

Nominations are invited for the 1989 Sir Ian McLennan Award. Established in 1985, the Award recognises outstanding contributions by CSIRO scientists to Australian industry.

It offers the winning scientist a grant up to $10 000 to undertake overseas study appropriate to the achievement. As well as the grant, the successful scientist receives the Sir Ian McLennan Medal, and the company or organisation involved in development and/or marketing of the innovation is presented with the Sir Ian McLennan Plaque.

The Award was instituted by the former CSIRO Advisory Council. The Council's role was, among other things, to help develop closer interaction between CSIRO and industry.

Named in honour of Sir Ian McLennan, the Award recognises his contributions to the application of science and technology to Australia's industrial development. Sir Ian was Chairman of BHP for many years and later Chairman of the ANZ Banking Group and Chairman of Elders IXL. He has been associated with Australian industry for over 50 years and is an enthusiastic supporter of new technology. Sir Ian was a member of the Advisory Council from 1979 to 1981.

The criteria for selection will be based on practical achievement, such as a major commercial success or advance of commercial value to a firm, industry or public authority, resulting from CSIRO work.

Nominations may be from individuals or organisations outside CSIRO or, inside CSIRO, from chiefs, directors or individual staff members wishing to nominate someone for an achievement in their area of responsibility. Where teams are involved, the team leader would generally be nominated for the Award itself, with the team receiving recognition on the accompanying plaque.

Innovation

Each nomination should contain a one page synopsis with the following information: a brief description of the innovation; the yearly value of sales of the commercialised innovation; the profit in dollars earned by the commercialised innovation; the value of royalties and licensing fees; and the number and location of patents.

A maximum of five more pages should include the following:

Cont. on p.6

Pat Naughtin of the Melbourne Science Education Centre in full flight at the ANZAAS Youth Science Festival. Pat's assistant looks somewhat doubtful. The work of the Science Education Centres, and other aspects of CSIRO's education programs, are examined in this month's special feature. Turn to page 4.

From the C Executive

A column by Dr Keith Boardman

Decisions from the Government's consideration of the submission by Barry Jones on Australia's science and technology capability suggest that science and technology have arrived as part of the political agenda. It is not before time in view of the crucial role that science and technology must play in improving the competitiveness of all Australian industry.

The Government agreed to the Minister's proposal to develop a major statement on science and technology policy. The joint press statement by the Prime Minister and Mr Jones stated that the 'Government fully appreciates the vital role science must play in laying the foundation for Australia's future prosperity'.

Staff will be disappointed that the Government did not go further in restoring the substantive cuts made in CSIRO's appropriation funding over the past few years. It is unfortunate that the Government's consideration of the Minister's submission coincided with the worsening of Australia's trade position and the call by several business leaders and the media for tougher fiscal policies.

The decision on revenue retention which will enable CSIRO and other Government laboratories to retain 100 per cent of external earnings (including asset sales) is specifically welcome. It will remove a source of resentment among researchers and also industry, and provide an incentive for a greater contribution from sources external to our direct appropriation funding.

We are all aware of the urgent need to replace obsolete equipment for optimum utilisation of our human resources and for CSIRO to remain internationally competitive. The additional $5 million provided for the purchase of new equipment in the current financial year enables a start to be made in overcoming the backlog in the replacement of obsolete and unreliable equipment. CSIRO will be making a strong case for a similar allocation in the next two financial years.

The Government's decision to defer many of the Minister's proposals, including extra funds to CSIRO for areas of high priority, is disappointing. It will not enable an immediate boost to employment prospects for younger Australian scientists.

We must continue to impress on Government the necessity for a positive decision on extra funding for these priority areas, later in the year when the Government also considers reviews on R&D in the tertiary education sector and the Primary Industries and Energy portfolio.

On behalf of all staff I warmly congratulate Barry Jones on his success in having science and technology placed on the political agenda and obtaining extra funds in this financial year under difficult economic circumstances. We pledge our support in the future.

Dr Embleton, Chairman of the Committee of CSIRO Chiefs, wrote to Mr Wran on behalf of the Committee to indicate 'the broad and strong support by Chiefs for the current efforts being taken by the Executive Committee, the Board and, in particular, yourself, to improve the budget position of CSIRO'. I can vouch for the very important role the Chairman has played in negotiations over the past few months.

Belt tightening

Dr Embleton's letter states that 'the Chiefs are conscious of the general need for belt-tightening as the Government reins in public spending. However, there is now clear evidence that the process has gone too far in CSIRO's case and our capacity to generate economic and social wealth for Australia is being seriously eroded. Unless additional funds are quickly injected back into CSIRO's R&D effort there will be significant damage to the Organisation's ability to deliver both in the short term and the longer term'.

The letter supports CSIRO's submission to the inter-departmental committee, and concludes 'The Chiefs are supportive of your personal efforts and those of your Board, the Chief Executive and the Directors to present a strong and persuasive case to Government for additional appropriation funding. The Chiefs and their staff remain as committed as ever to use research and its application to further the economic and social wellbeing of their fellow Australians. I can assure you that your efforts are appreciated and will be rewarded by the continued commitment of the Organisation's research and support staff and the undoubted benefits that this will bring to Australia'.

Keith Boardman

Letters to the Editor

Dear Editor,
Mr Langhorne has had a lot of your space on several occasions to tell us how much money has been saved by the Claytons restructuring of head office (corporate centre).

If this restructuring is so beneficial and the savings as large as we are told, how is it that the workers have not yet sighted any of them. Surely the whole point was to squeeze more money for research, the purpose for which we exist. Instead there are more cuts to appropriation funds in 1988/89 and some groups look set to go off the graph backwards in 1989/90. Enough of the talk, where's the bloody money?

J E Vercoe
Division of Tropical Animal Production
Rockhampton

(P.S. Three cheers for Tony Gregson and his article.)

Dear Editor,
I agree with Dr Dack's conclusions in a recent letter to *CoResearch* (No. 320, February 1989) 'that the nation may well face an undersupply of scientists' in the future, however I disagree with his assertion that the 'brain drain' does not exist and believe there are several assumptions in his argument that need to be clarified.

Firstly: the figures released by DITAC based on an analysis of immigration statistics and used by many to dismiss the 'brain drain' do not convince me. Analysis of this data shows that in the period 1983-1987, Australia benefited by the nett gain of 1087 lecturers and professors (Pure, 1988, *Search* 19, 85). This is enough to staff three universities the size of ANU.

These people may have come to Australia, but were they really 'lecturers and professors' and if so, where are they now? Did they actually work here or spend their time on the beach? Were these high quality professionals capable of transferring scientific know-how into Australia?

Secondly: he writes '...[the two way trade in brains] benefits the country by attracting the best of the world to our laboratories and gives our indigenous researchers an invaluable overseas experience which stands them in good stead when they return'.

There are several problems here. The immigration statistics are only concerned with the quantity of brains, not the quality. In my experience the best brains have no trouble finding acceptable positions, usually overseas. Once there, they start to produce technology that we must eventually import. Do the best brains then return to enrich Australian research? Rather, they choose to remain in the lucrative positions to which they have risen while overseas.

Other, less exceptional but competent brains may be forced into administration in Australia – the 'hidden brain drain' identified by DITAC last year. The movement of some scientists into administration is useful in raising the scientific literacy of these areas, but forcing non-tenured scientists out of science by restricting career prospects is no way the solve the problem.

I accept that an interchange of people with the world scientific community is necessary and healthy for Australian science. However, I do not accept that what we are seeing is the normal ebb and flow of such an interchange. From my personal experience and perspective at the lab bench, it has all the hallmarks of an exodus of people who can no longer tolerate an unsatisfactory career path.

Recent surveys of non-tenured scientists at ANU and CSIRO showed many regard their career prospects in Australia as poor. This data is confirmed by the observation that students are avoiding science courses, and conflicts with the Government's hypothesis that the brain drain does not exist. Solution: repeat the experiment using an independent measure and apply 'Ockham's Razor'.

There is one untapped source of data which can answer many of these questions – the tax files. These contain reliable information on the period of residence, the employer and the position. A survey of this data would settle the question of the brain drain.

Then we may be able to deal with the related though more serious problem of the 'brain drought', outlined in the remainder of Dr Dack's letter, and the subject of recent media attention.

Dr Greg Tanner
Division of Plant Industry

Dear Editor,
I noted with interest the article by Frank Harrigan (*CoResearch* 319, January 1989) concerning the dilemma the CSIRO Officers Association (OA) is facing in deciding upon measures other than scientific publications for assessing nominees for the award of the Rivett Medal. I have raised this issue with the OA on three occasions now, my concern being that by continuing to rely solely on published work the OA could be effectively 'disenfranchising' a considerable number of staff from consideration for the award.

I must admit that I find it difficult to understand why the OA seems to find this such an intractable problem. In describing the history behind the award, Frank Harrigan notes that it was designed to recognise 'a young Organisation'. Nowhere does that statement seem to preclude work of an industrially oriented or confidential nature, for which publication is inappropriate or impossible.

Frank goes on to record that the same dilemma confronting the OA in respect of identifying other relevant measures of achievement is also being 'faced by institute committees during the annual review of professional staff classifications, and it seems they too are yet to solve it'. This is simply not true! *CoResearch* No. 317 (October 1988) had a special feature of promotions which noted, inter alia, 'the latest round of senior promotions reflect the current CSIRO philosophy of recognising not only the advancement of scientific knowledge, but also contributions to industry and outstanding research leadership'. The new SPRS and CRS guidelines note that achievements for promotion to these levels may relate to work as an individual (contributing to science and/or industry and/or the community) or as a research manager. These guidelines do not explicitly mention publications. Perhaps, however, the best indication of the Organisation's more enlightened attitude, compared with that of the OA, is the fact that many of the CSIRO Medals have been awarded for highly significant achievements which have been realised in the market place and which have not been based upon published work.

The Organisation has had its act in gear for some years now. It is time that the OA stopped procrastinating and did the same, before its members lose all faith.

Ian Sare
Division of Manufacturing Technology

Dear Editor,
At the risk of commenting without having all the facts, may I query first the way the CSIRO logo has been used on the letterheads which I have seen. These have placed the logo in the centre of the page, such that there is insufficient room for Institute and/or Divisional title to be printed in a large enough font size to be seen as soon as one looks at the page. The logo would be far better at the top left hand side of the page with Institute and Divisional information filling the remainder of the top section.

As I have not seen the 'Corporate Identity Manual', I have not discovered a reason for such a poor layout, it it be contained therein. I have been told that the manual has been withdrawn, so I was not able to find out what the guidelines were.

Nor could I understand Vlad

Cont. on p.8

Discounting Eternity

The following has been contributed by David Erskine from the Griffith Laboratory of the Division of Water Resources. He said it was inspired by a talk at the lab late last year by an economist, who explained 'how discount rates applied to research effort'.

'Your Majesty, if you build a pyramid to ensure your survival in the after life, the money you spend now will not be of use until your Majesty passes on. That will be a long time into the future.'

'What are you driving at, Chief Accountant?'

'A piece of gold spent on an asset that is unusable until far in the future is worth a lot less than a piece of gold spent for immediate consumption.'

'Er, yes.'

'We call it the discount rate, sir. The future is discounted relative to the present. What happens in the far future, even eternity, is as nothing compared to consumption now.'

'There is a mad logic to what you are saying, Chief Accountant. But it is not only the money that bothers me. There is also the uncertainty. There are times when I wonder about this life after death lark.'

'The uncertainty, sir?'

'No one has come back from the after life to give us some pointers to improving techniques for ensuring survival after death. This lack of feedback is worrying. A lot of money is being poured into the eternal life industy, what with pyramids and theological research.'

'The uncertainty can be factored in, your Majesty. If you were to put a money value on eternal life, and if the probability of the embalming techniques and the rituals had, say, a 50 per cent chance of working, then the money value of eternal life is halved.'

'The High Priest might regard such views as theologically unsound. He might put on a curse.'

'A curse illustrates my point, sir. A lot of people want curses to strike far into the future. A curse working far in the future is worth much less than a curse working now.'

'Curses are cheap.'

'True, sir, so long as the, um, benefit to cost ratio...'

'Maybe you mean the damage to cost ration.'

'...so long as the damage to cost ratio is very high. But then there are the long hours of study in getting the curse word perfect. That is a cost too.'

'Even if we do not survive death, Chief Accountant, we still have a form of immortality in our children.'

'That is true from a philosophical point of view, sir, but from a financial point of view, ensuring your children have a good start in life means looking, say, 20 years into the future. Twenty years is a long time for an accountant.'

'And one can bequeath things to one's children and grandchildren.'

'In my humble opinion, your Majesty, that is financially dodgy. To bequeath something to one's children, or even worse, to grandchildren, implies a negative discount rate, in that the future is highly valued.'

'Sometimes the work we do lives after us, whether it is in great deeds or art. Some of the art carved and painted in our monuments will last for centuries. Some of our artists place a high value on such long term payoff.'

'If I may say so, your Majesty, the views of such artists are financially unsound. They need professional advice.

'How would you sum up your professional advice, Chief Accountant?'

'Eat, drink and be merry, your Majesty.'

Academy calls for proposals for White conferences

The Australian Academy of Science is calling for proposals for the 1990 Elizabeth and Frederick White Research Conferences.

Up to two conferences are organised each year, each with a membership of 20-30 and of about two days' duration. They cover the physical and mathematical sciences related to the solid earth, the terrestrial oceans, the earth's atmosphere, solar/terrestrial science, space sciences and astronomy.

The former Chairman of CSIRO, Sir Frederick, and Lady White, support these conferences to advance fundamental knowledge of these sciences, to endeavour to introduce to Australian research new aspects or directions and to encourage the participation of overseas scientists.

Proposals should reach the Academy's Executive Secretary by 31 July 1989. For further information, contact Mrs Hilary Back, GPO Box 783, Canberra ACT 2601, PH: 062-47 5777.

New Animal Health Chief

Dr Rickard to encourage greater collaboration with industry

The new Chief of the Division of Animal Health, Dr Michael Rickard, while acknowledging the crisis in Australian research, is positive about the future, particularly of his Division.

Dr Rickard said 'Australian science is going through difficult times. CSIRO has suffered significant reductions in funding for some years now. But I believe the government is at last being forced to acknowledge the vital role of science and technology and, more importantly, the need to provide adequate financial support.'

Dr Rickard has a distinguished record worldwide in the field of parasites of livestock. His particular area of expertise is in the immunology, biology, epidemiology and control of tapeworm infections and of tapeworms being transmitted from animals to humans.

He was elected to the Executive Board of the World Federation of Parasitologists in August 1986 and is now chairing the World Health Organisation Working Group on Immunology of *Echinococcosis* (hydatid disease). He has received many awards, including the University of Queensland Medal in 1963 and the Bancroft-Mackerras Medal of the Australian Society of Parasitology in 1983.

Until assuming his new position on 1 April, Dr Rickard was Reader in Veterinary Parasitology and Associate Dean of Research and Graduate Studies in the School of Veterinary Science at the University of Melbourne.

He has had considerable contact with CSIRO, having been one of two university representatives on the Division's advisory committee since its inception in March 1986.

'The Division of Animal Health plays a crucial role in solving major disease problems of our animal industries. The backbone of our work must continue to be medium to long term research directed towards solving specific industry problems. We also want to help industry make the most of export opportunities.'

'At the same time, though, we certainly won't be ignoring the importance of fundamental research. We cannot afford to sacrifice Australia's long term future.'

He said he was enthusiastic about the Division's amalgamation with the controversial Australian Animal Health Laboratory (AAHL), saying it was 'a very positive step'.

'We now have an even greater wealth of expertise to offer the Australian livestock industry,' he said.

'I will be encouraging all staff to work towards even closer collaboration with industry and to take an active role in getting our research results into practice. After all, without effective communication even the best research in the world is not going to help solve Australia's problems.'

Dr Michael Rickard

Women in Science Exhibition

An exhibition celebrating the achievements of women in science and technology is now open at the Australian Museum in Sydney.

Called A History for the Future, the theme is 'women are doing science and technology everywhere you look – as they always have done'.

The Women in Science Enquiry Network has put together the display which shows both historical and present-day women in Australian science and technology.

After a successful run at the Museum of Victoria, the exhibition will be on view at the Australian Museum until 14 May.

Beauty and menace in science

It is often hard for scientists to make the public aware of the work being done at CSIRO. With this in mind, Dr Gustaaf Hallegraeff of the Division of Fisheries has produced a book to bridge the communication gap and publicise his work.

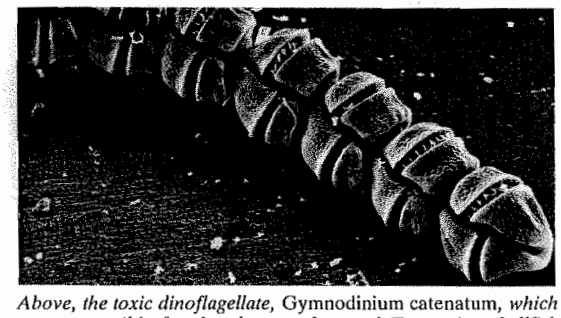
Plankton – A Microscopic World is a scientific coffee table book containing 100 outstandingly beautiful photographs of the tiny life forms that populate the world's oceans.

Despite their beauty, some plankton are deadly. The toxic dinoflagellate, *Gymnodium catenatum* is a good example. This is consumed by shellfish which concentrate its poison. It has no adverse effect on the shellfish, but makes them poisonous to humans. In 1986 there was a population explosion of this plankton in Tasmania and several shellfish farms were forced to close down for up to six months.

Dr Hallegraeff's book will be of interest to both scientists and the general public. It retails for $29.95, but CSIRO staff may buy it for $22.50. A $7.00 postage and packing fee applies for orders outside Tasmania.

Send your cheque or money order to:

Dr Gustaaf Hallegraeff
CSIRO Marine Laboratories
Castray Esplanade
Hobart
TASMANIA 7000



Above, the toxic dinoflagellate, Gymnodinium catenatum, *which was responsible for the closure of several Tasmanian shellfish farms during 1986. This and other fascinating plankton are examined in Dr Hallegraeff's book.*

Science Education Centres – showing science at work

A message to all CSIRO staff:
A sizeable proportion of the community only knows about CSIRO through CSIRO Science Education Centres. Please visit your local CSIROSEC to find how others are learning about CSIRO. Contact the manager (under education centres in the CSIRO Directory) to arrange a time when a class is visiting.

When you have experienced the centres, you may want to contribute to them in some way.

By the end of 1989, there will be seven CSIROSECs, one in each capital city except Canberra. The centres combine a showcase of CSIRO research with interactive exhibits relevant to school curricula. These hands-on laboratories relate school science to the real world and have been established with the co-operation and assistance of many CSIRO divisions and particular scientists. They are exciting and enthusing students from Year 5 (10 years) up to senior secondary level together with student teachers, TAFE students, parents and the general public.

The centres take school groups for half-day sessions with both pre-visit and post-visit work provided. A schools charge of $30.00 per session has been introduced to cover increasing costs. When the final three centres open this year, over 50 000 visitors will enjoy structured, informative sessions each year. The centres are also opened to the public for special occasions.

Each centre already owes a great deal to CSIRO staff. However, the centres would greatly appreciate hearing from staff who may be able to contribute further, such as in the development of experiments. They are there to serve CSIRO and they can do this most effectively with staff support.

Tasmania

Manager: Darrel Harington (Education Dept of Tasmania)

CSIROSEC Tasmania is located in Hobart in a former college canteen which has been extensively refurbished and is maintained by the State Education Department. The centre is much larger than other CSIROSECs and allows more flexibility in operation.

Our CSIRO-related administration is handled by the Marine Laboratories, to whom we are most grateful.

The Tasmanian centre attempts to cater for all Tasmanian students, not just those in the Hobart area. To this end it takes its activities to other areas of the state on a regular basis, and these visits have been an overwhelming success, with all sessions fully booked.

This state-wide approach is also applied to the Double Helix Science Club where, in addition to Hobart, local support groups have been established in Launceston and on the north west coast. These groups conduct science events in their areas, but such events are open to members from anywhere in Tasmania.

In its first full year of operation, 1986, the centre catered for nearly 7500 visitors, not including those involved in Double Helix activities in other areas of the state.

The three main themes for school groups are science and technology, data collection and treatment and science and computer control. The breadth of these themes lends itself to the inclusion of a wide range of science related activities, such as a satellite remote sensing simulation from the Division of Oceanography. Activities like this introduce students to new technologies and allow them to examine a current, and still developing, CSIRO research project.

In a multitude of ways, CSIROSEC Tasmania is becoming a focus for science activities in the state. The centre is headquarters for the Science Teachers Association of Tasmania, and numerous and diverse meetings are held at the centre each year. The Tasmanian activities for Australian Science in Schools Week are organised, promoted and conducted through CSIROSEC, and there is continuing involvement with the annual Primary Science Fair.

The centre caters also for groups outside school hours, such as scouts and associations for the gifted and talented. As well as monthly Double Helix events in each of the three areas of Tasmania, both formal activity sessions and member-directed project sessions are held each week at CSIROSEC for Double Helix members. Club holiday activities are a regular feature of the centre.

Above, the Education Programs team in Canberra. Standing, left, Ross Kingsland (manager) and right, David Salt. Seated, Lynn Pulford.

Sydney

Manager: Janette Griffin (NSW Dept of TAFE)

The Sydney CSIRO Science Education Centre, based at the Division of Applied Physics in West Lindfield, was opened in February 1988 by Mr Wran and the then State Minister for Education Mr Cavalier.

Its first year of operation was highly successful, with over 9000 people passing through, including 7500 students from 113 schools.

Like the other centres, the emphasis is on hands-on experiments using equipment not normally available in school. Many of the experiments in the Sydney centre are based on work done or techniques used by CSIRO scientists. Through these experiences we are increasing students' enthusiasm for and understanding of science, and particularly of CSIRO science.

Fourteen themes are offered, from which teachers choose the one most relevant to the topic being studied, and about 20 appropriate experiments are put out for the class. A Teachers Pack is sent out before visits to help teachers prepare.

Experiments cover a broad range of sciences, with a bias towards the work done at Applied Physics. For example, students may: calibrate electrical meters in a similar way to standards scientists; measure the comparative strength of rare earth magnets; watch the effect of temperature drop on a piece of superconductor; and carry out a number of experiments on sound and acoustics.

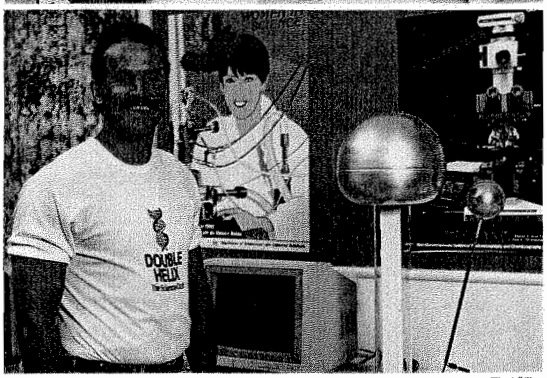
Experiments from other divisions include Sirofloc and Siroset, measuring the diameter of wool fibres, electrophoresis, and fluidised beds.

Several large public events were held in the Sydney centre last year. A day of experiments on the theme 'Chemistry in the Home' was held during Chemistry Week in July and over 260 people tried out experiments in two hour sessions. The centre was also open during the Division of Applied Physics Open Days and had over 1200 visitors.

Because many schools like to take two classes (a busload) out for the day, an Environmental Investigations Kit has been put together for one class to use in nearby Lane Cove Park, while the other class is in the centre.

The Sydney centre is placing emphasis on teacher in-service and pre-service. A library of books, games, videos and software is building up for teachers to use during their visits and during monthly Teacher Resource Days. In addition, teachers and trainee teachers are welcome to use the equipment in the centre any day after school. A number of in-service and pre-service courses and talks have been held.

The Manager is employed by TAFE, while Andrea Irwin, who teaches there two days a week, is paid from the booking fees provided by visiting classes. The centre is also very fortunate to have several volunteers who help with clerical work and maintenance of equipment.



Above, the Sydney CSIRO TAFE Centre in action. Janette Griffin with two visiting students. Below, Darrel Harington from Tasmania resplendent in Double Helix tee shirt at the Hobart Centre. (Photo: Thor Carter)

A commitmer

CSIRO's Education Programs
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Education Programs operat this f

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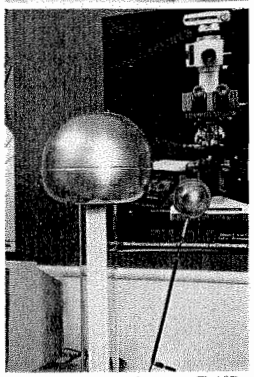

entre in action. Janette Griffin w, Darrel Harington from Helix tee shirt at the Hobart

A commitment to the future

CSIRO's Education Programs aim to:

- alert the community to the value of scientific research, especially that of CSIRO;
- encourage the most able students to take up science careers;
- provide an avenue for divisions and institutes to communicate with a wider audience; and
- promote a scientifically literate society.

At a time of gloom and despondency about science in Australia, the Education Programs section is maintaining a positive vision of the future – a vibrant and productive science scene in Australia. Its audience is made up of students and their families and teachers and often the broader community through public presentations. The programs demonstrate the exciting results of current research and how this work is contributing to our daily lives through useful products, a healthy economy and care of our environment.

At present part of the Corporate Services Department, the section has 12 full-time and three part-time staff (plus a number of volunteers). However, only 2.6 (equivalent full time staff) of these are appropriation funded. The remainder are paid for by state departments of education, sponsors or from revenue earned.

Education Programs operates all the projects outlined in this feature.

CSIRO's Double Helix Science Club – our future scientists

Double Helix is filling an obvious need in the community. When it started three years ago, up to 1000 members were expected over time. That original quota was filled in a few months and ever since, the Club has had to maintain a fine balance between alerting the community to its existence and being able to cope with the demand. With over 3000 members nationally, the Club is growing more rapidly than ever. As it grows, it offers more to its members.

- You will have seen *The Helix*, the Club's new quarterly magazine which appeared in divisions this month. It contains the latest in CSIRO research, projects, competitions, members' contributions, *Scifile* and articles from some of Australia's leading scientific professional bodies. *The Helix* also goes to all members of the Australian Science Teachers Association and every secondary school in Australia. If you would like a copy of the current issue, write to Double Helix at PO Box 225, Dickson ACT 2602.
- Hundreds of Double Helix events are held each year. On weekends, evenings and during school holidays, members enjoy sessions at the CSIROSECs. They use electron microscopes, do chemistry experiments, go hunting for bogong moths, take part in forums on the ozone layer, attend astronomy evenings, use flight simulators and much more. Members gain experiences not often available to students. Parents also regularly attend.
- Double Helix now has a weekly television segment on 'C'mon Kids', a national afternoon program. The five minute segments are hosted by Deane Hutton (of Curiosity Show fame). They each cover some aspect of Double Helix or CSIRO as well as an activity related to the topic.
- A point system encourages members to do their own research by entering science competitions to undertake other science activities at school or in the community.
- A membership kit is provided, containing a jumping disc, fridge magnet, a poster, stickers, a membership badge, information about CSIRO, and more.

Open to 10-18 year-olds, the Club looks set to play a major role in science education in Australia.

Northern Territory

Manager: Terry McClafferty (NT Dept of Education)

The Northern Territory's Science Education Centre will be located on the CSIRO Tropical Ecosystems Research Centre (TERC) site in the old German Club building now being renovated.

The TERC site covers about 35ha on a site 15 kilometres east of Darwin, in a position central to the schools of the Darwin region. Four CSIRO divisions are represented at TERC: Wildlife & Ecology, Tropical Crops & Pastures, Entomology and Horticulture. In addition, Siromath operates a computer node for CSIRONET at the Centre.

A number of wildlife displays have been planned for the new Centre, including an ant nest designed by Dr Alan Andersen.

Other activities replicating the research activities of TERC scientists will be developed for high school students. These include population studies using aerial photographs and the use of remote sensing with computer imaging.

The largest industry in the Northern Territory is mining, and the Chamber of Mines is represented on the centre's Advisory Committee by Mr Tony Hosking. A number of activities involving metals and mining are planned under sponsorship of Territory mining companies.

A range of initiatives has been organised to publicise the activities of the Science Education Centre before it opens in the new building. The Darwin Show last year had a major exhibit of the centre, with a display of many hands-on activities. This was well received by the public and resulted in coverage by ABC Radio Darwin.

It is hoped that in the future the centre will be able to service all major centres in the Northern Territory, including aboriginal communities.

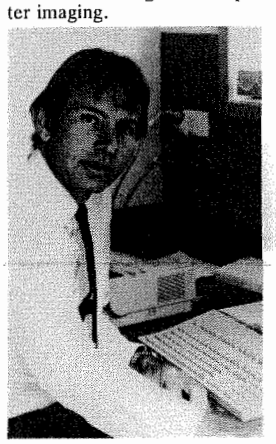

Photo above left, David Maynard of the Brisbane CSIROSEC. Above right, Vicky Iles (Education Officer) and Robert Namestnik (Manager), CSIROSEC Perth.

Brisbane

Manager: David Maynard (Qld Dept of Education)

Brisbane CSIROSEC is hosted by the Division of Tropical Animal Production at the Long Pocket Laboratories, Indooroopilly.

The newly constructed CSIROSEC building is comfortably placed near a 0.6ha rainforest area established by the Division and looks out over dry sclerophyll scrub paddocks. The centre is on schedule to accept the first school visit on 3 July. It is planned that the official opening will coincide on 15 August with a function at Long Pocket held by the Divisional Advisory Committee.

Much appreciated assistance in setting up has been provided by the host division. Without it, the centre would not have many of the experiments now under development. Of these experiments, some highlight the work of the Divisions of Tropical Animal Production, Entomology and Geomechanics. Imagine the fascination for students seeing a live cattle tick on the video microscope monitor, biological control in action, or remote sensing data from Landsat. The rainforest area will also be used for environmental science topics.

Other experiments such as Sirofloc, Siroset, Greenleaf Farmlab and the Microwave Moisture Monitor represent some of the work from other divisions around Australia. General aspects of science and technology are also represented, with weather satellite reception, aerodynamics, lasers, mineral processing and computer modelling as examples.

Sponsors and other visitors have commented enthusiastically on the CSIROSEC concept and the need for such a facility in the school system. Increasing interest and excitement from students, teachers and parents are evident as the centre is more widely publicised. Brisbane CSIROSEC is poised and (almost!) ready to enjoy the same success and popularity as other centres around Australia.

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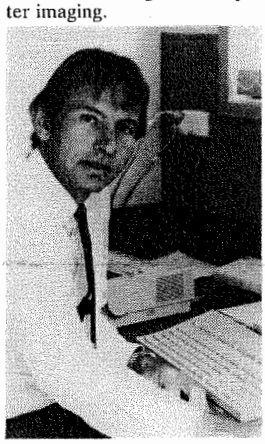

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Western Australia

Manager: Robert Namestnik (Scitech Discovery Centre)

At last, Perth is to experience a new concept in science education. The new CSIROSEC is about to be launched within Scitech Discovery Centre.

Scitech Discovery Centre is an innovative, hands-on science and technology centre in the City West complex, West Perth. It features more than 120 interactive exhibits aimed at increasing awareness and interest in science throughout the community.

Since opening four months ago, 26 000 school students have visited Scitech as part of school excursions; 9000 (30 per cent) of these have been secondary students. It is expected that this figure will increase with the opening of the new CSIROSEC.

To enable effective use of Scitech, about 600 teachers have attended full day courses which include information about the proposed CSIROSEC. Tremendous interest already has been expressed by the teachers who have seen the physical layout of the CSIRO centre.

The centre has capacity for 50 students and incorporates a modern layout with practical laboratory features. Presently there is only a basic skeleton, and now the real work must begin.

The Manager was appointed recently to initiate the program by liaising with CSIRO staff, teachers, local industry and managers of other CSIROSECs. Many ideas will be incorporated from other centres, and it is planned that where possible they will emphasise Western Australian related issues.

Vicky Iles, Scitech Discovery Centre's Primary Education Officer, will be involved in planning activities for primary school students and members of CSIRO's Double Helix Science Club.

This centre will be unique in that many of the planned activities relate to exhibits already found in the main Scitech Centre. Exhibits such as satellite tracking, remote sensing, lasers and fibre optics will provide applications for the laboratory activities.

It is expected that the centre will open late this year.

Melbourne

Manager: Pat Naughtin (Victorian Ministry of Education)

Melbourne CSIROSEC was opened in 1981 – the first of its kind in Australia.

Reflecting the major interests of its host, the Division of Energy Technology, the centre began a full program related to energy, especially solar energy. The centre is now developing themes reflecting the research directions of its new host, the Division of Building, Construction and Engineering, together with research from other divisions.

Among the 1988 highlights were: contact with over 46 000 visitors; demonstrations for 6500 students; over 4000 at hands-on sessions; 40 000 visitors to CSIROSEC at the Melbourne Music Show; the Bendigo country tour; international visitors; and the ANZAAS Youth Science Festival.

Classes offer three themes – energy, measurement or waves. The centre is not large enough to have themes running concurrently, so they are changed each term.

One teacher remarked, 'I learned more today than I did in all my High School science classes'. CSIROSEC was booked out for second term in under three hours and only a fraction of schools seeking places can be accommodated.

Some typical experiments include:

- **Light Pumps – students use light as the energy source to operate a Stirling engine.**
- **Check It Out – students read all 91 bits in a supermarket bar code.**
- **Decibel Range – students use a sound level indicator.**
- **Hot Colours – students convert light energy to heat energy.**

The CSIROSEC theme at the Melbourne Music Show was 'Science of Sound'. Each of the 20 000 children averaged 15 minutes at the exhibit, using 'hands-on' activities.

In Bendigo last year CSIROSEC had 500 visitors in four days, including primary and secondary teachers, the general public, the local Rotary Club and students from 10 schools. The Division of Building, Construction and Engineering, Bendigo CAE and Dr Doug Campbell all helped. Many *CoResearch* readers will remember Doug from the Division of Materials Science and Technology. Doug now helps at CSIROSEC.

At the ANZAAS Youth Science Festival last year, CSIROSEC made presentations to over 3000 students and teachers.

In 1988 international visitors came from Argentina, China, New Zealand, the USA and Venuzuela to see Melbourne CSIROSEC in action. The secretary of the US Science Teachers Association described a visit as 'the absolute highlight of my tour of science education facilities' and there has been feedback from across the Tasman suggesting that after investigating many different models, the Kiwis propose to use the CSIROSECs as models in New Zealand.

Education Programs continued

CSIRO Women In Science Project – ensuring equal access

Under this project, CSIRO women scientists and technicians visit schools to discuss their work with 15-16 year old students. The project encourages all students and especially girls to continue with science and maths at senior secondary level. Other features are a 17 minute video, *Women In Science*, produced by the CSIRO Film and Video Centre and a discussion sheet which encourages students to consider their future careers and the importance of studying science and maths. This written support material is being upgraded with a grant from the Curriculum Development Centre.

The project has had some spectacular results, with one school in Victoria reporting the number of girls studying physics jumping from 0 per cent to 35 per cent and from 11 per cent to 50 per cent in chemistry. Obviously we have some powerful orators in our midst.

The project would not be possible without the support of senior staff, supervisors and especially the women who visit schools. More women are always needed to take up this role. For further information, contact one of the co-ordinators:

Adelaide: Beryl Morris 08-268 0111
Canberra: Ross Kingsland 062-48 4477
Hobart: Darrel Harington 002-30 7889
Melbourne: Fran Young 03-556 2211
Sydney: Eily Gregg 02-467 6526
Brisbane: Jayne Seebeck 07-377 0809
Rockhampton: Annette Halliday 079-36 1288

CSIRO Astronomy Education and Visitors Centre Parkes

Located off the Newell Highway, this CSIRO Centre is one of the most widely visited CSIRO sites. See article on this page.

BHP Science Awards

CSIRO and BHP organise these awards. There are three categories covering student research investigations, science teachers and Double Helix members. From this year, entry to the awards will be via entry forms on the back page of *The Helix* and from forms available through the Science Education Centres.

CRA National Science Summer School

Each January, over 300 of the top final year secondary students gather to hear some of Australia's leading scientists and experience scientific research methods in laboratories around Canberra. CSIRO is one of the organisations which takes students into its labs for practical work and demonstrations of research.

CSIRO Student Research Scheme – the chance of a lifetime

This scheme allows final year secondary students to do individual research projects under the supervision of scientists from CSIRO, the ANU, Australian Defence Force Academy or Canberra CAE.

It is obvious from their comments that the students have gained a clear understanding of how scientific research is undertaken. One student wrote 'I discovered not only how unspectacular and repetitious the work can be but also how incredible it is to perform experiments never done before, where the end result is somewhat of a mystery – an experience simply not obtainable in the classroom'.

Dr Ian White of the Centre for Environmental Mechanics wrote: 'All in this Division who have been associated with the program find it stimulating, enjoyable and rewarding. ... this thoroughly worthwhile program is an effort of which we can all be justly proud'.

Corporate sponsorship is being sought to enable the scheme to continue.

CSIROPRAC

The experiments in the CSIROPRAC textbook were provided by CSIRO scientists and were based on their own areas of research. CSIROPRAC was published by CSIRO in association with the Australian Science Teachers Association.

Above, Ben Longden, Rick Twardy and Julia Hockings of the CSIRO Astronomy Education and Visitors Centre, Parkes.

Adelaide

Manager: Phil Allan (SA Dept of Education)

A student's perception of a visit to CSIROSEC, Adelaide:

'Miss Rogers is usually a bit grumpy early in the morning. I mean, who wouldn't be with a class like ours? There are 30 of us and we can be quite a handful at times.

'We really are quite smart (except Mark) and we all want to learn. It's just that we are a little bit loud when we are learning. In fact, we are a little bit loud even when we are not learning.

'One morning Miss Rogers had an announcement: we were going on an excursion. Here was our chance to increase the noise pollution in a different environment. It was to be a science excursion for a whole morning next week. My class likes science (particularly Mark, who once tried to construct a nuclear bomb at home) because there is lots to do and most of it is pretty interesting. The excursion was to CSIRO, Miss Rogers announced.

' "You will be able to find out some more about CSIRO and do some experiments when we visit their Science Education Centre," she said. The buzz started ... this was good news ... we are a very "hands on" sort of group and the chance to experiment excited everyone (especially Mark).

Later in the week we got our experiment sheets and some activities to try before our visit. As we read through the sheets our excitement was a little overshadowed by fear. No one had heard of some of the words used in the experiments. Most people had heard of a laser, but words like solar cells, streamlining, pneumatic and mineral recognition sent waves of panic through everyone (except Mark who had found the word bomb written in one experiment and was reading that one again). Miss Rogers did her best to calm us down as she explained some of the words. Gradually we understood a little bit of what each experiment involved and the feeling of excitement took over again.

'The day of the excursion was a Tuesday (we are fairly quiet on Tuesday) and we got to CSIRO in parents' cars (I can see why Mark was interested in bombs ... his mother drove one). The CSIROSEC was in the Division of Manufacturing Technology. We were very impressed when we arrived. The teacher in charge of the centre introduced some of the experiments to us and got some people up as volunteers to help him. We worked in groups of three when we did the experiments ... you will never guess who I got in my group!

'The experiments were great. We found out about lasers and actually got to use one; we used a small robot; we investigated liquid crystals used to measure temperature; and we found out how the shape of boats affected their speed through water. There were lots of other experiments we couldn't try because they were for older students. My big sister had been before and tried some experiments based on the work of CSIRO scientists. These included one where students could make a sand mould, create Moire patterns and investigate the efficiency of a factory floor layout.

'We also found out about CSIRO and some of the research done there. We saw some holograms and also some electron microscope photographs of metals and flies and leaves. They were unreal! The time really went quickly because we were so busy and it was disappointing when we were told to pack up. It was the best day I have ever had.

Now I enjoy science even more than before and I am thinking about being a scientist when I finish school.'

Parkes Visitors Centre

Manager: Rick Twardy

Australia's 'Grand Old Lady' of radio astronomy, the 64 metre radio telescope operated at Parkes by the Division of Radiophysics, is a popular attraction.

The telescope has a visitors centre staffed by Rick Twardy (Manager), Ben Longden and Julia Hockings. The centre features contemporary displays and information, some interactive exhibits, educational material for sale, and – thanks to the Film and Video Centre and the Division of Radiophysics – a world class, superbly crafted audiovisual, *The Invisible Universe*.

The centre's main role is to convey to the community a greater understanding and appreciation of the work of the telescope, and of astronomy, science and CSIRO.

Dealing with the public can be incredibly time-consuming, making significant demands on the resilience and initiative of the staff, but this is (after all) what we are about. CSIRO is often commended for providing staff at the centre, not just a static display.

The centre should not be regarded as just a tourist amusement. Students and parents, teachers and curriculum consultants, and many other people from Australia and overseas write for information or advice. Information requests range from routine to highly specific; the imaginative to the bizarre. Hundreds of letters a year are answered.

Furthermore, in 1988 the centre had 110 school visits from as far as Cobar, Adelaide, Townsville and Hobart. Each school group receives close attention: through prior liaison with the teacher, lessons on a range of topics can be created. There are worksheets concerning resources in the centre, and information on careers, experiments and contemporary issues, in addition to discussion during the visit. Many schools attend night observations which include the use of the centre's 10" reflecting telescope.

As well as 'selling' astronomy, science and CSIRO, the centre also sells astronomy products in a (currently successful) attempt to be self-funding. Public interest in astronomy is high, and signs are that it is increasing. The centre is open for all but four days a year, sometimes at night until the wee hours, and may deal with 500-600 visitors a day in the school holidays. In 1988, nearly 85 000 visitors called in, generating just over $170 000. Since there are no mandatory charges, perhaps the money recovered can be taken as one quantitative measure of public satisfaction with their visit.

Longden Twardy Hockings

McLennan Award

Cont. from p.1

• the extent to which the achievement has received acceptance –

* ***in the market place (list history, tangible benefits to industry in dollars, and, where appropriate, the extent of market penetration and geographical coverage);***
* ***in government areas (list Federal and/or State Government acceptance, use, special grants and awards received);***
* ***in overseas application.***

• comments on originality of the invention and/or degree of innovation of the development;

• whether the achievement is seen to have further application in Australia and/or overseas and an estimate of future sales, cost savings or economic benefits in dollars;

• a brief summary of working experience of the nominee over the past 10 years;

• details of any links with industry;

• summary of patents, patent applications, technology transfer to industry and publications in relation to the achievement itself and generally;

• any other details considered relevant to the Award;

• names of three referees to include one from the firm or beneficiary of the achievement and one from CSIRO.

Nominees should provide one original nomination and six copies by the closing date. Also, they should ask their referees to forward their reports direct to Ms Galinos by the deadline.

Nominations for the 1989 Award close on Friday 16 June 1989. The recipient of the Award is expected to be announced in September.

For more details, contact:
Ms Kay Galinos
CSIRO
PO Box 225
Dickson ACT 2602
PH: 062 48 4484
Fax: 062 48 4641

Bill Snowdon retires

AAHL Chief looks back on turbulent times

Bill Snowdon

Mr Bill Snowdon's no nonsense, down to earth nature must have been a great advantage in dealing with a job and a half: foundation Chief of the Australian Animal Health Laboratory (AAHL).

The Laboratory was formally established in 1974, and its secure facilities at Geelong were opened in April 1985, at a cost of $158 million. It operated within the Division of Animal Health until 1982 when a review was carried out, then it became a separate entity within CSIRO. The McKinsey reorganisation in 1987 made the Laboratory part of Animal Health again. It is set up quite differently to any other part of CSIRO. Since 1984, 50 per cent of its funding has come from the Department of Primary Industries and Energy and 50 per cent from CSIRO, and its policy direction is determined by a Board of Management.

Mr Snowdon – Bill as he would rather be called – retires at the end of April after 30 years with CSIRO and nearly 20 years' involvement with the planning and implementation of AAHL.

AAHL has had its share of crisis and criticism, and even during this interview Bill was in demand by the media to comment on the latest controversy. Weathering some of the storms can't have been easy, but Bill is philosophical about it. 'One of the most important things is to be open. It's absolutely imperative that whatever this place does, it is completely open, because there are always people criticising us.'

He does get a bit heated, however, when recalling one of the headlines during the furore surrounding the staff member who got some of the Newcastle disease virus in her eye, and was allowed to go home.

'One of them was something like "The Greatest Debacle Since the Second World War", he said, shaking his head with disbelief.

He is satisfied that the investigation of the matter was full and open – 'even though there may have been things we didn't agree with. But that is part and parcel of this process.

'We not only have to do things that are safe, we must also be seen to be safe. They are not necessarily the same thing,' he said.

'As a result of this incident, we now have a quarantine facility on site where people who may have been exposed to potential infection can be kept until we are sure they have not been,' he said.

Soon after our interview, this facility was put to the test for the first time, when an employee pricked himself with a needle used in some experiments. The resulting publicity appeared, overall, to be more favourable to AAHL.

Bill's involvement with AAHL (or the Australian ***National*** Animal Health Laboratory as it was first known) stems from a feasibility study started by CSIRO in 1970. Bill became part of the project evaluation committee.

His earlier work with the Division of Animal Health at Parkville led to his involvement. 'Early on I was in the virology section under Eric French, a wonderful scientist I was lucky to work with,' he said.

At that time he researched a range of infectious animal viruses such as swine fever, mucosal disease, ephemeral fever and infectious bovine rhinotracheitis.

In 1964 he went to the UK and spent 18 months at the Animal Virus Research Institute at Purbright – laboratories well known for their research into foot and mouth disease.

'It was my particular role to test the susceptibility of some Australian fauna to infection of the F&M disease virus,' said Bill.

Many years later, F&M disease caused a controversy when AAHL applied to import the virus for study here. The disease had not been known to occur in Australia since the late 1800s, and there was an outcry from farmers' groups who feared that this really devastating disease would somehow get loose if imported by AAHL.

'The Government decided it would not permit importation of the virus. For us to develop our diagnostic capabilities, we sent our people to the UK to develop techniques to produce reagents which do not contain live virus,' he said.

This process will continue, but Bill said to ensure the capability is completely developed, AAHL is collaborating with ACIAR to support another project in Thailand in which, among other things, the UK reagents are being field tested.

Another fear-provoking disease with which AAHL is associated is rabies.

AAHL does all rabies diagnostic work for Australia. This might involve, for instance, a fairly routine check on dogs and cats which have died in quarantine, or of specimens from animals with suspicious symptoms.

Unfortunately, in 1987 there was a case in Queensland of a child with rabies, which was thought to be the first case of its kind in this country. The child (who subsequently died of the disease) had been to India and other south east Asian countries, and it's thought he was bitten by a monkey. AAHL diagnosed the disease.

'Incidences like these cause concern because it's necessary to trace the activities of the person. We need to establish a link between that person and a possible rabies country. If that person had developed rabies and had not been out of Australia, there would have been a lot of concern to trace where it might have come from,' he said.

Rabies

Rabies is a horrifying disease with a mortality of rate of close to 100 per cent if treatment is not administered immediately. Anyone bitten by a rabid animal will almost certainly contract the disease without treatment.

AAHL's work with rabies, however, has been nowhere near as controversial as its work on avian viruses – controversy which reached its peak at the time of the virus-in-the-eye incident.

An earlier problem had come about during the fowl plague scare in Victoria in 1985. Critics such as the outspoken Dr Graeme Laver, then with the Australian National University, attacked AAHL over its handling of the affair.

'If you go back through the history of AAHL, a lot of the early controversy and criticism came from people who believed too much money was being spent and this took resources away from other areas. The arguments did not make much impact on politicians or anyone else, and they switched their criticisms to the risks of introducing some of these exotic diseases, as another way of having a go at the establishment,' said Bill.

'Through all this, the people I have felt most sorry for have been the producers themselves. One can well understand their dilemma, when we had the scientific community divided. One couldn't really expect them [the producers] to be in a position where they could easily make any judgement about the controversy. From our point of view, one of our greatest concerns was about the conflicting information bombarding the industry people.'

And do you think you have won them over? 'The stand we adopted over the years has been vindicated to a large extent,' said Bill.

A review was held in early 1987 of the exotic pathogens that are needed by the laboratory to carry out its functions. The review committee made recommendations for the introduction of numerous strains of 15 different exotic organisms.

That committee had a member who, Bill said, could have been called 'our greatest antagonist' – Professor Bede Morris who at the time was head of immunology at the Australian National University (he died tragically in a car crash in Europe last year), and represented the National Farmers' Federation on the committee.

That report then went to the NFF for comment, and then to the Standing Committee on Agriculture for approval. Subsequently, it went to Primary Industries and Energy Minister John Kerin, Science Minister Barry Jones and Trade Minister Michael Duffy who have now approved it. Permits have been granted for importation of the first of the exotic organisms.

This report was very important, said Bill, because it had been prepared by an eminent committee, among them one of AAHL's sternest critics. ' This has probably assisted us very much in getting the authority we need to completely develop our capability to diagnose exotic diseases. It has probably also reduced the time required for consultation if it had to go through the normal mechanisms of approval,' he said.

Bill is now looking forward to a quiet and peaceful retirement – and who can blame him? He said he has no intention of haunting the Laboratory after his official departure. A bit of golf – and no more media interviews – seem to be on the agenda.

'The stand we adopted over the years has been vindicated to a large extent' ***Bill Snowdon***

Eos plans well underway

Scientists at the Marine Laboratories are gearing up to participate in the polar orbiting Earth Observing System (Eos) project.

In 1995 NASA will launch a long-lived earth observatory into polar orbit. The observatory will provide scientists with daily information and observations of the entire globe.

The aim of Eos is to undertake worldwide observations necessary to understand the chemical, physical and biological processes responsible for Earth's evolution. This in intended to allow accurate predications of changes in the global environment – both natural and man made.

Examples of this are the greenhouse effect and the hole in the ozone layer over Antarctica.

Dr Graham Harris of the Division of Fisheries will head a team of scientists using data from Eos to study the relationships between climate, ocean circulation, biological processes and renewable marine resources in the Australasian region.

Scientists from Fisheries and the Division of Oceanography will take part.

Dr Harris' team will the only one in Australia involved in the Eos project and one of only eight teams operating outside the United States.

The fact that CSIRO's proposal was selected from a field of 455 submissions is something of a coup. Australian proposals were submitted to NASA by COSSA.

In addition to Dr Harris and his group, Dr John Parslow of the Division of Fisheries has been chosen by NASA has a member of a team which will define the specifications for a Moderate Resolution Imaging Spectrometer (MODIS) which will be carried on the spacecraft.

This instrument will measure the colour of oceans, providing information about their dissolved and suspended constituents.

Dr Harris said he was excited at the prospect of working on the Eos project and was especially pleased that Australia would be represented in a research program of such global importance.

'If we are concerned about the future of our planet and wish to preserve it, we must have a deeper scientific understanding of the global earth processes, and Eos is an attempt to do this,' he said.

June Olley retires

CSIRO's distinguished biochemist and fish technologist, Dr June Olley, has retired from the Organisation.

After completing her PhD in 1950 and working with the Medical Research Council, Dr Olley spent 18 years at Torry Research Station at Aberdeen, the UK laboratory devoted to seafood technology.

Her work at Torry mainly involved fish lipid biochemistry and her applied work concerned the processing and nutritional properties of fishmeal.

She decided to make the move to Tasmania, and in 1968 she joined the CSIRO Division of Food Preservation at the Tasmanian Regional Laboratory.

In Hobart, she quickly established herself as an authority on the canning, drying and general processing of abalone, an industry then in its infancy and in need of scientific help. This was followed by investigations into heavy metal pollution in the Derwent Estuary and its effects on the fledgling oyster growing industry and the inshore fisheries.

Many other general fish technology problems were tackled under her guidance, including mechanical separation of fish flesh, electrophoretic identification of species, lobster processing and sensory evaluation.

Dr Olley has always maintained a high level of industry liaison, believing it essential for the effectiveness of a fish technology group. She has worked on problems of practical significance in the belief that underlying patterns will emerge and that a broad brush approach is the best way of seeing the patterns in the data. Furthermore, she has inspired others to follow the same path.

This is particularly evident in her most important work – temperature function integration, bacterial growth rates and rates of deteriorative change in stored foods.

Much of this work has been done in collaboration with the University of Tasmania, but it has been Dr Olley's enthusiasm, drive and good spirits that have kept up the momentum.

This highlights a most important part of Dr Olley's scientific approach in that she is always willing to listen and to share: 'why compete when you can have more minds working on the problems, since there are more than enough [problems] to go round'.

Many students have benefited from her wisdom, advice and help, given unstintingly. Similarly, many young scientists (and some not so young) have much to thank her for in helping their careers.

'Fairy godmother'

This is evident in her Fellowship of Christ College of the University of Tasmania, where she is regarded as something of a 'fairy godmother'. In more recent times, she has taken an interest in the development of research centres in South East Asia, particularly Indonesia, Thailand, Malaysia and the Philippines.

Among her many achievements and awards are: a DSc from the University of London in 1968; Membership of the Order of Australia in 1987; Fellow of the Institute of Food Science and Technology (UK); Foundation Fellow of the Academy of Technological Sciences; Member of the Faculty of Agricultural Science at the University of Tasmania; Senior Vice President of the Tasmanian Royal Society; and Member of the National Research Fellowships Advisory Committee. In addition, she will receive an honorary doctorate from the University of Tasmania next month.

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Dr June Olley

Pulpwood studies lead to DSc

Bill Balodis of the Division of Foresty and Forest Products has been admitted to the degree of Doctor of Forest Science by the University of Melbourne.

He has received the DSc for his thesis *Comprehensive assessment of forest resources for pulpwood quality and studies on wood, pulp and paper.*

Since joining CSIRO from the Queensland Forest Service in 1962, he has been working on pulp and paper physics and on the assessment of forest resources for pulpwood quality in Australia, Sarawak and Papua New Guinea.

The cabbage patch solution

Researchers at the Division of Animal Health in Armidale have been alarmed to discover that their painstaking work on a vaccine against mastitis in dairy cows has been in vain. The answer has been staring them in the face all along.

At the recent Armidale Show a woman fronted the Division's exhibit and calmly dismissed all the work they were proudly displaying on the mastitis vaccine research as a waste of time.

Geoffrey Major (described in the Division's Armidale newsletter as Major in the Mastitis Corp, retd), while supervising the exhibit, was approached by the woman who informed him that when she (personally! herself!) had mastitis, she had fixed the problem by covering her breasts with two cabbage leaves.

By the way, the Division also won the Champion Theme Exhibit.

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Letters

Cont. from p.2

Mosmondor's reference to business cards in *CoResearch* No. 320. Does the manual issue directives?

When business cards were being ordered in our Division last year, several possible layouts were circulated. Not liking any particularly, I sketched out another variation. This has since been used as the Divisional standard layout. One would hardly call the print size of any of [our cards] microscopic.

There is one universal rule for business cards, which I hope the manual does not contradict – that the person's name should be in the largest of any type size on the card.

There is another strange usage seen in newspapers of late, that of lower case letters for a divisional name, such as 'CSIRO division of coal technology' instead of 'CSIRO Division of Coal Technology'.

I felt these comments were worth making.

Paul R C F Goard
Division of Coal Technology
North Ryde

Industry award for coal process

Development of an on-stream coal ash analyser based on natural radioactivity has resulted in a major industry award for Dr Bill Mathew from the Division of Mineral and Process Engineering.

Dr Mathew has received the AusIMM Mineral Industry Operating Technique Award for 1988. The award honours outstanding, innovating, cost saving mineral industry techniques developed in Australia or Pacific Rim countries.

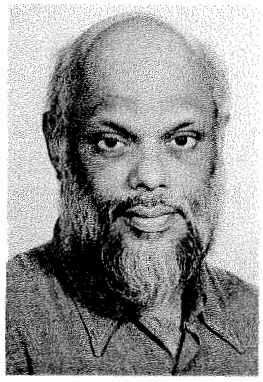
Ash content is an important quality parameter of coal and analysers which rapidly and accurately monitor ash content of moving coal streams are of considerable technical and economic importance to the coal mining industry.

Consistent quality

The use of such analysers can significantly improve the recovery and performance of coal washeries as well as assist in the automation and control of coal sorting and blending operations to produce a contract specification product. A consistent coal quality greatly assists efficiency in coal utilisations plants and reduces waste.

As a leading nuclear geophysicist, Dr Mathew's research involves development of measuring, detecting and controlling devices to assist automation and quality control in the mineral industry.

His study of natural radioactivity and its distribution in coals and minerals has led to the development of a number of quantitative techniques of considerable value to the industry.



Dr Bill Mathew

'Golden era' wool scientist retires

Dr Ian Watt has retired from the Sydney laboratory of the Division of Wool Technology after 40 years' association with CSIRO and its predecessor CSIR.

Ian worked with the Division of Tribophysics in 1949 while a graduate student with the Melbourne University Chemistry Department. After graduating he became a member of staff of the Division before going to Birmingham University where he gained his PhD, and on to post-doctoral work at Cornell University.

In 1956 he joined the Wool Research Laboratories in Ryde, which later became the Division of Textile Physics. In 1980 he was awarded the RACI Archibald D Olle prize for his contributions to chemistry.

Among the 75 guests who gathered to farewell Ian at a dinner on 17 February were many eminent former members of the Division of Textile Physics. Ian's department brings to a close an era in wool research initiated by a team of scientists who became leaders in their fields. They were recruited by Victor Burgmann, foundation Chief of the Division and later Chairman of CSIRO. It was a golden era spanning the 1960s, during which the crown for basic wool research was wrested from Leeds and brought to Australia.

A close collaborator and co-author of a dozen research papers, Dr John Leeder, formerly with the Division of Textile Industry in Geelong, amused and confused the guests with a farewell address full of anecdotes.

Ian will spend part of his retirement in the US as a visiting scientist with some leading keratin research laboratories.

Dr Ian Watt

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CoResearch **is produced by the Public Affairs Unit for CSIRO staff. Readers are invited to contribute or offer suggestions for articles. The deadline is the last Monday before the issue month. Editor: Liz Tynan, PO Box 225, Dickson ACT 2602. Ph: 062-48 4479.**

CoResearch

No. 322 April 1989 CSIRO's staff newspaper

CSIRO AUSTRALIA

Sad end to long history at the Bend

A chapter of CSIRO's history ended in a very public way with the controversy surrounding evidence of radioactivity at the Fishermens Bend site.

On 12 April, less than a month after a 'wake' held by staff to mark the end of CSIRO's presence at the site, it was announced that a report was being prepared to determine the extent of radioactive contamination there.

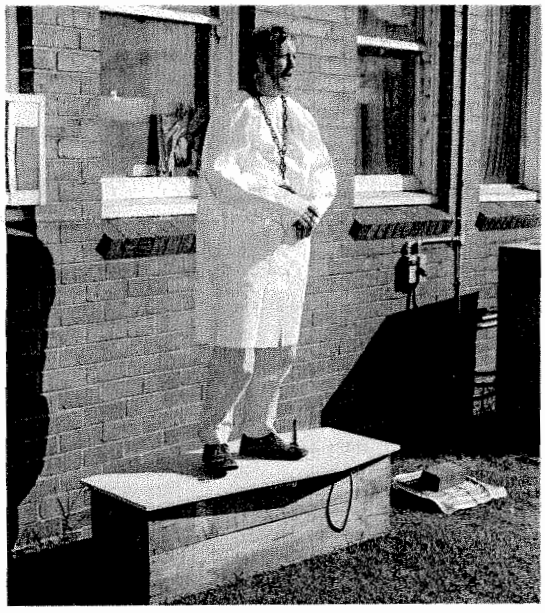
This was prompted by results of a survey conducted by the Australian Radiation Laboratories for the Department of Defence which is proposing to take over the site.

The few remaining staff at the Bend were evacuated as soon as the results became known.

The issue has provoked a storm of media interest, with most major newspapers running items about the problem. Some delved into the questions surrounding the death of Dr Rinaldo (Ron) Bergamasco in 1983.

On 17 March former Bend staff were probably unaware of the controversy that was about to blow up, when they held their wake.

A report of the wake can be found on pp. 4&5 in this issue.



Above, Jim Aylmer delivers the oration at the 'End of the Bend' wake on St Patrick's Day

Budget row

Crisis or restructuring?

The Executive Committee has reacted angrily to an information circular issued on 13 April by the Officers Association which questions whether a budget crisis really exists.

A statement issued by the Committee said that the OA's circular 'seriously misrepresents CSIRO's budgetary planning and makes unacceptable remarks about the corporate centre. The Executive Committee deplores the offensive and unjustified reflections on corporate centre staff'.

However OA president John Stephens denied the union's statement was a wholesale attack on the competence and loyalty of corporate centre staff and said this was never its intention. It was issued, he said, because of real concerns about the loss of 500 appropriation funded positions over three years and the impact of this on the Organisation's long term strategic research.

He also pointed out that the Executive Committee takes full responsibility for the budget errors. 'One presumes that this includes the direction and management of the budget process'.

Mr Stephens said it looked as though senior management was using current budget difficulties as an opportunity to restructure the salaries/operating ratio and create a large pool of uncommitted funds, but was not being frank about it.

He said at the time of the Federal Budget last August there had been an obvious attempt to 'sell' the budget to staff by putting the best face on it, but now management was crying poor. 'Indeed, the OA's opinion of the purple budget document issued last year as more of a political than an financial statement is reinforced,' said Mr Stephens.

'The Executive Committee's statement in response to our circular does nothing to address our concerns. It does not respond to our criticisms of the Committee's evaluation of CSIRO's budget position nor does it address its responsibilities to divisional staff,' he said. He said the OA did accept that some restructuring was desirable, but this should be achieved in 'an orderly way', taking advantage of natural attrition.

Appropriation positions

Mr Stephens said that during discussions with the acting Chief Executive, Dr Colin Adam and other senior officials on 31 March, no mention was made of abolishing 500 appropriation positions. Nor was it mentioned at the Consultative Council meeting on 15 March, chaired by the Chief Executive Dr Boardman, despite lengthy discussions on the budget. He said there had been nothing volunteered by management about any effect on employment arising from the budget issue.

A story in the *The Australian* on 12 April quoting the Minister for Industry, Technology and Commerce, Senator John Button, seemed to the OA to better reflect the situation. That story said 'The shedding of 500 staff,..was because of a structural and administrative review of the organisation rather than predicted budgetary shortfalls'.

It went on: 'Senator Button told Parliament the staff cuts were a result of "strategic decisions" by CSIRO management'.

Yet a statement issued to staff on 7 April following a meeting of senior management said 'CSIRO will need to reduce its expenditure of appropriation funds...mainly because of shortfalls in items such as land and assets sales. This will mean that some research will have to be stopped. The number of appropriation funded staff will need to be reduced by 500 over the next three years to achieve a proper balance in the budget'.

The OA claimed in its information circular that there has in fact been an improvement in the budget; if greater than expected external resources are taken into account. 'These resources have been obtained almost wholly by the efforts of divisional staff or because of the services they can deliver,' said Mr Stephens.

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Views are welcome from all staff on any aspect of the budget issue. A special letters section on the subject is planned for the June edition of* CoResearch. *Please write to the address shown on the back page.

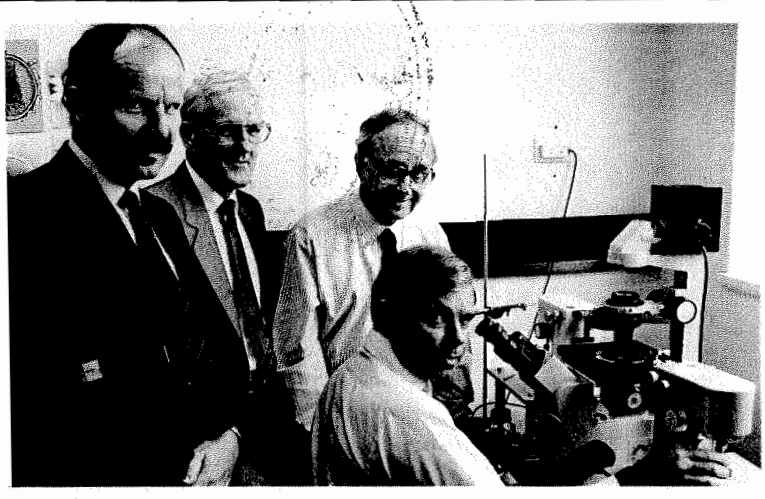
Kiwi Minister visits CSIRO

The New Zealand Minister of Science and Technology, the Rt Hon Robert Tizard, recently visited the Division of Animal Production's Sydney laboratory.

He was accompanied by Mr Michael Collins, Assistant Director General of DSIR, and Mr Owen Coup, DSIR's Manager of Strategic Policy and Research. Their main interests were developments in biotechnology, such as genetic engineering and immunobiology, and they were given an account of the Division's research in these fields, in which it is a world leader. While in Australia, they also visited a number of other CSIRO divisions and met Senator John Button and Mr Barry Jones.

Photo right, Dr Kevin Ward, seated, of the Division of Animal Production, demonstrates the apparatus used to inject gene preparations into an animal ovum, to Mr Owen Coup, left, Mr Michael Collins, centre, and the Rt Hon Robert Tizard, right.

Photo: Philip Potter



From the acting Chief Executive

Some comments from Dr Colin Adam

'We simply cannot run top-rate scientific R&D programs with budgets of the sort we've been receiving for the last several years.

'It places the management of the organisation in a very hard position.

'Our response has been to go to the outside community and simply earn our way out of this by generating more export income for Australia, hoping that Australian companies will be able to pick up the benefits of our labours over past years.

'I think we've been outstandingly successful in that area.

'But we are still far short of the total budget we need to run the Organisation.'

Making these points in a radio interview with Wendy Wicks on Canberra's ABC Radio 2CN, Acting Chief Executive Dr Colin Adam highlighted CSIRO's budgetary strictures by comparing its funding to an internationally accepted yardstick.

For every employee – research and support staff, maintenance and administration – scientific research organisations worldwide use $100 000 per employee as a benchmark. Anything less means the potential of the organisation is not fully available to the community it serves – it is an underutilised resource.

Dr Adam pointed out that measured against this scale – with over 7000 staff – CSIRO should be working with a budget of at least $700 million. This is a guide to perhaps how under-utilised CSIRO is: consider how much more we could do and how much faster we could do it with twice the money now available.

With about $320 million in appropriation funding and about $100 million from outside sources, CSIRO is poorly nourished on any international comparison. Dr Adam was able to put this into a national context in relation to Australia's overseas debt of over $100 billion.

'The Organisation is responding to a range of economic pressures that Australia as a nation is facing....Those ministers charged with managing the economy have to make some tough decisions.'

But is cutting back on R&D expenditure an exercise in sharing the burden? Or is it a false economy which will limit our chances of turning the deficit around?

'There's an enormous danger that we in Australia are going to miss some very important scientific breakthroughs. There is no question about that,' Dr Adam said.

Discussing management issues in CSIRO, Dr Adam affirmed that recent press reports in one newspaper claiming poor management and disharmony between levels of management was a fantasy on the journalist's behalf. He indicated there was no real argument between the Chairman and institute directors, and between division chiefs and government ministers.

After it had been put to him that professional administrators should be in charge of scientific research programs, Dr Adam made a strong case for the appointment of scientists as managers.

'The rise of Japanese companies and their success in technology has come predominantly from a management structure led by scientists and engineers.

'If one looks at the Top 100 corporations in the United States – who I must say have not been extraordinarily successful in competition with the Japanese – we find those management ranks filled with the sort of people you are suggesting should run CSIRO: namely accountants, people with Masters of Business Administration, and some with no formal qualifications at all.

'So if you want to compare the two greatest technological countries in this century, the Japanese companies are certainly run by the sorts of people we have running CSIRO.'

N.B. Dr Boardman is overseas.

Joint venture deal with Websters

A $5 million three year joint venture research project to develop animal vaccines using recombinant DNA techniques was signed this month.

The agreement with Arthur Webster Pty Ltd involves scientists from the Division of Animal Health's Parkville laboratory and AAHL.

***A feature on the work is planned for the next issue of* CoResearch.**

Letters to the Editor

Dear Editor,

Recently we experienced for the first time a burglar at home. Regardless of how much loss people suffer, the violation of privacy is a most unpleasant thing.

Last year some young people broke into several laboratories in our Division and destroyed expensive equipment worth $100 000. Car theft, violence in trains and on railway stations and the hijacking and bombing of commercial aeroplanes are very serious problems. Stealing and damage of computer software and data are other problems in our modern society.

The security industry is rapidly growing, but effective ways to prevent these crimes have still to be developed. I am wondering if CSIRO should set up the Division of Security Research to tackle these problems and alleviate the general public's apprehensions. The Divison could investigate a wide range of issues and problems, from the development of new devices and systems, to watchdog training and leasing systems to computer technology.

The Division could expect to obtain research funds from governments, car manufacturers, public transport authorities, airlines, computer companies and narcotic control authorities. Newly developed techniques would be highly exportable.

M Shibaoka
Division of Coal Technology

Dear Editor,

So P H Langhorne wants to have the last word on CSIRO's restructure (*CoResearch* 320, February 1989). No fault of his, but if he were a scientist, as anyone in his position should be – small wonder our science faculties are waning – he would know that there is no topic under heaven upon which scientists have ever closed debate. Hurrah! Hurrah!

Let him know, however, that while we old mules of science, now under the iron heel of Reconstruction, are resigned to concede him his desire for the next decade or so, nevertheless, by sheer and vindictive patience we'll win in the end.

Six horse loads of graveyard clay on top of anyone who seeks to stifle open, objective inquiry; and may the Lamb 'o God stick his hoof through the floor of heaven to kick the ass down to hell of him who would strangle the scientific spirit!

The sadness for all is that there is scant joy or productivity in patience.

John J Lenaghan
Manager of Myself

Dear Editor,

I recently received a memorandum advertising an Executive Management for Women course to be run for CSIRO female employees aspiring to executive management and leadership in their organisation. I was not only perplexed as to why a separate course should be run for women, but I was *appalled* to find that the cost for the four week course was $8250 (that is eight *thousand*, not eight hundred, dollars). If that is where our appropriation money is being spent then it is no wonder we have so little money for research. I say put a stop to these expensive management training courses and let us get on with the job of doing useful research.

It is when such large amounts of money get wasted on courses like this that I feel ashamed to call myself a public servant.

Margaret Mackinnon
Division of Tropical Animal Production.

Dear Editor,

I wish to correct an error in my letter that appeared in the February issue of *CoResearch*.

The percentage of SES positions in the Australian Public Service was stated as 0.01 per cent. In fact this should have read about 1 per cent. CSIRO is about 0.6 per cent.

P H Langhorne
Director, Corporate Services

Time to get out your running shoes

No, it isn't quite time for the Sirocredit Black Mountain Cup, CSIRO's infamous Canberra 'fun' run, but it is time to start training if you want to participate in the 1989 running of this prestigious event.

Race organisers are expecting a big field to compete on 21 July for the coveted trophy. In addition to the Cup itself, which goes to the divisional team of four with the fastest aggregate time, many individual prizes are awarded.

Although a non-Canberra division has never won the Cup, a team from the Division of Fuel Technology in Sydney has already beguan a comprehensive training program to wrest the Cup from Plant Industry, last year's winners. Organisers are encouraging more interstate teams to compete this year.

Potential entrants are reminded that the BM Cup is run over a moderately demanding 5.6km course on the slopes of Black Mountain, so hill running should be included in any training schedule.

For more information contact Greg Heath (062-46 5692) or Will Steffen (062-46 5648) at the Centre for Environmental Mechanics, GPO Box 821, Canberra ACT 2601.

Entomology's Tom van Gerwin with a friend he picked up along the way, during the Black Mountain Cup fun run.

COSSA chief to retire early

CSIRO's most vocal advocate of space-related research and development in Australia, Dr Ken McCracken, will leave the Organisation at the end of May for health reasons.

Dr McCracken was made foundation Director of the CSIRO Office of Space Science and Applications in 1984. He has made the job a high profile one, and has been interviewed countless times about the benefits to Australia of space R&D, in such areas as remote sensing.

Space science

His association with space science goes back many years. He was one of the scientists involved in the heady early years of the United States space program, working with NASA between 1959 and 1970. During this time, he ran a group which built nine instruments for various spacecraft. The computer codes he developed in 1959 are still used today to predict the radiation hazards encountered by high flying aircraft and spacecraft.

In 1971 Dr McCracken became officer in charge of the CSIRO Mineral Physics Section, then in October 1972, foundation Chief of the Division of Mineral Physics, a position he held until his appointment as COSSA Director. He is a Fellow of the Australian Academy of Technological Sciences, a Fellow of the Australian Academy of Science and a Member of the Australian Space Board.

Dr McCracken has been transferred to other duties until he starts leave on 31 May, before retirement. New organisational arrangements for COSSA will be made.

An interview with Dr McCracken will appear in the next issue of *CoResearch*.

Dr Ken McCracken

'We are not alone...'

The following is an excerpt from the 1987/88 Annual Report of the Institute of Animal Physiology and Genetics Research, Cambridge Research Station, Babraham. It was sent to* Co-Research *by Dr Ken Bremner at the Division of Tropical Animal Production.

'We are confident that the scientific strength of the Institute will prevail in any future reversals of Government policy or reorganisation of publicly funded research. Our scientists have learned to live in a world where today's plaudits go to yesterday's offenders. More to be feared than budgetary cutbacks, I believe, is the threat to scientific research from overbearing bureaucratic constraints imposed under the banner of accountability. Scientists now spend more time away from the bench in interminable reporting rituals than actually doing science. The effect of all this mandatory paper work is to extinguish spontaneity and sap creative energy. Time was when the call of the unknown would keep young investigators in the laboratories round the clock. Now health and safety regulations preclude this and much of normal hours is spent in sterile office work. Even the unknown is demoted, for agricultural scientists are now expected to forecast the outcome of their intended research and estimate the economic advantage arising therefrom! Scientific exploration has never worked like this and it is hard to see how such accounting antics can possibly be credible or cost effective.'

NASA provides upgrade money to AT for Voyager fly past

The Australian Space Office, on behalf of NASA, last month presented the Australia Telescope National Facility with $1.2 million for use of the Parkes radio telescope during the Voyager 2 fly past of Neptune in August this year.

The telescope will augment NASA's own Deep Space Tracking Station at Tidbinbilla near Canberra.

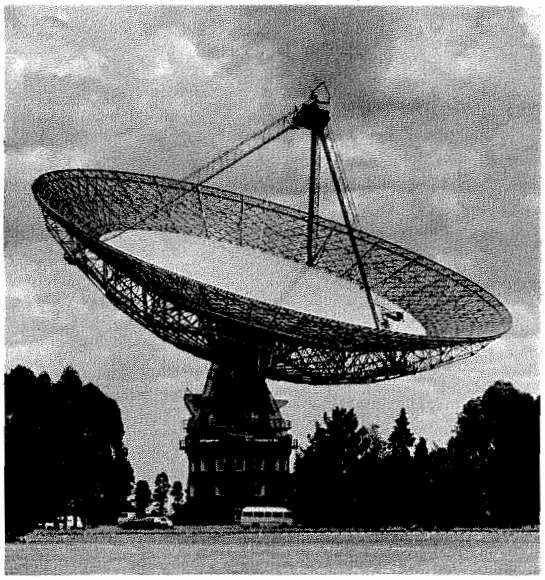
Voyager will gather data on Neptune's atmosphere, magnetoshpere, partial ring system and two known satellites, Triton and Nereid.

Pictures of Neptune are already coming in, but continuous observations will begin in mid-June and run until early October, with NASA having the prime use of the Parkes radio telescope for six months from March.

During the period of closest encounter on 25 August, Voyager's signals will be best received in the southern hemisphere. Tidbinbilla and Parkes will be able to track Voyager for 12.5 hours a day, whereas NASA's northern hemisphere facilities will only 'see' it for eight hours a day.

This is not the first time NASA has used the Parkes telescope. During Voyager's fly past of Uranus in 1986, Parkes provided crucial help in receiving the space probe's extremely weak signals. The telescope was also involved in three of the Apollo moon missions.

The NASA funds have been earmarked for new equipment for both Parkes and the new AT array near Narrabri.



The Parkes Radio Telescope

Calendar success 1

National Print Award for CSIRO publication

Dr Bob Frater, left, and Jeff Prentice with the National Print Award.

CSIRO, in conjunction with The Craftsman Press and John Reberchini Advertising, scored a win at the 6th National Print Awards recently. The Australia Telescope 1988 Calendar was awarded a certificate and bronze medal for third prize in a calendar category.

The calendar was a collaborative effort between Dr Bob Frater, then Chief of the Division of Radiophysics, and Jeff Prentice of the Information Services Unit. The stunning photographs were taken by John Masterson of the Division.

The National Print Awards are presented by the Advertising Print Production Association, the Printing and Allied Trades Employers Federation of Australia and the Graphic Arts Services Association of Australia.

This is the first time CSIRO has received an award for design and printing at the National Print Awards.

Remote sensing training course

An international training course on remote sensing in hydrological, agricultural and meteorological applications will be held in Canberra in May.

It is being organised by CSIRO in collaboration with Australian remote sensing experts from other organisations, with sponsorship from organisations such as the United Nations, the World Meteorological Organisation and the Food and Agriculture Organisation, as well as the Australian Government.

For further information contact Ms Lyndal Thorburn at COSSA on 062-70 1808.

Calendar success 2

Kodak to use van Aken photos in promotion

Bill van Aken's eyecatching photographs have made the Division of Water Resources' 1989 calendar a big success.

As reported in *CoResearch* 319, January 1989, the calendar was runner-up in an ABC competition in Perth.

Kodak has also recognised the quality of Bill's photography and has selected four of the plates to be used in a promotion.

The company has taken the theme 'Kodak – Imaging the Future', and posters carrying the photographs will be displayed in all its major offices and dealer locations throughout Australia and New Zealand. The posters will also be used at trade shows and exhibitions. Kodak has indicated it would like to use more of Bill's work in 1990.

The photographer, the Division and CSIRO are strongly identified on the posters.

Meanwhile, the New South Wales Department of Water Resources recently obtained 30" x 40" enlargements of all seven plates to hang in its boardroom. Commenting on the calendar, Director Peter Millington said it 'reflects highly on those associated with its production; in particular, the photodesign and photography are outstanding'.

Also, the Australian Water and Wastewater Association expressed admiration for the calendar and asked to be able to use one plate on the front cover of its Association Handbook.

ON THE RECORD
a selection of quotes

'Brutally simplistic economic thinking has had a field day in Australia of late, and CSIRO has been at the receiving end of more than its fair share of it.' Dr John Thomas, Division of Water Resources newsletter, 3-14 April.

'I am confident the CSIRO will not again be consulted in the search on the part of industry, the ACTU and politicians for suitable guidelines for new pulp mill developments.' Mr Chris Northover, Chairman of the Forest and Forest Products Industry Council, *The Australian*, 7 April, in a story concerning Wesley Vale.

'The criticisms of CSIRO are that it does not give enough attention to manufacturing. Those criticisms come from a minister interested solely in manufacturing, Senator Button, and the CSIRO [Institute Director] concerned with manufacturing, Dr Adam.' Professor Frank Larkins, President of the Federation of Australian Scientific and Technological Societies, *The Canberra Times*, 7 April.

'...an angry CSIRO chairman, Mr Neville Wran, had justifiably applied "size 12 shoe leather to several CSIRO staff backsides".' A 'ministerial office spokesman' quoted in a story about CSIRO not tendering for Sydney's beach protection program, *The Australian*, 5 April.

'There is no point in expecting CSIRO scientists – and divisional chiefs in particular – to act like company clones. They were all educated in the pre-Dawkins era when things like academic freedom and the pursuit of truth and excellence were ideals in which they were steeped.' Verona Burgess, science journalist, *The Canberra Times*, 5 April.

'It is vital that CSIRO become more outward looking and truly the scientific and research organisation it was set up to be.' John Button, Minister for Industry, Technology and Commerce, in story reporting his reply to a letter on the 150 per cent tax deduction from the Committee of Chiefs, *The Australian*, 3 April.

'The Hawke Government may be strongly committed to promoting research and development in Australia but that has not been evident in its funding support. If it is serious about economic growth, the Government must put more money into science. We simply cannot afford to wait.' Editorial in the *Melbourne Herald*, 30 March.

CSIRO staff flock to Woolexpo

Sixteen staff from four divisions and the bookshop represented CSIRO at the 1989 New England Woolexpo held in Armidale from 13 to 16 April.

They were joined by over 40 000 visitors, 10 000 more than last year's record attendance.

Woolexpo has been an annual event in Armidale since 1982 and is a major showcase for the Australian wool industry. Displays cover every aspect of the industry, from breeding, sheep health and management, shearing, fleece preparation and processing to wool fabrics, wool crafts and high fashion garments.

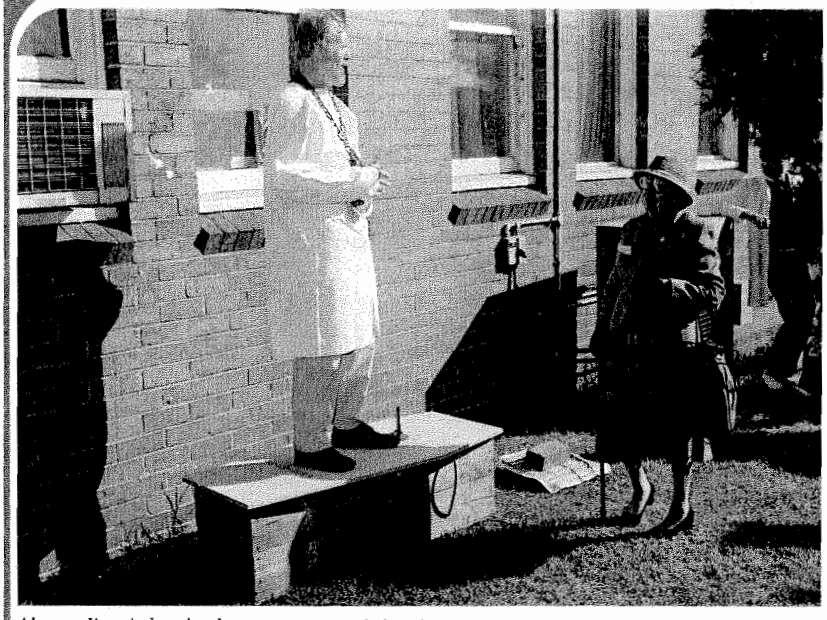
A special exhibition was provided this year by Elders Pastoral to mark its 150th anniversary. Billed as the 'Elders Technorama', this featured CSIRO displays on management strategies for control of worm parasites, genetic control of blowflies and the sale of raw wool by description. Staff from the divisions of Animal Health, Entomology and Wool Technology also participated in the associated series of seminars.

CSIRO was represented in the main exhibition area by a display on the new mastitis vaccine developed by staff from the local Pastoral Research Laboratory, a video showing the exploits of Animal Production and the CSIRO Bookshop display supervised by Alexa Cloud-Guest.

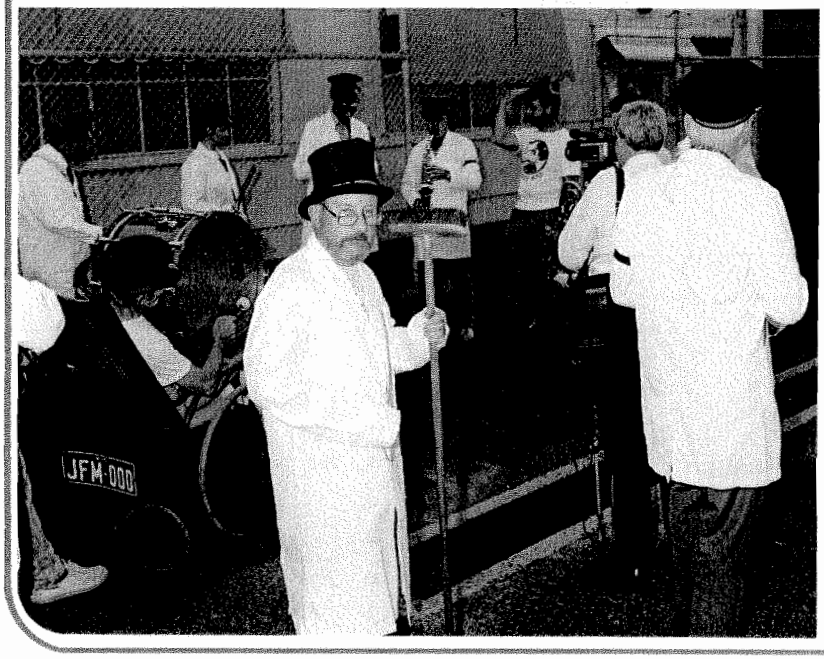
Alexa is responsible for the advertising and marketing of CSIRO publications. She was more than happy with public response to the bookshop display, which featured a wide range of CSIRO specialist and general interest titles. Over $2700 of books was sold and many visitors also were directed to divisions for further information.

Woolexpo social highlights included Dr Keith Dash's address to the assembled multitudes at the Friday evening launch of Elders Pastoral Technical Services, followed by the Woolexpo Ball and fashion parade and a morning after breakfast of Pancakes in the Park with music from the Armidale City Band.

The



Above, Jim Aylmer's eloquence attracted the closer attention of the guest of honour, Miss Jean McKenzie. Miss McKenzie became Dr (later Sir) Ian Wark's private secretary in 1942, at the Bend. Below, the Band.



End of the Bend

It's all over – CSIRO has left Fishermens Bend. Staff and former staff on both sides of the continent marked the occasion on St Patrick's Day with a wake...

Well it finally happened. On 17 March at 4pm we arrived at the still-imposing building in Lorimer Street, Fishermens Bend, for the last time: the birthplace of the CSIR(O) Division of Industrial Chemistry. Our reason? The formal departure of the last people of the Division of Chemicals and Polymers to Clayton.

It was a nostalgic time for about 350 of us. Of 187 professional staff working there before 1950, 16 returned to recall those exciting wartime projects which the best of Ian Wark's men – our section leaders – trusted to our abilities. In Wark's words, 'No other national chemical research laboratory of the day had so much encouragement and freedom, or such a talented and dedicated staff'.

We signed the visitors' book, labeled ourselves and recognised old colleagues, but suddenly we were called to order to follow the Augmented Sirocats Jazz Band (founded 1944) up the famous Burma Rd to beat the bounds, expunge CSIRO's ghosts before ARL's forthcoming takeover, and gather on the front lawn for the only ceremony.

Dr David Solomon welcomed us and recalled that it was mooted in the 1950s that we would move to Clayton. Some of us moved house, have recently retired and, in the case of Mineral Products at Port Melbourne, we are still waiting! Bryan Loft then read greetings from 12 colleagues celebrating their wake at exactly the same time in Perth (see below). Jim Aylmer, standing on a coffin-like box, gave a St Patrick's Day oration and introduced the guest of honour, Miss Jean McKenzie who, in February 1942, entered the laboratory as Dr Ian Wark's private secretary.

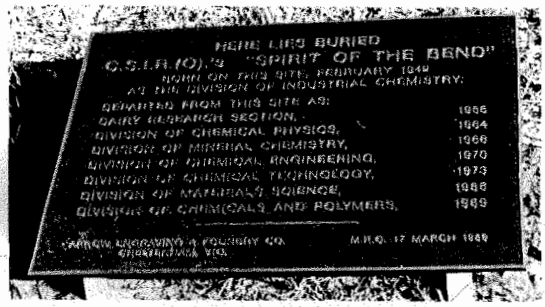
Jean unveiled a memorial plaque and reminded us that as we were standing outside 'C2' (Wark's office), 'it all started here'. The band, resplendant in blue caps and white lab coats trimmed with black, played the Funeral March; Band Master Restarick blew his whistle and led off the 13 ex- and present CSIRO bandsmen. We followed back to the canteen lawn, peering into deserted dusty laboratories – some converted 1946 army huts – talked, imbibed, remembered and listened to more music.

When we reluctantly drove out the gate, the Yarraville chemical plants across the Yarra were still silhouetted against the pink autumn sunset and a famous era came to a close for many Australian chemists.

John Moresby

Below, Sirocats leading the End of the Bend wake, 'beating the bounds'.

Below, the Spirit of the Bend memorial plaque unveiled by Miss Jean McKenzie.



In Perth, memories of the Bend live on

The closing of the Fishermans Bend site was remembered on the other side of the continent in an event timed to coincide with the on-site activities, thanks to daylight saving. With a three hour time difference, 11 former staff of the Chemical Research Laboratories sat down to lunch at 1pm WAST to hold a wake for The Bend.

The wake was organised by John Perdrix, who, with Don Swift, found 16 ex-Bendites now resident in WA. With no equivalent to Jimmy Watsons there, they settled for The Shents (Shenton Park Hotel), a local watering house, to enjoy lunch and a lot of talk.

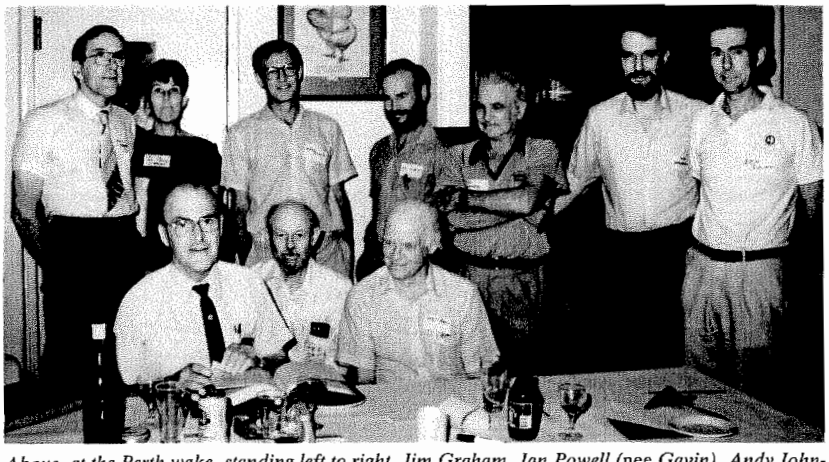
The toast to The Bend was drunk with a 1963 dry red from the Rutherglen Viticultural Station brought along by John who had bottled it in 1966. Appropriately, the luncheon special for the day was Irish Stew.

Two of the mourners had started at The Bend in 1946 and the last had left in 1972.

Many forgotten names and faces were revived when John produced the old staff register book. 'Do you remember...?' 'Yes, he was the one who used to...' Libel laws prevent the documentation of all these conversations and the recalling of events which took place 30-40 years ago.

Whether we hated it or loved it, our time at The Bend will live long in our memories.

John Perdrix



Above, at the Perth wake, standing left to right, Jim Graham, Jan Powell (nee Gavin), Andy Johnson, Rik Vigers, Bill Barker, Jack Harrowfield, Don Swift. Seated, left to right, John Perdrix, Ted Davis, Wilf Ewers. Graham Powell Johnson Vigers Barker Harrowfield Swift Perdrix Davis Ewers

Gray's Elegy viewed from the Bend

The curfew tolls the parting knell of day
The lowing herd wind slowly o'er the lea
The scientists homeward plod their weary way
And leave the Bend to darkness and to me.

The ships still ply the murky Yarra water
Where once corks did blow and sheep did drown
And folks did things they shouldn't oughta
And sadly once, a bridge fell down.

Full many a gem of purest ray serene
The dark unfathom'd caves of ocean bear
Full many a flower is born to blush unseen
And waste its sweetness on the desert air.

And there too, behind the hedge at 504
Some genii did rise to well deserved fame
And others muddled on for ever more
Whilst some did plagiarise to their eternal shame

Never at the Bend were glories wasted
The brightest eyes saw paths that others ne'er could walk
And discoveries – like Sirosip wines – were fully tasted
By those who worked so hard they scarce had time to talk.

But gone are the days of scientific ease
And the Bend and the 'drome are but memories
Along with shirt tails that like whips did crack in the breeze!

Don Swift
Division of Mineral Products
Perth

Report prepared on conditions of remote area CSIRO staff

Staff in all CSIRO's northern locations were visited recently by Ms Shirley Pipitone, for discussions on employment conditions – particularly those conditions specific to staff in remote areas.

Shirley, who is Assistant Manager Employment Conditions, made the trip last month.

Overall, Shirley found staff were happy with their work and conditions. In many locations, the initial reaction was 'but we are not really remote!' Interestingly, Shirley said they would then usually proceed to describe at least 10 reasons why they were remote – for remoteness (in conditions terminology) is determined not only by distance from major centres, but also cost of living and climate.

Shirley's visit started on 7 February with an early morning flight to Alice Springs. After discussions, she and Ken Parker had a quick lunch at the old Telegraph Station – one of Alice's tourist attractions. Shirley spoke with as many staff as possible including Grant Allan, Margaret Friedel and others emerging from the pool to face the heat of the afternoon.

Arriving in Katherine that evening, Shirley enjoyed some local culture – dinner at Aussie's Bistro with Jackie Chardon, Anna Palmer, Geoff Routley, John Sellwood and Mike Spillman. The next day saw a lively discussion of conditions issues, thanks to Cliff Thompson who made sure most staff could be present.

Shirley was pleased to find that staff in Katherine were fairly relaxed about their future despite the imminent closure of the station.

In Darwin on 9 February, the discussions were even more lively, with Dick Braithwaite, Terry McClafferty and Jeff Corfield being among the participants. Dick provided an excellent overview of what remoteness is all about. Shirley also said she had an interesting session with Elias Chacko talking about his research on mangoes, cashews and other tropical crops.

Only a few days into her trip, Shirley started to experience *deja vu* as the same issues kept popping up – some of the main ones being leave fares (dependency criteria, package tours, 'nearest capital city'), cost of living, availability of training and mobility.

Barry Richards, Jill Colefax and Shirley then drove to Kapalga where Shirley met Darryl Murphy and his wife Trish. With Manager Peter Pan Quee away, they are indeed isolated – the only company is the sound of the generator and the birds. On 10 February, Shirley joined the party accompanying the Minister for Science Barry Jones around Kapalga – a wonderful opportunity to gain an appreciation of the research being done by TERC staff.

The following week, Shirley visited the Atherton Laboratory – a very pleasant tropical clime, though marred by 'scrub itch' and the preventive measures staff have to take against it. As well as OiC Graham Harrington, Shirley spoke with Bernie Hyland, Bob Hewitt, Ian Webb, Les Moore and many others – including Nev Starkey keeping the weeds at bay in the Lab's garden.

Shirley spent half a day at Lansdown on 15 February, where Ron Dixon had assembled most of the staff for discussions over morning tea; then a day at the Davies Laboratory to renew acquaintance with John McIvor and meet some of the staff. Mike Whiting was one person Shirley was pleased to meet because she has spoken with him on the phone several times over the past eight years. In fact, Shirley said there were many instances during her visit when she appreciated being able to put a face to familiar names.

In Narayen on 17 February, Keith Gould provided a comprehensive tour so Shirley, Darby Butterick and Ann Smith could meet all the staff *in situ*, including Terry Smith on horseback and Frank Hochmuth on dozer. Ann was busy with preparations for the Narayen Open Day. Lys Gould gave Shirley some useful comments including a woman's view of life at Narayen.

Shirley returned to Canberra on 18 February with a great deal of background information useful for reviewing remote locality conditions. She felt her visit had been most valuable in increasing her understanding of CSIRO people and places in the Northern Territory and north Queensland. Shirley also said many staff had expressed their appreciation of her visit, commenting that she had 'put a face to the Human Resources Branch'.

Shirley has prepared a full report on her visit with recommendations for action on the major issues raised. A number of issues already are scheduled for review, starting with dependency criteria, the air conditioning subsidy, Northern Territory rentals and leave fares. Staff in the Employment Conditions Unit are also following up a wide range of individual issues and requests for advice.

IRN has a new look

April has seen the publication of a revamped *Industrial Research News*.

Full colour front and back pages and a full colour centre are the most obvious changes. Added to this, changes in typeface, headline style and page design have given the magazine a completely new look. Editor Brian Harding has also reduced the average length of the news items.

'These changes are intended to give the magazine greater industry appeal,' said Brian. 'The next step is to increase our distribution drastically – there's no reason why a wide ranging publication like IRN shouldn't have a circulation of 20 000,' he added.

IRN

CSIRO child care centres

Work based child care is being introduced at three major CSIRO sites, following allocation of funding.

The proposed child care centre at North Ryde will receive a total of $250 000 over two years to get started, after which it will become self funding.

At Bradfield Park a community based centre in co-operation with the Kuringai Council is expected to open in June, while at Black Mountain a survey has been conducted to determine the demand there, as a lead up to establishing a centre next year.

The EEO sub-committee has pressed for child care centres since its inception, and the concept has been supported by the CSIRO Board.

The North Ryde centre has been held up somewhat because of problems finding a suitable location, however it is likely to be operating some time next year. More details about the centres will appear in a future issue of *CoResearch*.

Results soon from CoResearch survey

About 420 staff members have responded to the 1989* CoResearch *survey, and collation is well underway.

By far the greatest number of responses have come from scientists, followed by technicians, administrative staff and others. Early results show strong support for the continuation of* CoResearch *across all classifications: i.e. on a count of over 200 scientists so far, 94 per cent want* CoResearch *to continue (although that is not to say that they are all completely happy with it). Of more than 50 replies from administrative staff counted so far, all but two say they want* CoResearch *to continue, while of the 60 technicians counted so far, 50 would like to see it continue.

The survey has shown up several misconceptions about* CoResearch, *such as the apparent belief that it is put together by a team of people, when in fact only one person works on it, or that the editor doesn't actively seek contributions. The report on the survey will include some information about how* CoResearch *is produced, for those who are interested.

Thanks to all who have taken part in the survey.

WA Wheatbelt

Native birdlife research strengthened with community involvement

Earlier this month, ABC's Four Corners program predicted that 1989 would be 'the year of the environment', with environmental issues attracting the concerned attention not only of the 'greenies', but of all Australians.

Community interest in the environment does seem to have increased, and the impact of man made environmental changes on our unique wildlife is one subject of particular concern.

A CSIRO ecologist in Western Australia has involved the local community directly in his environmental research, to good effect. Dr Denis Saunders, OIC of the Division of Wildlife and Ecology's WA lab, is in the midst of a major survey of birdlife in the WA wheatbelt with the help of a number of enthusiastic volunteers.

The aim of his project is to identify the changes in the bird fauna associated with clearing and agriculture, and to devise a management plan to halt the decline of those species facing extinction in the wheatbelt.

Native vegetation has been reduced substantially in recent times, and not surprisingly this has led to changes in bird populations and distributions. The wheatbelt covers some 140 000 sq km, and only seven per cent uncleared land now remains in the region.

The number of birds almost exclusively dependent on native vegetation for food and shelter has now reduced dramatically and in fact about 14 have disappeared from some areas of the wheatbelt. Other species have benefited from the new conditions, especially from the increased food supplies in the agricultural areas and from greater access to water. For instance, while Carnaby's cockatoo has disappeared from a large part of its former range, the galah has colonised the wheatbelt from the adjacent pastoral area.

The data gathering part of the project, which started in May 1987, will run until the end of this year. Volunteers assist by providing details of bird distribution in their areas. They use a check list of 177 birds known to have been in the area in the past, noting when and where particular species are sighted.

Dr Saunders is very pleased with the results so far. The data are getting better and more comprehensive each year, and now the average number of identifications of species per person is about 57 compared with 46 in the first year. Newsletters are produced to keep volunteers informed about the progress of the research, and this feedback has further stimulated interest in the project. The newsletters also give tips about accurate identification of birds, from Perry de Rebeira, a Senior Technical Officer in the Division.

Data are being entered continuously back at the laboratory at Helena Valley and a useful picture is emerging of the changing patterns.

About 250 people have been involved in collecting data over the whole area of the wheatbelt. Dr Saunders has encouraged interest in the project by visiting small towns in the region and talking to local groups or attending country shows with a display.

The youngest participant is 11 and the oldest 78. Apart from the data collected and recorded in the checklist, Dr Saunders has also recorded a lot of anecdotal history, particularly from the older volunteers who remember the presence of various bird species at various times. The project is helping to foster conservation in the agricultural areas. Dr Saunders believes that without community involvement, conservation policies would be unworkable in the area.

Two Earthwatch expeditions during 1988 also assisted the project.

Earthwatch is a US-based organisation concerned with international scientific research, and expedition participants are volunteers who pay their own way and contribute to the cost of the research in which they are involved.

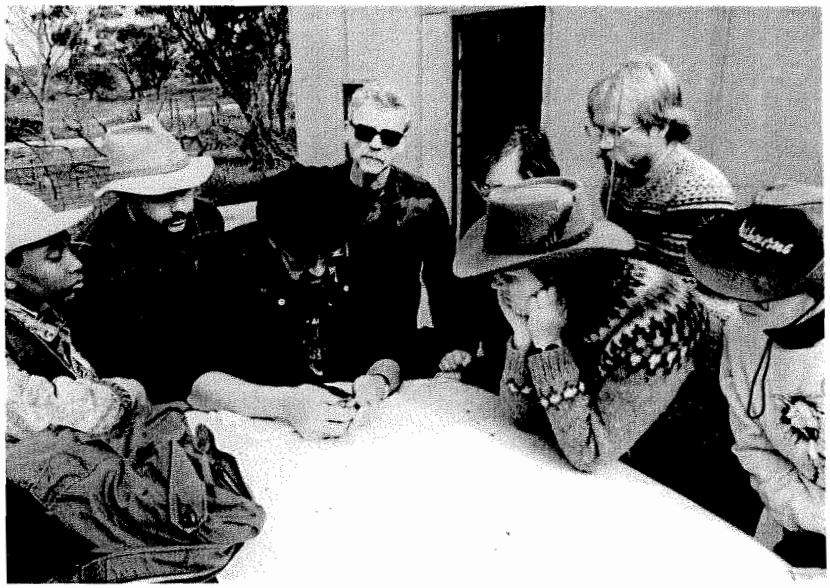
The WA expeditions, each of 14 people from several countries, examined the movements of birds around areas of fragmented native vegetation and also assisted in a census of kangaroos in remnant vegetation and along road verges as part of a project conducted by Dr Graham Arnold of Wildlife and Ecology. Dr Saunders said the two week expeditions each provided the equivalent of about seven weeks of work by the small group of CSIRO staff involved in the bird project.

Bird banding was one of the principal activities. Two CSIRO bird banders worked with three volunteers each at a series of banding sites. Mist nets were used to trap the birds and these were checked at regular intervals. The volunteers each rotated this activity with other projects such as the kangaroo census.

The kangaroo project is also examining the changes to the kangaroo population with the advent of agriculture.

Dr Saunders said a lot of analyses were needed of the results gathered from both the birdwatching exercise and the more concentrated Earthwatch expeditions, but what is already emerging is a detailed picture of the changes wrought by man to our native fauna.

'...without community involvement, conservation policies would be unworkable in the area...'



Senior technical officer Perry de Rebeira dissects a road-kill for an impromptu lesson in avian physiology, during one of the Earthwatch expeditions. Left to right, Roger Davis, Steve Freiberg, Perry, Dick Rahe, Linda Vainomae-Hoffman, Mandy Rashleigh, Kurt Wollenberg and Donna Lefevbre.

Joan gets silver teapot for years of service

Malcolm Robertson at Headquarters marked the retirement of tea lady Joan Watts with a charming memento on behalf of staff.

The Silver Teapot Award inscription said staff had appreciated her 'dedication and skill in maintaining morale over many years through the delivery of a timely and refreshing tea and coffee service'.

Left, Malcolm Robertson of the corporate planning section presents the unique memento to Joan.

New apprentices shine at North Ryde

While it's no doubt widely recognised that CSIRO trains apprentices to become skilled members of the workforce, the valuable contribution made by CSIRO apprentices to research projects and maintenance programs may not always be appreciated.

Two new CSIRO apprentices, shown above, have already proved their worth. Vanessa Honan, left, and Aaron Holborrow started their apprenticeships at North Ryde with the Site Engineering Services group (serving the divisions of Coal Technology, Exploration Geoscience and Mineral and Processing Engineering) on 30 January this year, after completing one year TAFE pre-apprenticeship courses.

In the few weeks since her arrival, Vanessa – a carpentry apprentice working under the guidance of Kevin Malone – has had substantial involvement in the construction of an impact testing rig for coal briquettes.

Aaron, who is a fitting and turning apprentice working under the guidance of Nigel Imre, has manufactured perspex cradles for use in ultrasonic baths.

Vanessa, Aaron and five other North Ryde apprentices will not only be great assets to the site during their training, but should look forward to rewarding careers when they take their places in industry.

Vale David J Brett

David Brett, training officer in CSIRO's Centre for International Research Co-operation (CIRC), died suddenly in Adelaide on 8 April 1989.

David Brett

David was born in Isleworth UK and as a young man migrated to Australia to take up jackerooing in northern New South Wales. In 1959 he joined CSIRO's Pastoral Research Laboratory in Armidale where he worked briefly as a technical assistant before transferring to the University of New England, working part time as a technician and studying part time for his BSc.

On his return to CSIRO in 1965, David was promoted to experimental officer. He moved to Queensland in 1968 where he worked initially at the Beef Research Unit at Samford and later at the Cunningham Laboratory at St Lucia.

David's experience and skills in animal husbandry and associated experimentation using advanced analytical techniques led him to accept the position of laboratory manager at the CSIRO Project for Animal Research and Development at Ciawi, Indonesia, in 1975. He lived and worked in Indonesia for six years, the last two as co-ordinator for training of all Indonesian scientists, technicians and administrators attached to the project.

In 1981 he returned to Australia and assumed the position of CIRC training officer. During these last eight years of his life, David became known and recognised throughout CSIRO and many other Australian institutions and organisations, particularly for the enthusiasm and vigour with which he pursued his job of placing and looking after trainee scientists and technicians from developing countries. David did much to raise the international profile of CSIRO overseas and was greatly respected by those with whom he interacted, in United Nations agencies, other national and international aid agencies and foreign governments.

David is sadly missed, not only by his immediate friends and colleagues here in Australia, but also by the hundreds of young scientists and technicians overseas, his extended family, to whom he was adviser, confidante and guardian, during their periods in Australia.

Friends and colleagues from CSIRO wish to extend their deepest sympathy to David's wife May and children Timothy, Megan, Richard and Nicola.

Barry Filshie

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Obituary

Jack Cotterill: jack of trades

The following tribute to the late Jack Cotterill, formerly with central maintenance and later chief CSIRO purchasing officer based in Canberra, has been contributed by Dr Wilf Crane of the Division of Forestry and Forest Products. Apart from his 30 year career with CSIRO, Jack was a pioneering aviator, and founded the Canberra Aero Club 50 years ago.

'My first meeting with Jack was in the pits of a car racing circuit at Longford in Tasmania, when I was 18. Jack drove with the touch and ability, not only of someone with talent, but also as the person who had built the engine and prepared the car; he always finished with himself and machinery intact.

This was true of his 50 years of experience in aviation before, during and after the war. He taught hundreds of people to fly, and in many thousands of flying hours never bent or damaged a machine. He did, I know, have to land in the grounds of Government House once with a mechanical problem, but he never had an accident.

As a mechanical engineer, Jack was uncanny. He sat a certificate exam with GMH in Melbourne while with CSIRO and no-one ever exceeded his mark. He could diagnose a problem in an engine by just listening.

Jack's ability with machinery and his genius for 'making do' doubtlessly came from his rural roots at Bombala in the southern tablelands of New South Wales, where he was born.

In the late 1950s, Jack took an engine from a fire pump – the Coventry Climax – and first enlarged it from 1500 to 2000 cc by boring the cylinders. He then 'stoked' it to 2.5 litres. Stoking is something few engineers today would contemplate, even with the help of computer controlled lathes. It involves lengthening the travel of the pistons in the cylinders by machining a full new crankshaft, starting from unshapen steel.

The resulting engine in a Cooper car was so powerful that it broke an axle in the warm up lap at Longford. The start was delayed 20 minutes while Jack fitted a new axle and then, as he remarked, 'they didn't really see which way we went'. It took till the next season for anyone to catch up. With Alex Mildren and a Cotterill-tuned Cooper-Maserati, they won the Australian Grand Prix in Queensland in 1960.

Jack left the RAAF after the war as Flight Lieutenant and acting Wing Commander, and joined CSIRO. There, his multiple talents, including flying, were used for the next 30 years.

Jack flew with many of the leading scientists of the day to research sites all around Australia. One scientist with fond memories of Jack was Max Day, an entomologist who later served as a member of the CSIRO Executive. Jack flew while Max collected insects at altitude.

Jack's long time friend and associate, Ken Prowse, describes Jack as a tower of strength in CSIRO. Any problems – 'we got Jack'.

Next to his family and friends, flying was Jack's lifetime love. He learnt to fly at Kingsford Smith aerodrome in 1932 and aviation was part of his life until the day he died. I flew with him on his 80th birthday and he had the true touch of someone who was as one with the machine.

He flew over 10 thousand hours in Avros, Ansons, DH Dragons, Moths, Oxfords, Piper Wirraways, Hudsons, Catalinas, Canberras, Cessnas and many others, including a "Flying Ant" which he built himself. Several years ago, Jack gave me his leather flying helmet, still with the voice tubes. I couldn't have a better memento of him.

Jack packed a lot into 80 years. He was in his early years a member of the "Light Horse". He and his wife Teen built a house on the then outskirts of Canberra, at Ainslie!, and lived simply and unpretentiously raising a family in the Depression years.

During the Depression, Jack planted trees in the hills around Canberra, supplied firewood by contract to the Canberra bakery, and later ran a fish shop for which he flew his own fresh fish up to Canberra from the coast. Jack was also a keen amateur fisherman. He built one of the first domestic solar heaters (CSIRO design) in Canberra.

He did all these things and more in apparent unhurried, thorough and timeless style.

Jack's era in CSIRO was one in which we were close to the rural industry. It was the era when myxo, rust-free wheat and improved pasture were introduced and CSIRO helped build the foundations of the wool industry. Jack was a jack of trades and his innovation and multiple talents were the hallmark of CSIRO at that time. Few could forget his kindly smile and ready help to any, in any situation. I doubt any knew him in anger.

For all who brushed with him, may I express to the joy of having known him and at the same time join his family in saying Vale Jack Cotterill.'

Alick Lascelles retires

Former Chief of the Division of Animal Health, and latterly CRS at the McMaster Laboratory, Dr Alick Lascelles, has retired.

He became Chief in 1974 following a career as researcher and teacher in several universities.

Dr Lascelles is an international authority on veterinary immunology and has published over 100 papers.

***CoResearch* is produced by the Public Affairs Unit for CSIRO staff. Readers are invited to contribute or offer suggestions for articles. The deadline is the last Monday before the issue month. Editor: Liz Tynan, PO Box 225, Dickson ACT 2602. PH: 062-48 4479.**

CoResearch

No. 323 May 1989 CSIRO's staff newspaper

Australia's National Museum needs friends

The history and achievements of CSIRO will be among the many features of the National Museum of Australia in Canberra – when the project gets back on its feet.

Funding for the Museum has stalled and a new group called Friends of the NMA has been formed to gather community support to urge the Government to fulfil its obligation to create an Australian cultural museum.

Jack Thompson, Australian actor and member of the NMA Council, was in Canberra recently to attend a major promotion by the Friends of the NMA. He said that it would be impossible to have a national museum without a CSIRO section.

'The history of Australia over the past 100 years has been the history of a technological society. Australia has made significant contributions to world technology, much of it through CSIRO,' he said.

'As in music, film, publishing and so on, it seems we have made a disproportionately large and vital contribution to scientific research and innovation, considering our population.'

CSIRO is one of a number of organisations targeted by the Friends of the NMA as appropriate for support of the concept of the Museum – a concept which Mr Thompson equates with America's Smithsonian Institute.

For details on how CSIRO staff can join Friends of the National Museum, and a little about the project itself, turn to p.8.

The Budget
A divisional perspective

Dispute about the CSIRO appropriation budget is continuing. Chief of the Division of Entomology, Dr Max Whitten, who has been at the forefront of comment on the budget, is questioning the 'official line', saying that we are far worse off than we are led to believe by figures announced by Government. In conjunction with his administrative staff, he has prepared figures which indicate that, even with the science and technology package unveiled this month, CSIRO is many millions of dollars behind the 1987/88 budget. Dr Whitten has shown the figures to CSIRO management, who question the inclusion of the four per cent second tier wage increase and the 1.25 per cent efficiency dividend. However, Dr Whitten says these elements result in reduced budget capacity at the divisional level. He has offered his calculations to CoResearch to give a divisional perspective on the budget.

The capacity for CSIRO divisions to deliver results has been severely – maybe irreparably – damaged by the cutback in appropriation, according to Dr Max Whitten.

Even after reducing staff in 1987/88 and 1988/89, his Division is facing a shortfall of at least $800 000 as it enters the next financial year, and earlier this month he was faced with the painful task of identifying 12 positions which would have to go in 89/90. This was 'just the tip of the iceberg', he said.

Dr Whitten said the 87/88 budget figures provided by the Government failed to include adjustments to convert the 87/88 budget to 88/89 dollars and also the impact of the second tier wage increase and the efficiency dividend, even though these represented real costs to divisions. For a proper comparison between 1987/88, the current financial year and the next two, it was essential, he said, to convert the running costs to 88/89 dollars and to take into account the wage increase and efficiency dividend (see table below).

Cont. on p.6

CSIRO Appropriation Budget Summary 87/88-91/92
(Using figures provided by Government on 9 May 1989, with 87/88 figures adjusted to 88/89 dollars)

	1987/88	1988/89	1989/90	1990/91	1991/92
1. Annual 2. 4% 2nd tier 3. 1.25% ed†	336.6 9.0* 3.7*	324.9	327.5	327.5	327.5
4. Capital	29.9	23.1	16.1	16.1	16.1
5. Govt allocation 9/5/89			14.0	19.0	19.0
6. Total Govt appropriation	379.2	348.0(-31.2)	357.6(-21.6)	362.6(-16.6)	362.6(-16.6)
7. Revenue (component of appropriation budget)	35.5	37.3(+1.8)	23.0(-12.5)	21.7(-13.8)	29.9(-5.6)
8. Total approp. budget	414.7	385.3(-29.4)	380.6(-34.1)	384.3(-30.4)	392.5(-22.2)
9. Total approp. (without effects of 2nd tier & 1.25% ed)	402.0	385.3(-16.7)	380.6(-21.4)	384.3(-17.7)	392.5(-9.5)

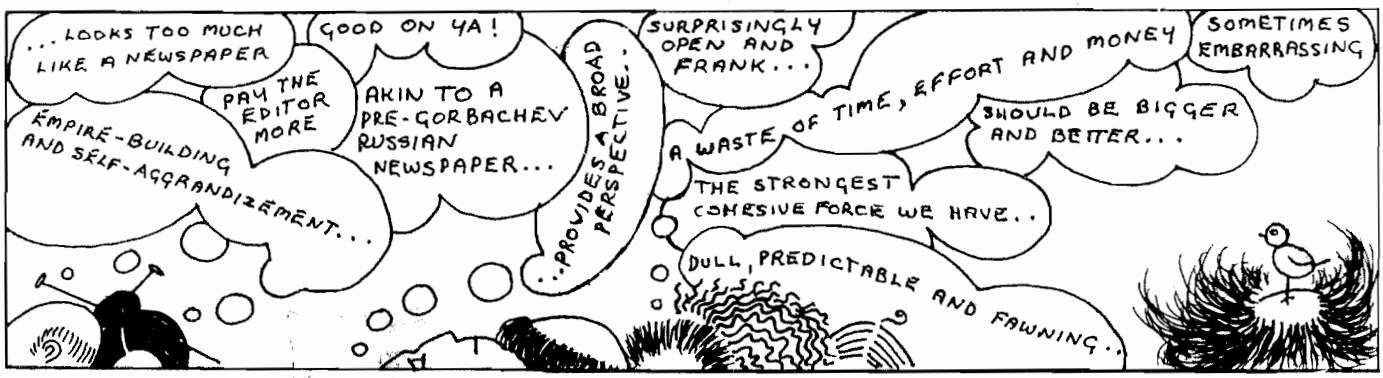
† 'ed': efficiency dividend
N.B. Reductions/additions from 1987/88 shown in brackets.

Russell Clements
Narayen field day

The Division of Tropical Crops and Pastures recently held a highly successful field day at its Narayen Research Station. Pictured above at the event, Division Chief Dr Bob Clements and researcher Dr John Russell. A report on the field day appears on p.6.

'Not a publication anyone would buy...'

Well, fair enough, but who would buy any staff newspaper on the open market? CoResearch readers responded in their hundreds to the 1989 survey, and a small sample of comments appears on pp.4 and 5 of this issue. Anyone who can think up a way to reconcile all the vastly different opinions can have the editor's job. Happily, the great majority of readers wouldn't like to see CoResearch axed, so that probably means we won't have to resort to flogging it on the news stands in order to keep going.



From the Chief Executive

A column by Dr Keith Boardman

The role of science and technology in improving the economic performance and social and cultural wellbeing of Australia has at last been publicly acknowledged by the Federal Government with the release of the Science and Technology Statement by the Prime Minister.

The appointment of Barry Jones as Minister Assisting the Prime Minister for Science and Technology will allow the Minister for Science, Customs and Small Business to have an important influence beyond the DITAC portfolio. The formation of a high level Science Council chaired by the Prime Minister and the appointment of an eminent scientists, Professor Slatyer, as Science Advisor should raise the profile of science.

The Prime Minister's Science Council will provide a much needed forum for Ministers whose portfolios have significant science and technology components to discuss important issues with senior representatives from the science and technology community.

An important component of the Science Statement is the extension of the 150 per cent tax concession for business enterprise R&D.

The measures are very welcome, but they can only represent a start to greatly improving Australia's R&D effort. Much will depend on the response of the private sector, and CSIRO has a central role in providing a strong strategic research base, which will be of increasing importance as industry's R&D effort expands.

The extra funding for CSIRO of $90 million over five years was welcome, but disappointing in that it fell well short of the $300 million over five years needed to restore CSIRO appropriation to the real level of 1982/83. CSIRO will benefit, however, from the extension of the 150 cent tax concession and the earlier Government decision to allow CSIRO to receive external funds without penalty to its appropriation funds.

For the first time, CSIRO has guaranteed appropriation funding for three years, which will enable us to plan with certainty.

At the time of the Prime Minister's statement, Mr Kerin announced the establishment of a Primary Industries and Energy Research Council. The new Council is sure to have ramifications for CSIRO as well as the Rural Research Funds, particularly our interaction with the Department of Primary Industries and Energy.

I do not wish to underestimate the problems facing CSIRO in the coming financial year. Declining appropriation funding over the past few years and the decision of Government not to fund the four per cent second tier wage increase have meant substantial staff reductions, but still we have not reduced staffing levels sufficiently. We have been able to minimise staff reductions by using one-off revenue earnings, e.g. sale of property and bank not royalties. This situation cannot continue and we must achieve a more appropriate salary/operating ratio.

One of the aims of the Science and Technology Statement was the promotion of careers in science and technology. But much more is needed to convince graduates to undertake research careers. Many young researchers in the universities and CSIRO are now employed on short term appointments with little career security. The attractiveness of careers in CSIRO is being further eroded by the numbers of early retirements and retirements.

It is understandable that morale in CSIRO was adversely affected by the false press reports of early staff retrenchments of 500 in order to overcome a budget shortfall and improve the salary/operating ratio. The recent message to staff from the CSIRO Board makes it clear that the emphasis on achieving changes in total staff numbers will be on redeployment, retraining and natural attrition.

The need to remove the distinction in employment conditions between appropriation funded and industry funded staff has been recognised for some time. Institutes and divisions will be required to move to staffing structures which remove the distinction, but retain sufficient flexibility by having an appropriate percentage of staff on fixed-term appointments. We will also be discussing with the unions the introduction of some 'roll over' appointments as suggested by Mr Jones in a letter to the Chairman. Under the rolling appointments scheme, scientists would be employed on four year contracts, then told every two years whether the contracts would be extended for two more years.

M Keith Boardman

Letters to the Editor

Dear Editor,

The award for Understated Euphemism (the opposite to Football Commentators Tautology) has gone to the CSIRO Executive Committee. They achieved this by using the phrase 'the need for budgetary adjustment' to describe the impending loss of 500 staff in response to a $21 million shortfall in revenue (Executive Committee circular 19/4/89). It was a split decision though, as many of the judges preferred the phrase 'a re-arrangement of bricks' in reference to the bombing of Beirut.

Our [acting] Chief Executive Dr Colin Adam made a strong showing when interviewed by the *Sydney Morning Herald* 21 April 1989, but was excluded on a technicality. He described the revenue shortfall as representing only a few days spending for CSIRO, and indeed a rough calculation revealed we do spend $1.2 million per day (including weekends) and thus he was not totally wrong.

The clear message for all aspirants to the corporate hierarchy is, never deal with any issue in human terms but keep sharply focused on the re-arrangement and re-arrangement and re-arrangement... of positions, dollars and bricks.

Robert Dobson
Division of Animal Health
Sydney

Dear Editor,

I would like to draw attention to an inconsistency in Dr Boardman's column in the March *CoResearch*. Dr Boardman states that 'the additional $5 million provided for the purchase of new equipment in the current financial year enables a start to be made in overcoming the backlog in the replacement of obsolete and unreliable equipment'. In practice, $1.2 million of this money, as I understand, was used to purchase an additional NMR machine to be housed at North Ryde, alongside existing NMR machines which are neither obsolete nor unreliable.

Alister K Sharp
Food Research Laboratory

Dear Editor,

'Chief Accountant, it has come to my attention that you have been leading me up the Nile.'

'Really, Your Majesty?'

'Yes, Chief Accountant. I had a visit today from a member of a rival Guild to yours. He says you accountants have got it all wrong.'

'How can that be, Sir?'

'He says you can only discount money. You can't discount eternity, nor do bequests to my grandchildren imply a negative discount rate!'

'He lies, My Lord.'

'I don't think so, Chief Accountant. He made the matter quite clear. If the value of something increases faster than the discount rate, it makes sense investing in it now. The value of eternity seems to me to get bigger and bigger as the years go by.'

'I see that now, Your Majesty. But what about bequests to your children and grandchildren? Surely the value of the bequest gets less as they get older?'

'You have a point, Chief Accountant, but it all depends on the nature of the bequest. For example, the value to me of elephants in 20 years' time (so that my grandchildren can see them) is much greater than their value now (because I have already seen them). There is also a lag effect: my greatgrandchildren will only be able to see elephants if my grandchildren can. We must have continuity, Chief Accountant.'

'Tell me, Your Majesty, what is the name of the Guild of which you speak?'

'They call themselves "economists". I think they really are the guardians of the future.'

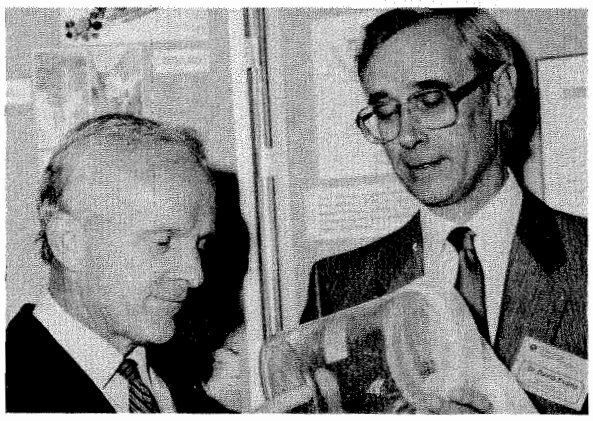
'Uh...'

'Yes, Chief Accountant. You're fired!'

Peter Cox
Cotton Research Unit
Narrabri

***(Editor's note: this letter is in response to David Erskine's article, Discounting Eternity, in the March issue of* CoResearch.)**

Million dollar deal between Ento and ICI



Left, Senator John Button comes face to face with the world of insects, at the Division of Entomology. Showing him the way is the deputy Chief of the Division, Dr David Evans.
Photo: Alan Edward

The Minister for Industry, Technology and Commerce Senator Button officiated at the signing of a research agreement this month between the Division of Entomology and ICI.

The signing established a million dollar agreement to research a genetically engineered viral insecticide.

ICI will provide $560 000 over three years, to add to the Division's contribution and funds from three rural research councils. ICI Australia's Research Group is funding the project in collaboration with ICI Agrochemicals in the UK, which will access the international market.

The interest of ICI was attracted by the world class track record the Division has established in biological control and molecular biology. The new agreement will concentrate on a major pest – *Heliothis armigera* – and the use of a naturally occurring, environmentally safe virus known to be deadly to it.

***Heliothis* is a major pest in Australia and worldwide causing damage worth hundreds of millions of dollars, mainly to cotton crops, though maize, sorghum, sunflower and vegetable crops are also vulnerable. The bug is showing signs of resistance to pyrethroid insecticides now being used.**

Senator Button had not visited the Division before, and the Chief Dr Max Whitten and deputy Chief Dr David Evans took the opportunity to set him along the path to 'becoming an entomologist'. The Senator has always been most closely identified with high tech and manufacturing industry rather than agricultural or biological research.

At the ceremony, Senator Button was presented with the book *Butterflies of Australia* as part of his education in entomology. Senator Button also pleaded with the entomologists to understand something of the ways of politicians.

A Matter of Opinion

Back to the present

Ralph Young of the Corporate Planning Office replies to David Erskine's article in the February issue of* CoResearch, *Discounting Eternity. Another response to Mr Erskine's article appears in the Letters to the Editor section on p.2.

David Erskine's amusing parable on the effect of applying discount rates to evaluate different forms of expenditure serves the cause of humour well but abstracts from reality so much that I fear the cause of research evaluation may be ill served.

I would like to add some qualifications to David's note because it seems clear that only part of the message got through in my talk at Griffith.

A piece of gold today has the same value as another identical piece of gold today regardless of what it is spent on. The Chief Accountant of the parable does not seem to subscribe to this truism because he states: 'A piece of gold spent on an asset that is unusable until far into the future is worth a lot less that a piece of gold spent for immediate consumption'.

But a dollar (currency) today is generally viewed by most people as being worth more than the same dollar in 20 years, or indeed any time in the future, regardless of inflation rates. This is because each of us has the opportunity to invest the dollar today and reap the expected returns so that a dollar now may be worth $2.65 in 20 years' time assuming an annual return of five per cent.

Correspondingly, one dollar in 20 years' time is worth only 38 cents today (it's present value). Alternatively, we could spend the dollar today on consumption ('eat, drink and be merry') and most individuals would choose this over the same dollar's worth of consumption in 20 years' time, even assuming a zero inflation rate.

What this means is that if the king decides to spend his gold on a pyramid today rather than consumption today, he has at least implicity evaluated these alternatives and decided that investment in a pyramid has greater value for him than eating, drinking and being merry, even though the benefits may not accrue until His Majesty passes on.

We make similar decisions every day when we decide what we are going to spend our limited funds on, whether it be on consumption or investment. It does not mean that 'what happens in the far future, even eternity, is as nothing compared to consumption now'. Not if you decide otherwise. We, as taxpayers, may of course ask the king, at the risk of being attacked in the local press or worse, about the value of his investment. We may even suggest to His Majesty that it would have been better to invest in scientific research.

Future benefits

To demonstrate this view, it would help if we had an evaluation framework enabling us to compare the value of these alternatives. To make past and present costs comparable to future benefits, we need to value them at a single point in time, and usually this means discounting future values back to the present and compounding past values forward to the present.

This point was vividly illustrated during the heated debate on alternative sites for the third London airport being considered by the Roskill Commission, one of which required flattening the priceless Norman church of St Michael at Stewkley. A correspondent to the *London Times* commented 'the £100 spent on building a church in 1182, when discounted at 10 per cent to 1982, represented roughly £1 300 000 000 000 000 000 000 000 000 000 000 000'! (Thanks to Don MacRae for drawing my attention to this example).

Although the Chief Accountant may only be concerned with an economic criterion for comparing benefits and costs, the king (or research manager) should ideally take account of other criteria when evaluating alternative opportunities for spending limited funds. These may include relevance to royal priorities, feasibility, and, in the case of scientific research, scientific merit.

When it comes to very long lived projects, a question of equity between generations arises. It may be that the economic criterion will have to give way to equity if the king decides the equity criterion is more important.

The key is to compare the value of different opportunities using the different evaluation criteria. To address that issue, perhaps David Erskine's Chief Accountant will offer us another parable. Alternatively, if you are a research manager, you could opt to participate in one of the research evaluation workshops being offered by the Corporate Planning Office via the Employee Development Unit and most Institutes.

World first

Do it yourself gluten test

People unable to eat foods containing gluten soon won't have to rely on trial and error to manage their diets. The Wheat Research Unit has come up with the world's first home test kit for the detection of gluten in foods.

Scientists Dr John Skerritt and Ms Amanda Hill have been the prime movers in developing the kit, in collaboration with Queensland biotechnology company Qlone. Several months ago the company also released a laboratory test kit designed by the scientists and based on the same principles.

The breakthrough is in the tests being equally effective on raw and processed/cooked food, using monoclonal antibodies which bind to the gluten proteins in wheat, rye and barley (though not to maize and rice which are non-toxic to gluten sensitive people). These antibodies react with the heat-stable portion of gluten, allowing reliable results from cooked and uncooked food.

The kit is designed for home use by people suffering from coeliac disease which is an intolerance to gluten, and those who are allergic to the substance. Also, dietitians, gastroenterologists and food manufacturers will benefit.

Coeliac disease, which was first described in ancient Greek times, damages the small intestine and has been known to cause death by malnutrition. It was only after World War II that doctors first noted that gluten was the culprit. Bread had been scarce in Europe and many people who had this mysterious disease got better.

Allergic responses to flour usually involve respiratory and skin reactions.

The gluten test kits have recently undergone field testing among about 60 gluten sensitive people, dietitians and food companies in several states. The kits are the size of a small lunch box and contain tubes, samples and instructions for a five stage test taking about five minutes and no more complicated than a home pregnancy test. A simple colour system indicates whether the food is safe for a gluten sensitive person. The laboratory test gives a more detailed estimation of the gluten present.

At about $3.90 per test, the 10-test kit will retail at around $39 and will be available in a couple of months. A smaller kit, about the size of a cigarette packet, could be developed for people to use in, say, restaurants, where the composition of the food is unknown.

Field testing has indicated the need for some slight refinements, such as the inclusion of a cardboard stand for the test tubes. Dr Skerritt said some of the older people who tested the kit were a bit daunted at first by the instructions and all the tubes, but they became confident in mastering the technique after only one or two tries.

Qlone provided some support for test development, and will pay royalties to CSIRO on sale of both the home and laboratory test kits. The test has been trialled by several European countries and the USA, and considerable interest has been reported. The laboratory test has been on sale overseas for several months.

The kits are the result of work started in 1983, when Dr Skerritt's group was formed with the aim of using immunological methods in the study of the proteins of wheat. This evolved from basic work on using antibodies to study cereal protein structure and function.

Dr Skerritt said the development of the gluten test kit was part of the group's overall strategy to examine a range of improved methods and tests for plant breeders, manufacturers, regulatory bodies etc, who deal with foods, especially those based on wheat and starch. Work on the gluten test kit has provided considerable experience to Dr Skerritt and his group in seeing research through from the experimental to the manufacturing stage.

One of the major projects now underway is developing improved testing methods for determining the presence of pesticides in wheat – of increasing importance for exports. Industry has provided funding for three experimental scientists for this project.

###

Pye lab hosts BHP Awards launch

Above, Dr Alan Castleman, Chief Executive of the VFT Joint Venture, is on secondment from BHP, and he described the new awards at the launch.

The tree-planted courtyards of the Centre for Environmental Mechanics' Pye Laboratory provided the setting for the ACT launch of the BHP Science Awards.

Both BHP and CSIRO seized the occasion to stress their commitment to fostering the identification and development of the scientifically talented.

Hosted by BHP, the function brought together BHP staff, CSIRO chiefs and education program staff, and Canberra science teachers, to launch the expanded awards scheme.

Keynote speaker was Mr Barry Jones, Minister for Science, Customs and Small Business, who emphasised the need to arrest declining enrolments in science based courses and to ensure a next generation of scientists.

'Both government and business could do more to avoid the "begging bowl" status of some of our greatest contributors to the community – the talented PhD student,' said Mr Jones.

Mr Jones stressed the importance of raising the low level of scientific literacy in the community, saying that one of the best ways of doing this was through the participation of young people.

Also officiating at the launch was CSIRO Chief Executive Dr Keith Boardman, who said unless the scientific literacy of the entire community was raised 'we will be unable to convince it of the necessity of a strong science base and will encounter growing resistance to the introduction of new technologies.

'We will also risk becoming an increasingly divided, unhappy, undemocratic society, because the majority of the

Cont. on p.6

THE CoRESEA
Readers ha

Well over 400 people responded to the survey in the February issue of *CoResearch*. Many of them offered comments on various aspects of the paper, and these have been included in a report prepared to show senior CSIRO management what staff want from *CoResearch*. A cross section of quotes is published in this feature, to give a small taste of the range of views presented. Incidentally, I realise I leave myself wide open to complaints about squeezing too much in, but they represent only about one-eighth of comments received, and I think they are important and enlightening.

In general, how do you rate the format?

I have always found *CoResearch* to be useful and enjoyable, no matter what the format.

It is at its best when provocative, but the most interesting things are often lost because of the page layout.

Looks too much like a newspaper and is hard to read...

After many years of being associated with CSIRO, I find *CoResearch* very useful in keeping me interested.

Content good, format fair. Should be either A4 or more like a newspaper in size.

There is no need for change. Let's retain some tradition.

It has improved enormously over the last two years.

Better but not good enough.

Does CoResearch succeed in its aim to enhance the flow of information?

It's the only publication which provides a broad perspective.

Often much better than our own internal communication system.

Good for divisional information not usually available on the grapevine. Often duplicatory and out of date on major events, corporate centre edicts, etc.

The recent increase in editorial independence/initiative has increased its usefulness as a complex of opinion.

It presents a very unidirectional flow of information, pushing the corporate image.

It's OK if you're a PhD.

Articles are clearly written and concise.

Full of executive types blowing their own horns.

It does not succeed in conveying the environment of this division at least.

It serves HQ propaganda.

Do you find CoResearch interesting to read?

Opinions and letters the most interesting parts.

Reads more like an official promotional brochure.

Yes, but only because it interests one to see how our leaders really do believe their own propaganda.

Curate's egg.

From the Chief Executive and letters to the editor have a boring sameness to them. You could swap any of these with other issues and nobody would notice.

The writing is dull and stodgy and the subjects unreal and boring.

Very rarely a dead loss.

The level of interest and approval for *CoResearch* will be reflected in the response level to this questionnaire – I'd bet about 25 per cent.

Do you believe CoResearch gives an honest account of what is happening in CSIRO?

Yes, but you have to look for it.

Yes, when the writing is by the editor or by members of divisions (as distinct from HQ administrators).

I believe it probably does, but I don't have access to other sources to know for certain.

Yes, and I think it has won respect for doing this.

Yes, except where certain statements from management do not reflect reality.

There are too many corporate view articles.

Yes, but reports are very short.

***CoResearch's* part is honest but some official submissions misconstrue what is happening in the Organisation.**

I believe only 'nice' things are written. Staff don't need wishy washy nice articles about CSIRO.

Honest but inadequate. The huge range of activities needs to be stressed. It is too little appreciated both within and, more especially, outside the Organisation.

In recent times it has had to come clean on various issues.

No. Views expressed are not balanced or comprehensive enough.

It tries to do so but can't succeed. Too few people are prepared to sign their names to teaspoon grievances.

Empire building and self aggrandisement reign.

Generally yes, but substantial portions of the contributions by Boardman, Wran and other HQ-involved people on budget matters have been more misleading and incorrect.

Yes. The post budget [issue] confirms this.

Up to a point. I think the Chief Executive would be upset if we were more honest.

A qualified yes, as you basically publish what is submitted so unless it causes a riot it goes unexamined.

Mixed. Official censorship. Editor doing a difficult job well.

It serves to perpetrate the myth that CSIRO is well governed. It is not!

Do you read stories about the politics of science?

One of the best features.

They tend to be predictable and repetitive.

Scientists have to be aware of politics these days.

I'm not interested in reading lies.

Yes, but inclined to platitudes.

Whenever I can find them – they're never in *CoResearch*.

CSIRO must keep its corporate eyes trained on the political sphere.

Always good material for the study of megalomania.

The stories don't correspond to the facts. Big announcements don't mean anything in hard cash to us.

Are they for real?

Do you find these stories interesting and useful?

Good for around the afternoon tea table.

Discussion rarely of interest to average scientist.

Follow-ups would be useful to see if promises are kept.

Yes, although I don't believe they're necessarily factual.

One of the few ways of knowing the political views of science.

Yes, despite the fact that the message is always the same: politicos paying lip service.

Yes, although often they are deriviative of what has already appeared in the national press.

Any vaguely political articles in *CoResearch* are 'nice', not pithy.

Yes, but very often highly biased and not revealing of the true situation in relation to science funding or the importance of the agricultural and biological sector.

Do you read the Chief Executive's column?

Very useful and informative. One of the important contents of *CoResearch*.

Less avuncular, more scientific approach needed.

Often full of waffle and motherhood statements.

The Chief Executive rarely has anything intelligent or meaningful to say.

A waste of space.

I have started to read the column on several occasions but have never finished the job.

It generally lacks the enthusiasm and leadership that is essential in these times. It is simply not good enough. If he writes it himself he should be given some competent assistance.

One always reads with the hope of information, inspiration or enlightenment.

Viewed with a certain level of scepticism.

A most welcome item in plain talk.

Do you find the Chief Executive's column interesting and useful?

Irritating and frustrating.

I generally find this column patronising and platitudinous.

They look as though they are written by a ghost writer from the Department of Finance.

If I read any more management cliches, e.g. 'cutting edge', I'll rip them up. Instead of making us more management aware, I'd like to read what things he has done on behalf of the Organisation.

Variable. Usually old hat, middle of the road. I would like to think he would tackle more controversial issues.

It is revealing in that we can see what he believes is important and also in what he sees to be desirable for staff to know. He is clearly unable to represent scientists' views accurately or effectively to the Board.

You read one and you've read them all. Something other than a rehash of his speeches/media releases would be good.

Totally divorced from my perception of the Organisation.

Too much emphasis on economics and not enough on science.

Yes, in as far as it documents the brain death of CSIRO.

Do you read the Letters to the Editor section?

Probably the most vital part of *CoResearch*.

A great forum for airing staff views. Keep it up.

Trivia.

The apparently unbiased representation is refreshing.

The development of this section is one of the biggest pluses for *CoResearch*.

These are really the most interesting, because they often voice the real concerns of scientists. They give a stronger feeling of camaraderie.

A good idea to have, though regrettably too many correspondents are pretty negative – the malaise of the developed world.

The only vehicle for communication among staff.

Some issues seem to go on unnecessarily long. Some editing is required.

This tends to be one section that shows some spirit.

Too long winded.

Needs more and better letters.

Do you read the Matter of Opinion column?

A thoughtful new area.

Always interesting.

I have used this column in discussions with people outside CSIRO.

Good when written by a scientist ...Usually old hat when written by a politician or public figure.

It rates with the letters as a key part of *CoResearch*.

These vary more than most other parts of the publication – inevitable I guess. But I would not miss this if it were left out.

This column does display the odd spark.

It's a matter of opinion whether it serves any useful purpose.

Extremely well written and to the point.

The best regular feature.

They are badly written.

Very repetitive stuff nowadays. Does nobody have original opinions?

Do you read the division/special features?

These, to me, are the most important parts. They are generally very well done.

Aside from news clippings, it seems to be the only avenue for discovering others' activities.

Some divisions are more of interest to me than others.

Because I am with the corporate centre, this is one way of keeping up with what is happening in divisions.

They are generally very good.

Only way to find out what some 'sleepy hollows' do.

Sometimes embarrassing.

Do you believe these features are worthwhile?

If the reader is interested in the work he has usually already made contact or informed himself.

Unfortunately the limitations of space result in very sketchy presentation.

Enable you to find out what is happening in another division in a simplistic way.

More relaxed style needed for staff readership.

Yes, if kept brief and concentrating on achievement.

Too much hype, usually as though written by PR persons.

Do you read stories about research achievements?

There is a particular need now for morale boosters and these provide a lift in esteem.

If we can't sell ourselves, who can?

Useful when friends, teachers and students ask about current activities within CSIRO.

Useful as a morale boost in these days of decreasing funding.

How often they sink without further trace.

Not enough of these in *CoResearch*.

Generally these are well done.

Could be done better. Take a leaf out of Robyn Williams, ABC.

Usually self congratulating and exaggerated.

What achievements? Someone steals them anyway.

Do you read stories about major admin changes in CSIRO?

Always, if for no other reason than to foam at the mouth about the waste of money.

It's interesting to know what the official line is supposed to be.

Administration is the enemy.

In this area the magazine lets admin staff down a little. Corporate centre views predominate.

CoResearch lacks currency to be useful in this area.

I'm sick to death of changes in HQ – they mean nothing to a bench scientist.

Corporate centre disinformation!

Bad for blood pressure and invariably rubbish.

Usually totally incomprehensible and irrelevant to the workers.

Generally hot air. Administrators have a credibility problem.

The stories are biased towards the views, generally minority views, of senior management.

Do you feel CoResearch adequately covers issues relevant to the work you do?

The issues covered are generally irrelevant to individual research programs.

How about acknowledgement of those who labour rather than only those who are seen to succeed.

Yes, although corporate issues may need more attention.

Need information on matters that affect us, e.g. how significant is the 30 per cent funding target? Where do we get the money from? Does it affect our promotion? Is CSIRO policy likely to change? Who is influencing govt on CSIRO policy? Do we have any interest in pursuing the frontiers of knowledge?

Dominated by high tech, product oriented issues; very little on environmental/ecological issues.

Biological sciences under represented.

***CoResearch* is not seeking information from all divisions. It seems slanted towards agriculture/astrophysics.**

An article on 'How Devolution is Progressing' would be good.

***CoResearch* must not become a technical journal.**

Would be interested in more about instrument development.

It would be unlikely that any one publication could adequately cover all types of work in CSIRO.

CoResearch is dumped on my desk with no mention of input from tech staff or how we can independently go about contributing.

Would you like to see CoResearch continue?

It is essential in an organisation as large and as geographically wide as CSIRO.

It is the most forceful and effective communication tool in an organisation which has very serious internal communication problems.

Yes. People who suggest otherwise should be shot. It is often the only vehicle for meaningful staff comment.

Please do not let them kill it also.

A company mag is essential.

RCH SURVEY
ve their say

It's vital – it should be bigger and better...

It is about the only unifying feature in the whole Organisation.

One of CSIRO's undersung successes.

It has my strongest support.

No. One more bandwagon for the hierarchy to jump on.

No, because it's largely froth and bubble, its demise would be no great loss.

Yes. We need all the tying together, *esprit de corps*, we can get. We are so far flung.

No, in its present form. Yes, if it was aimed at staff and not executive types.

Only in updated form. Currently anachronistic.

Every organisation needs a newsletter, however bad.

It's essentially harmless.

Most definitely. It cuts across divisions.

Do you have any views on how CoResearch could be improved?

A more structured news format – currently a bit hit and miss.

Monthly column from staff development group with tips for self improvement, motivation, value of training, comparison of opportunities with other organisations etc. Updates on group activities.

CoResearch is read by the media and people outside CSIRO. I believe there should be much less long winded bickering and internal politicking contained in it.

Try to get it to us earlier – it usually comes the next month when the news is stale.

Address difficult issues. More frankness from management.

I realise that most of the articles in *CoResearch* have to be topical and brief. I think this needs to be balanced with one or two longer articles on general themes such as forests, salination, rabbits, etc, but in a different style to that of *Ecos*.

Humour!

***CoResearch* needs little or no improvement – if however staff numbers were to increase to help with its production, we could then look at improvements.**

...there are still improvements that could be made to make *CoResearch* a more open, vigorous forum for discussion on matters relevant to CSIRO. Clearly, restraints remain. However, it is difficult to see how they can be overcome in the current climate, with poor morale, uncertainties, etc. We don't want *CoResearch* to become a mouthpiece for whingers, but for honest, reasoned discussion about issues affecting CSIRO and its staff. Paradoxically, the current climate makes this role ...all the more important.

***CoResearch* is better than it was a few years ago, but it still contains too much official propaganda. If the reader is unhappy with the present management then reading *CoResearch* just arouses anger.**

Further attempts should be made to remove the impression that *CoResearch* is a mouthpiece for the official party line. For example, why not ask other interested parties, e.g. CSIROOA or CSIROTA reps to respond to some of the bilge dished up from the Chairman's and Chief Executive's offices.

Perhaps soliciting external contributions would be helpful. The Matter of Opinion column would provide the suitable vehicle.

Less politics, more information on work carried out by various divisions to keep us in touch with CSIRO as a whole.

It's a bit too much like *The Sun* – a bit too general. Needs to be more like *The Age* – a bit more detailed.

I often feel that it looks like the production is much more expensive than necessary.

Keep articles short and to the point. Keep them lively and relevant. Keep *CoResearch* coming out on time.

More could be made of *CoResearch* as a vehicle to transfer information (corporate and policy) from the top to the workers – at least this way information would get through.

It should be more newsy on an individual level. Emphasise what individual scientists are doing. Interviews at random on the telephone would do wonders. Less emphasis on corporate/admin policies.

More objective analysis of issues. Less showpiece self advertising.

Larger format, bold headings, frequent issue, bold paragraphs, adverts, headings, photos, topical, frank reporting, book reviews, CSIRO publications.

More comprehensive.

Increased editorial independence. Try to get the truth. Keep CSIRO honest...Root out corruption and fat cats. Support the science!

You can't blame *CoResearch* for the situation CSIRO is in.

More indepth discussion of research.

CoResearch strives to be non-controversial and self-congratulatory. My own impression is that CSIRO does not represent an organisation of contented scientists working in a contented community. I believe that if *CoResearch* wants a useful role it must address itself to the concerns of scientists working in a bureaucratic organisation, and in a largely scientifically illiterate society. Does the editor ever get out of the corporate centre?

Go colour.

More progressive, investigative journalism. More people articles and less obituaries, i.e. life not death.

Generally it does a good job. It will always be difficult to please such a diverse readership. But the people who need it most are those in remote places. Try to put yourself in their shoes when writing material. And keep it light hearted above all else, but avoid flippancy.

Keep up the good work. Pay the editor more.

***CoResearch* is just a piece of HQ propaganda. It highlights the void between them/us.**

I suspect that you wait for articles to be submitted rather than soliciting articles. This means that groups and divisions with active information officers with an interest in *CoResearch* are better covered than those with no such officers. Information is therefore rather patchy.

Would you like to make any more comments about CoResearch?

More of something like investigative journalism required – e.g. Greg Tanner article.

Good work. It demonstrates attitudes which exist in CSIRO and exposing these frailties may make for the ultimate good of the Organisation.

Presently it is akin to a pre-Gorbachev Russian newspaper. Investigate CSIRO's federal power structure, particularly with regard to women.

As my old Irish ancestor Rumply said, 'if you try to please everybody, somebody is not going to like it'. The mix of topics you cover is adequate and in my experience the reporting is balanced.

I consider the Organisation has a morale problem and is losing its sense of identity. *CoResearch* stands out as the strongest cohesive force we have. It has made a quantum jump in its impact in the past few years and every effort should be made to continue this momentum.

Head office propaganda of little use to the main goals of the Organisation.

A high quality publication which is surprisingly open and frank and provides a good forum for staff to express their views.

[Print] less about what is happening at HQ. Who the hell is interested?

Overall it is rather boring.

Use cheaper paper and no colour. This might enable more pages to be printed at the same cost. This could then solve the readability problems such as the too small type face.

In the past year or so *CoResearch* has become the sort of paper CSIRO has needed for some time.

I find *CoResearch* to be vital as the lack of communication between divisions and the corporate centre is incredible.

CoResearch does the best job it can. There is no way you can publish the real opinions of the troops, re. chiefs whose incompetence is rewarded with golden handshakes or reclassification to higher duties, or corporate centre financial incompetence that will just about scupper us, etc. etc.

I think it could do with a name change.

As a true staff newspaper it should have more coverage on ordinary personal events such as weddings, births, sporting achievements, etc, to which every staff member can relate.

Does *CoResearch* really know what things are like at the laboratory/bench level in CSIRO? Apart from individual submissions...*CoResearch* editors give little or no voice or opinion as to what they see in CSIRO. Is this because they are too remote from the laboratories? Could *CoResearch* staff visit our laboratories and staff and find out for themselves what the real research environment is like?

It is an excellent effort.

***CoResearch* is obviously of some use to those people at HQ but of little use to those of us who work at the coal face. It's a waste of time, effort and money.**

In my opinion *CoResearch* is one of the most poorly designed publications I have seen. It fails to invite the viewer to read. We are confronted with vast blocks of text, with very little direction of what to read when. The viewer tends to give up in frustration.

Keep up the trend toward independence from the dictators at the top. Good on ya!

During difficult times *CoResearch* has been very successful in achieving good balance and spread over a variety of issues, topics and opinions.

Delighted with the factual but critical reports of what is happening in CSIRO. Congratulations to the editor on preserving freedom of expression and promoting lively discussions via letters to the editor.

Items for inclusion must be approved by the Chief. This inhibits contributions...

I find it surprising that some matters affecting many staff go unreported in the newspaper, e.g. laboratory craftsmen translation.

The publication seems...Canberra oriented and generally the viewpoints expressed follow this pattern. Many of the articles by senior managers are excessively pompous.

***CoResearch* is not a publication anyone would buy. It is dull, predictable and fawning – about on a scale with other throwaway newspapers. If scientists are to advance they need a forum for discussion and tactical survival – not a predigested pap sheet.**

Let is die peacefully, the same as CSIRO is.

***CoResearch* seems to be caught between being a people paper and an organisational paper. Remember that CSIRO has been cut to the bone in staff and our world has become much busier. We have less time to read.**

It is appreciated and I would personally like to see it continued.

What the numbers say

Following are some of the key results in the survey, expressed as numbers of responses and percentages. Space does not permit showing the results for all the questions, but anyone who is interested may obtain a copy of the survey report from the *CoResearch* editor (see address on back page). Please note the table does not show results from the 30 respondants who did not fit into the three listed categories, although their responses are taken into account in the 'total' column. In all, 413 people responded to the survey.

Scientists: 237
Technical staff: 66
Admin staff: 80

		Scientists		Technical staff		Admin staff		Total
Questions	**Options**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**%**
In general, do you find CoResearch in its current format:	Good	182	76.8	39	59.1	58	72.5	**73.1**
	Bad	4	1.7	10	15.1	3	3.7	**4.5**
	Indifferent	49	20.7	16	24.2	18	22.5	**21.1**
	No answer	*2*	*0.8*	*1*	*1.5*	*1*	*1.2*	***1.2***
CoResearch aims to enhance the flow of information in CSIRO. In this respect is it:	Very useful	46	19.4	9	13.6	22	27.5	**20.8**
	Quite useful	167	75.5	38	57.6	51	63.7	**65.8**
	Of little use	20	8.4	17	25.7	7	8.7	**11.1**
	Useless	0	0	1	1.5	0	0	**0.2**
	No answer	*4*	*1.7*	*1*	*1.5*	*0*	*0*	***1.9***
Is CoResearch generally interesting to read	Yes	178	75.1	39	59.1	63	78.7	**73.6**
	No.	7	2.9	16	24.2	6	7.5	**7.9**
	Indifferent	48	20.2	10	15.1	8	10.0	**16.2**
	No answer	*4*	*1.7*	*1*	*1.5*	*3*	*3.7*	***2.1***
Do you believe CoResearch gives an honest account of CSIRO events?	Yes	149	62.9	38	57.6	59	73.7	**64.9**
	No	44	18.6	15	22.7	8	10.0	**16.2**
	No answer	*44*	*18.6*	*13*	*19.7*	*13*	*16.2*	***18.9***
Do you contribute ideas or articles to CoResearch	Yes	45	19.0	2	3.0	20	25.0	**16.9**
	No	190	80.2	62	93.9	59	73.7	**81.6**
	No answer	*2*	*0.8*	*2*	*3.0*	*1*	*1.2*	***1.4***
Do you find the Chief Executive's column interesting & useful?	Yes	91	38.4	16	24.2	26	32.5	**35.3**
	No	106	44.7	41	62.1	40	50.0	**46.2**
	No answer	*40*	*16.9*	*9*	*13.6*	*14*	*17.5*	***18.4***
Does CoResearch cover issues relevant to the type of work you do?	Yes	125	52.7	15	22.7	35	43.7	**45.0**
	No	77	32.5	40	60.6	34	42.5	**37.0**
	Don't know	29	12.2	10	15.1	5	6.2	**10.6**
	No answer	*6*	*2.3*	*1*	*1.5*	*6*	*7.5*	***7.3***
Would you like to see CoResearch continue?	Yes	222	93.7	55	83.3	78	97.5	**92.2**
	No	10	4.2	6	9.1	1	1.2	**4.3**
	No answer	*5*	*2.1*	*5*	*7.6*	*1*	*1.2*	***3.4***

BHP Awards
Cont. from p.3

community simply won't understand the things and processes that have the greatest influence over the lives.'

The three sections of the awards were described by Mr Alan Castleman, a senior BHP executive on secondment as Chief Executive of the VFT Joint Venture.

In the first section – the BHP Science Student Awards – students may enter research projects, individually or in groups of up to three, in a broad range of scientific areas. Up to 40 students will be named as finalists and will receive a certificate of achievement, $100 and a visit to a BHP or CSIRO research lab. Four winners will receive the BHP Science Award plaque, $500 and an interstate trip including a lab visit.

The second section – BHP Special Project Competition – comprises two special projects during the year, promoted through the Double Helix magazine and Science Education Centres. Books, cash and lab visits are among the prizes.

Science teachers demonstrating great commitment and innovation will benefit from the third section. BHP will reward up to five teachers each year with funds to develop their school programs, as well as personal rewards.

After the ceremony, Drs John Philip and Will Steffen of Environmental Mechanics, and CSIRO Education Programs Manager Mr Ross Kingsland, conducted tours of some of the Centre's research projects in which education was an important component.

The Centre has a strong history of involvement in education, both of its own initiative and in co-operation with the corporate centre.

Two of the display projects – a wind tunnel study of curved air flow and the hydrodynamics and thermodynamics of a billabong – involved significant contributions by university students under the Centre's Vacation Scholarship scheme.

The third – design of TDR surface probes for the measurement of the moisture content of porous materials – was aided by Ms Louise Rostron, a Canberra science teacher who joined the Centre for a month as part of the ACT Schools Authority's 'Teacher in Residence' program.

Entomology budget/Cont. from p.1

Perhaps one of the most disturbing things about the figures, said Dr Whitten, was that by 87/88 we had already been cut by 17 per cent in real terms over five years (as noted in the 87/88 CSIRO Annual Report).

The budget deficits, costs associated with devolution of administrative responsibilities, costs of promotions and other costs passed to divisional budgets have combined to add to divisional hardship and reduce the capacity to perform.

The Division of Entomology has an appropriation budget of $11 million in 88/89 and has increased its external funds to $6 million from $4 million in 87/88. Its external funds are locked to specific projects and the reduction in appropriation funds is making it increasingly difficult for the Division to support this level of external funding.

Ad nauseum

The heaviest element known to science was recently discovered by physicists at CSIRO.

The element, tentatively named Administratium (Ad), has no protons or electrons, which means its atomic number is 0. However, it does have one neutron, 125 assistants to the neutron, 75 deputy neutrons and 111 assistants to the deputy neutrons. This gives it an atomic mass number of 312. The 312 particles are held together in the nucleus by a force that involves the continuous exchange of meson-like particles called memoons.

Since it has no electrons, Administratium is inert. However, it can be detected chemically because it seems to impede every reaction in which it is present. According to Dr I M Fedup, one of the discoverers of the element, a very small amount of Administratium made one reaction that normally takes less than a second, take over four days.

Administratium has a half-life of approximately three years, at which time it does not actually decay. Instead, it undergoes a reorganisation in which assistants to the neutron, deputy neutrons and assistants to the deputy neutrons exchange places. Some studies have indicated that the atomic mass number actually increases after each reorganisation.

Administratium was discovered by accident when Dr Fedup angrily resigned from the research liaison committee and dumped all his papers into the intake hatch of the division's particle accelerator. 'Apparently, the interaction of all those reports, grant forms, etc, with the particles in the accelerator, created the new element,' he explained.

Research at other laboratories seems to indicate that Administratium might occur naturally in the atmosphere. According to one scientist, Administratium is most likely to be found on all CSIRO campuses and in large corporations and government centres, in and around the best appointed and best maintained buildings.

Anon

Narayen field day
Big crowd goes west to see latest research

'In my 16 years in the Division I can't remember a greater high.' So said the Chief of the Division of Tropical Crops and Pastures Dr Bob Clements of the Narayen Field Day held on 12 April.

The event drew a crowd of 700 and guests ranged from farmers/graziers to extension officers and agribusiness people. Considering the Narayen Research Station is 64km west of the nearest town (Mundubbera), this was quite an achievement.

About 60 Divisional staff, including 13 from Narayen and the remainder from other locations in south east Queensland, helped prepare exhibits and handle the large number of visitors.

The 9000ha station has been operated by CSIRO since the 1960s.

Dr Clements paid special tribute to Dr Don Cameron and Mr Keith Gould, 'who inspired, encouraged, cajoled and bullied the troops tirelessly' into putting on a great show.

It was the first time the Division had staged a field day at Narayen since 1976.

The event was opened by well known Queensland grazier Mr Richard Wilson from Banana Station. Mr Wilson is a member of the Division's advisory committee.

The field day was intended to provide visitors with an insight into how researchers are tackling some of the technical issues confronting farmers and graziers on the brigalow and spear grass areas of Queensland.

Dr John Russell of the Division demonstrated research being done into cereal crop-grain legume systems and short term pastures for Queensland's brigalow soils.

Dr Russell has been involved in experiments at Narayen to examine the effects of current farming systems on the soils, and to devise better, more profitable and sustainable systems.

In spear grass country, cattle production can be increased by the use of legumes. Mr Cam McDonald presented a number of options for land improvement using clearing and legumes.

Visitors were also introduced to new research focusing on the long term stability of pastures and cattle production on spear grass country. The use of legumes is one method for increasing animal production.

Dr John Taylor of the Division said the project was being conducted on Narayen and at 'Glenwood', a private property near Narayen. It involved comparing the pros and cons of a range of development options on different types of spear grass country. The project has received substantial funding from the Australian Meat and Livestock R&D Corporation.

Also on display was an experimental band seeder developed to cost effectively improve legume establishment in spear grass country.

The seeder was designed by Mr Peter Walsh, an agricultural engineer with the Queensland Department of Primary Industries, to specifications devised by Dr Sid Cook of TC&P. It sows legume seed while simultaneously applying herbicide.

Unreliable sowing methods have been a hindrance to grazier acceptance of legumes as a means for pasture improvement, despite well documented benefits. The band seeder could help overcome this resistance.

Research into the use of superphosphate on grass/legume pastures was also demonstrated at the field day.

Dr Peter Kerridge and Mr Ron McLean of the Division have carried out research at Narayen showing that super would lift beef production on country where little soil phosphorus was available. Results showed that $12.50/ha spent on super could provide $52/ha worth of extra beef.

New legumes have been selected for use on speargrass country. Mr Geoff Bunch demonstrated a grazing experiment designed to evaluate *Wynn cassia*, a new release from the CSIRO plant introduction program.

Above, preparing for the day, left to right, John Ogden (farm overseer), Keith Gould (OIC) and Terry Waters (stock overseer). Below, on the day, Mr Geoff Bunch, left, and Dr Peter Kerridge.

McCracken retires

Stress takes Ken by surprise

'I thought I didn't get stress – I gave it'. Dr Ken McCracken was as surprised as anyone when modern society's insidious affliction, stress, forced him out of his job as Director of COSSA.

A visit to his doctor for an extensive '32 000 mile service' led to a dramatic collapse on the ECG treadmill machine, and the first evidence that his heart was under pressure.

The problem is arrhythmia. As Ken says, there are levels at which arrhythmia is okay and levels where it is certainly not okay. Ken's problem falls into the second category.

But he's not despairing. By getting out now 'I am guaranteeing that McCracken is going to be around to give people hell for quite a long time', he quipped.

After his collapse on the treadmill, he started taking a scientific approach to examination of his illness, keeping records of factors such as pulse rate on waking in the morning, compared with pulse rate during times of pressure.

'I measured the parameters for six months and it was incredible how on certain days they were very high – days on which I had an aggro meeting, for example,' he said.

'Strangely enough, one of the high ones was the day I had the CSIRO Medal given to me. On that occasion I took my courage into my hands and gave a little lecture about the state of science in Australia, and I had to wind myself up a fair bit to do that.

'It's a fairly stressful thing when you take on the Chairman, the Minister and the Chief Executive all at once, face to face in public,' he said.

Ken does not believe the stress in his job could have been lessened. 'Anyone who is paid at my level to do the job I have been doing should expect that degree of stress. Some people will be able to handle it and some won't.'

But he said he is distressed that stress pressures extend so far throughout society and to all levels in CSIRO these days. 'It is clear that the amount of stress for anyone at all levels of management in CSIRO, or outside, is increasing.'

'I'm not saying I have been hard done by, I'm just saying let's recognise in CSIRO that stress, which is out there in the community and which all the medicos say is bad, is well and truly with us, and CSIRO is not an island.

'Let's also recognise that maybe we are generating a lot of stress within CSIRO,' he said.

Scientists and other staff members now have a wider range of expectations placed on them.

'Doing research of the highest international standard is stressful enough. Then meaningful liaison with industry is extremely stressful and difficult, and so's management. We are in an age when all of us are trying to do good research, to commercialise and be good managers as well, and I think we are expecting too much of ourselves and our colleagues,' he said.

'I don't want it ever to be said that CSIRO shouldn't have changed – it needed to – but *everyone* didn't have to change.

'We have to learn how to do this without having the whole culture change. The management ethos and some of our targets needed to change, but not the total culture,' he said.

CSIRO has in recent times been on the receiving end of flak from politicians, the media and others, often regarding the performance of the Australian manufacturing sphere, while overlooking the enormous benefits the nation has gained from CSIRO's support of other parts of the national economy, said Ken. But the failure of manufacturing to take off in Australia cannot be put wholly onto CSIRO or industry, 'we also have to put it onto government.

'For example, we are being expected to rectify a situation which was largely the result of removal of a number of tariffs by the Whitlam government. This in itself wasn't a bad thing, but why wasn't some other form of political will expressed to show that Australia wanted a manufacturing industry then? The tariffs were taken away and there was nothing to stop the greater part of our high technology manufacturing industry disappearing overnight,' he said.

'I think science did the best it could to stem the tide, and I also have a very warm spot for industry. Having been closely associated with a number of companies which have gone bankrupt, I understand the dangerous world in which they live and the last thing I would do would be to criticise Australian industry for not performing. They perform as well as they can given the environment they live in.' It is up to governments to generate the right environment.

Ken says we must be prepared for the consequences of the strain placed on people in modern society – 'for the fact that people like me have to make a choice. The choice is that I listen to the fact that I have a heart problem or I ignore it. I didn't have to tell CSIRO I had collapsed, but I made a choice. I was not going to do as some of my scientific colleagues have done – ignore it and drop dead at my desk in two years.'

So what of life after COSSA? 'I'm going to have a hell of a time', said Ken, characteristically.

'Before this happened, my wife and I saw that CSIRO was developing strategic plans, operational plans, tactical plans. I said to my wife (largely in jest) "we ought to have a strategic plan for when I retire". So several years ago we decided that our strategic plan was to live in the southern highlands of New South Wales.'

They bought a 100 acre property just outside of Mittagong, soon to be replaced by a larger property, where they engage in commercial vealer production. Ken's wife, Gillian, continues to work as an arts administrator in the Australia Council in Sydney and they therefore maintain a *pied-a-terre* in Kirribilli.

Cattle farming for a physicist? Ken has an enormous advantage in this field, having a daughter who is a vet. Another daughter is a doctor, and Ken said an hilarious time was had recently when Dr McCracken, Dr McCracken and Dr McCracken gave the cattle their annual injections. It's probably a safe bet that Dr McCracken the physicist was less use in this than the two younger McCrackens.

Very active

And of course, Ken will remain very active in scientific and technological matters. 'The interaction of science, technology and the community is still very poorly understood in Australia and I believe I still have a contribution to make,' he said. 'Above all else, I will have a luxury that I haven't had for a long time – enough time to think about issues that are far from trivial.'

Reflecting on his stewardship of COSSA, CSIRO's experiment in space research management and co-ordination, Ken is frankly proud.

'I'm conceited enough to say that if COSSA had not been given life in 1984, I doubt very much that either of the instruments which have been transferred to Australian industry would be now getting ready for flight on foreign satellites'.

In addition, a number of initiatives in remote sensing may well have been more difficult to achieve without the 'marriage broking' role of COSSA, which brought together .CSIRO and industry, and perhaps just as important, different CSIRO divisions.

Also, Ken believes COSSA has given credibility to Australian made space based products.

He estimates that the products which have been put out in space, based on CSIRO licences in the past three years, have been worth about $20 million on the market already, and they are just the beginning of a range of products on the verge of commercialisation.

'I am not going to say that all of those would not have happened without COSSA, but by far the great majority would not have happened,' he said.

Australia's future in this area now depends on political will, said Ken. 'I think we have made enormous steps forward in four years. We have gone from zilch to a nicely defined niche'.

'If we want to go further, the government will have to put more into the space program than $6 million per annum. If we want to have a high tech industry which has the design and intellectual spin off that other countries aspire to, we have to pay the admission price.

'We are paying the price that gets us up onto the hill, and at least we can see the game and enjoy some of it, but if we really want to be in the game we have to get into the grandstand by paying a bit more. And if we can get into the members' club, then we can influence the game,' he said.

The members of the space game that Ken aspires to emulate are countries like Sweden, the Netherlands and Belgium. The USA and Japan are in a different league, not (realistically) to be aspired to.

Membership of the club would cost about $25-30 million per year. Ken will continue to champion Australia's space industry through his participation on the Australian Space Board for the life of the current Board.

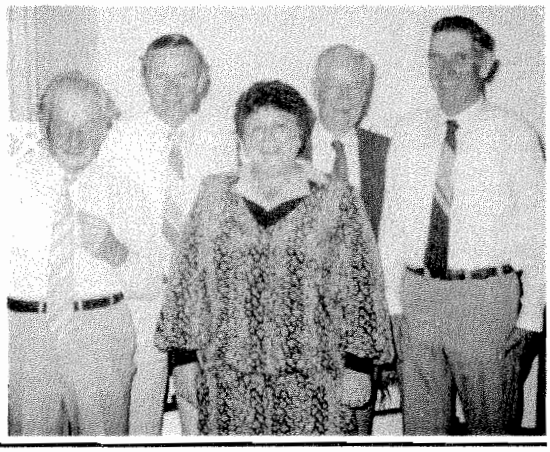
He said he won't have too much trouble letting go, as he will have plenty of things to amuse him.

'All I can say is that I am enormously proud and pleased with what we have achieved in CSIRO since 1970. We did some marvellous research that was relevant and is now used by the mining industry. Then the space years have been very fruitful and rewarding.

'Above all else, I have had marvellous colleagues, in CSIRO, in academia and in industry. The teamwork and also the invisible support from many seemingly uninvolved people, is what made it possible. I can look back and say we actually achieved something that just wasn't there. It is a great way to feel when you go out,' he said.

At the age of 55, Dr Ken McCracken is leaving CSIRO, and the position of COSSA Director has ceased to exist. Instead, the COSSA Manager will report to the Director of the Institute of Information and Communication Technologies, Dr Bob Frater. At present, Mr Jeff Kingwell is acting Manager. Last month, Dr Frater instituted a review of the organisational structure of COSSA and his own office, and the results should be known soon. It is being carried out by Dr Ron Sandland, Chief of the Division of Mathematics & Statistics, Ms Christine Astley-Boden, IMEC Manager Policy and Market Development, Dr Ian Elsum, IICT Manager Planning, and Mr Kingwell. The review will recommend on forumulating and implementing an organisational structure enabling COSSA and IICT to pursue their objectives most effectively and efficiently.

Above, Dr Ken McCracken.



Above, Dr Tim Williams. Right, original staff at CSIRO Rockhampton, left to right, Phonse Schleger, Brian Thompson, Beverly Marler, Greig Turner and Jim Davies.

Help take the NMA off the back burner

Australia, unfortunately, is not overrun by millionaires with an eye to immortality and a degree of public mindedness. It would be very convenient if we had our own Smithson, but instead the establishment of a cultural museum has to rely on changeable political winds.

At present those political winds are unfavourable. The National Museum of Australia was scheduled to open next year, but in last year's federal budget the plan was deferred for five years. Jack Thompson believes the Government is hoping it will die from lack of nourishment.

The decision to establish the NMA was formalised by an Act of Parliament about nine years ago, and this makes it difficult for the Government to scrap the proposal altogether. However, viewers of Yes Minister will be familiar with the ways Government projects can be stalled indefinitely.

Jack Thompson, his colleagues on the NMA Council and the new Friends of the NMA, are not prepared to have that happen.

'I feel we need the NMA because it's only recently that Australians at large have had a sense of identity and have moved away from the cultural cringe,' he said. 'The melting pot, the cultural soup we have become, is a pretty rich brew by now.'

So as a way of rallying community support for the project, the Friends of the NMA has been formed – not to raise money for the project itself, but rather to indicate to the Government the will of the people.

For the Museum to get going again, it would need about $60-$70 million over the next five years, not all from Government but also from benefactors in the private sector. It is envisaged that eventually the Museum will become self-funding.

The Museum will be far removed from the 'dead artifacts' concept. Rather than being a single building, it will spread over 88 hectares on the shores of Lake Burley Griffin, and will consist of a series of pavilions. Emblems of our culture and heritage will range from graphic depictions of the landscape and fauna of Australia's pre-history, to displays as diverse as Phar Lap's heart, Australia II's boxing kangaroo flag and the Aboriginal tent embassy which stood in front of Parliament House in 1972.

'I think if you are going to have a sense of dignity in your culture, and a sense of identification, and if you are going to consider that this country is worth caring about, then you have to be able to identify it as a place worthy of cultural consideration,' said Jack Thompson.

'I think an institute of this nature will celebrate our growing sophistication. I really believe we can't consider ourselves a nation with a mature identity until we have such an institution.'

Application to become a Friend of the National Museum

I/we wish to become a member in the category indicated (please mark box):

☐ Single	$15	☐ Supporter	$250
☐ Household	$20	☐ Corporate	$1000
☐ Concession	$10	☐ Benefactor	$5000
☐ Student	$10	☐ Affiliated small institution	$25
☐ Donor	$100	☐ Affiliated large institution	$100

Cheque enclosed, payable to: Friends NMA, for $ .....

Please debit my ☐ Bankcard ☐ Visa ☐ American Express ☐ Mastercard

NAME ON CARD: ..... EXPIRY DATE: .....

NUMBER ON CARD: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

SIGNATURE .....

MEMBERSHIP TYPE: .....

NAME/NAMES: .....

ADDRESS: .....

..... STATE: ..... POSTCODE .....

TELEPHONE: .....

Post to: Friends NMA, GPO Box 2977, CANBERRA ACT 2601

Retirements

Rockhampton farewells Tim and Brian

Dr Tim Williams and Mr Brian Thompson are leaving the Division of Tropical Animal Production in Rockhampton.

Tim has fulfilled a five year contract with the Division, working on the manipulation of cattle embryos. Brian has completed 34 years' service with the Organisation.

Brian's career started at Belmont in 1955. He transferred to Wollongbar in 1962 where he spent 20 years on the Australian Milking Zebu project. In 1982 he transferred back to Rockhampton where he participated in research on embryos and reproduction.

For the past two years, Tim and Brian have been key members of the teams that have collected embryos from the Boran and Tuli breeds in Zambia and Zimbabwe and successfully transferred them to recipient cows on the Cocos Islands.

Tim returns to his home state of Illinois where he will maintain his interest in embryos and expand his involvement in practical farming, while Brian will be moving south and taking his prize Sahiwal herd with him.

Tim and Brian were farewelled by CSIRO Rockhampton staff at a dinner on 10 May. Guests included the original Division of Animal Health and Production Rockhampton employees, Mr Greig Turner, Mr Phonse Schleger, Mrs Beverly Marler and Mr Jim Davies, who, with Brian Thompson, can boast a total of 171 years of service to CSIRO.

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Good food cook book

A cookbook based on The Good Food Show, an eight part series produced by the CSIRO Film and Video Centre for ABC TV, is now available throughout Australia.

The show, featuring chef Gabriel Gate and Dr David Topping from the Division of Human Nutrition, has received some highly favourable reviews from television critics, although the ABC has copped some flak for programming it on Saturday mornings – a singularly inappropriate time to air a cooking program.

The reviews have been extremely laudatory of the production standards and the content of the programs, although some reviewers haven't resisted the temptation to hurl around the cliches about scientists. For example, Jim Schembri of *The Age* said, 'If the CSIRO has an image problem it's probably due to those dull documentaries you tend to see at 4.15am about such things as The Sex Lives of Bullants. But the CSIRO isn't all dull docos and boring men in lab coats with bad moustaches taking deadpan into the camera about bean sprout production in the Mallee. The Good Food Show ...is designed to turn that image around'.

The show has certainly lifted CSIRO's profile in a very positive way, and as Schembri goes on to say, 'even David Topping is informative and occasionally chuckleworthy'.

The book of the series is priced at $6.95 and available from all ABC Bookshops, and from the CSIRO Bookshop in Melbourne.

###

Madsen Medal for Poulton and Bird

Dr Geoff Poulton and Dr Trevor Bird of the Division of Radiophysics have been awarded the 1988 John Madsen Medal for their paper 'Earth Station Antennas for Multiple Satellite Access', published in the *Journal of Electrical and Electronics Engineering, Australia*.

The award is made annually by the Institution of Engineers, Australia, for the best paper by IE members appearing in the journal.

It perpetuates the memory of the outstanding engineer, Sir John Madsen, who was Foundation Professor of Electrical Engineering at the University of Sydney from 1920 to 1949, and helped to establish both the Radio Research Board (now ATERB) and the CSIR Division of Radiophysics.

***CoResearch* is produced by the Public Affairs Unit for CSIRO staff. Readers are invited to contribute or offer suggestions for articles. The deadline is the last Monday before the issue month. Editor: Liz Tynan, PO Box 225, Dickson ACT 2602. Ph: 062-48 4479.**

CoResearch

No. 324 June 1989 CSIRO staff newspaper

CSIRO AUSTRALIA

Eckersley report

CSIRO up front in debate on the environment and society

CSIRO is taking the lead in community discussion on the environment and society with the release of a paper which advocates a new approach to our social, economic and environmental problems.

The paper, *Regreening Australia: the environmental, economic and social benefits of reforestation*, by Richard Eckersley, is destined to be controversial because it makes no claim to being purely an objective statement of facts.

'It is a propagandist document in some ways, intended to set out the strongest case possible for large scale reforestation. Having said that, I must stress that the report provides a lot of objective data to back up its recommendations,' said Mr Eckersley.

Mr Eckersley, Principal Issue Analyst in the Office of the Chief Executive, achieved considerable publicity last year with his report for the Commission for the Future, *Casualties of Change: the predicament of youth in Australia*, a document which exposed the worsening level of youth suicide, drug abuse, crime and general despondency about the future. Mr Eckersley sees his latest paper as an extension of that work.

Regreening Australia argues for a massive program of reforestation and revegetation in Australia, both as a sound ecological and economic move and also as psychologically beneficial for the community.

While Mr Eckersley sees the process of regreening having positive effects on our most pressing environmental problems – land degradation and the greenhouse effect – his argument broadens to link the environment with a range of economic and social problems. He contends that 'the conceptual strength of the proposed program – its capacity to symbolise a new approach to national affairs, and so encourage among all Australians the belief that we can overcome the serious problems we face' is as important as the resulting physical achievements.

His youth report argued that fundamental social, economic and technological change lay behind the worsening plight of youth. 'I believe the solutions to these problems, like those of the environmental problems we face, will have to be as fundamental as their causes.'

The inspiration for Mr Eckersley's latest paper came from a variety of areas. A report by the World Commission on Environment and Development called *Our Common Future* discussed the need to integrate environmental and economic objectives. Later, Mr Eckersley read a newspaper article quoting Dr Denis Saunders, a CSIRO scientist with the Division of Wildlife and Ecology in Western Australia and a spokesman for the Ecological Society of Australia. Dr Saunders talked of the need for massive revegetation to avert the looming ecological disaster threatened by land degradation. Around this time, several journals like *Science* and *New Scientist* ran articles examining the possibility of reforestation slowing down the greenhouse effect.

At talks to youth conferences following the release of his first paper Mr Eckersley introduced the subject of national initiatives like massive reforestation as a means of reflecting and reinforcing the fundamental changes society needed to make in order to resolve the worsening environmental and social problems we face, and got some mixed reactions. He said there were strong views both ways, with some people supporting the idea but others arguing that they neglected the political roots of our social problems.

He decided to investigate the matter further and contacted a number of CSIRO scientists, who readily offered their knowledge and advice. In particular, he was assisted by John Ive of the Division of Wildlife and Ecology and chairman of the Yass River Valley Revegetation Project, Graham Harrington in Atherton, Barrie Pittock of Atmospheric Research in Melbourne, Roger Gifford of Plant Industry in Canberra and Bill Rawlins of Forestry and Forest Products.

The paper does not merely present a summary of their research and opinions. In fact, several scientists were concerned about the thrust of the report, perhaps doubting that CSIRO should be seen to go beyond the reporting of scientific research and into the realm of advocating change. Most, however, responded positively to the proposal.

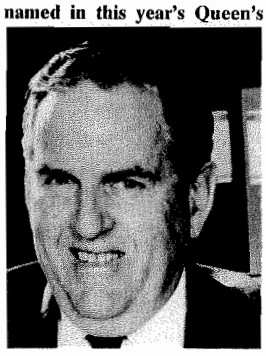
Mr Eckersley believes that CSIRO is uniquely placed to present convincing arguments for fundamental social change, certainly backed up by solid scientific data, but still not afraid to push a particular line.

Scientists honoured in Queen's birthday list

Several CSIRO scientists were named in this year's Queen's Birthday honours list.

The award recipients were: Dr Keith Norrish of the Division of Soils in Adelaide; Dr Ken McCracken, recently retired Director of COSSA; Dr Bill Blevin, Chief of the Division of Applied Physics; and Dr Katie Helms who retired late last year from the Division of Plant Industry. In addition, CSIRO Board member Sir Gustav Nossal was awarded the Order of Australia for his medical research.

More details, p.6



Above, Dr Bill Blevin who received the AM

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Boran and Tuli project moves to next stage with birth of calves

The hopes of the cattle industry are riding on a group of little creatures now being born on remote Cocos Island in the Indian Ocean.

The creatures are Boran and Tuli calves which are the culmination of a complex and lengthy project undertaken by the Division of Tropical Animal Production. One of the requirements is that the calves be born at the offshore quarantine station on Cocos, following the implant of frozen embryos from Africa into Australian cows.

The birth of the calves is the start of a whole new phase in the bid to introduce some new genetic vigour into Australian cattle herds, particularly those in the north.

The multi-million dollar project (outlined in *CoResearch* No. 308, Dec 87/Jan 88) now moves on to multiplication and evaluation of the cattle and finally commercialisation. A consortium of 23 beef producers has been formed to oversee the import of the calves early next year, then the multiplication and evaluation of the herd, and eventually their dissemination to the beef industry.

The project has only been possible through the development of special health protocols by government, and advanced techniques in embryo collection, freezing, screening and transfer by scientists at the Division's Tropical Cattle Research Centre in Rockhampton.

The Boran and Tuli are known to have high fertility and docility combined with tick resistance and other characteristics which make them suitable for a wide range of Australian conditions.

Above, Dr Miles Cooper, OIC Cocos Island, right, and Dr Trevor Schmidt with the first Boran and Tuli calves born to surrogate cows on Cocos earlier this month.

S-COR

From the Chief Executive

A column by Dr Keith Boardman

The environment is well and truly on the agenda in many countries, and Australia is no exception. The Wesley Vale pulp mill, the greenhouse effect and its implication for future patterns of energy use, the management of forests in south eastern Australia, the heritage list of rainforest areas in north Queensland, the treatment of Sydney sewage, and pesticides in food have been well publicised in the media.

The Government is now preparing a major environmental statement with three year funding for a range of activities with significant environmental impact. It is clear that much more attention will need to be paid to environmental costs in considering the economic viability of new industries or the expansion of existing ones.

CSIRO has the expertise to provide broadly-based and objective advice to Government, industry and the community on many environmental issues, and recent requests from Government for advice indicate that much is expected of CSIRO.

CSIRO scientists Dr Chris Fandry of the Division of Oceanography, Dr Peter Nelson of the Division of Forestry and Forest Products and Dr Robert Johannes of the Division of Fisheries visited Sweden, Finland and Canada at the Government's request to obtain up to date information on pulp mill technology and environmental aspects. A position paper is now being prepared for Senator Button, Senator Richardson and Mr Kerin.

There is also an excellent opportunity for CSIRO to take the initiative in promoting constructive discussion on environmental matters and assist in the resolution of conflicts. I firmly believe that CSIRO must take a lead role.

CSIRO has just released an occasional paper outlining the advantages to Australia of a massive reforestation program [see story, p.1]. The paper, *Regreening Australia: the environmental, economic and social benefits of reforestation* by Richard Eckersley, draws together much information on the potential of such a program to counter land degradation, the threatened extinction of many native plants and animals, and the greenhouse effect; to contribute to the sustainability of our agricultural industries, the expansion of our timber industries and the development of an environmental management industry with considerable export potential; and to generate many thousands of socially useful jobs which would particularly suit young people. Richard is a member of my staff and wrote last year's Commission for the Future report on youth problems.

The greenhouse effect will be a main topic of discussion at the first meeting of the Prime Minister's Science Council, and Dr Graeme Pearman, Assistant Chief of the Division of Atmospheric Research, and Dr Brian Walker, Chief of the Division of Wildlife and Ecology, will make the presentations. I was informed on my recent visit to Europe that climate modelling and the greenhouse effect are high on the political agendas, and the UK and France are according top priority to these areas for co-operation with Australia under the bilateral science and technology agreements.

Technologies to combat pollution of the atmosphere, water and land are top priority for all the European countries I visited, and are seen to provide significant opportunities for industry.

I gained the strong impression from my discussion with Government ministers and research organisations that basic and strategic research are to be accorded higher priority in government research organisations with extra funding, while near market research is seen as the responsibility of industry itself. New technologies such as materials technologies, including the development of new materials, biotechnology, software engineering and optico-electronic devices, top the list of priorities, rather than direct support for particular segments of industry.

A Keith Boardman

Letters to the Editor

Dear Editor,

After reading in many recent issues of *CoResearch* the banter and controversy over our new logo, I couldn't resist sending you the enclosed advertisement [see below] which shows how our Clayton colleagues like it to appear during Victoria's current footy season!

Greg Richards
Division of Wildlife & Ecology

CSIRO AUSTRALIA

Dear Editor,

I noted in a piece on the Parkes Radio Telescope on p.3 of the April issue that 'the telescope was also involved in three of the Apollo moon missions'. In fact it was involved in all seven, six from take-off to earth return – which were scheduled. The other was the ill-fated Apollo 13. A month's postponement cancelled Parkes' involvement as the moon would have been outside the northern limits of the telescope's coverage during the moon walks. However, when the fuel tanks blew up a day out from earth, Parkes was rapidly commissioned for the emergency resulting from loss of transmitter power and was able to cover the shortened trip straight around the moon and back to earth.

The Apollo series was not Parkes' first involvement with NASA; in the mid-60s data from one of the Mariner probes was recorded for an hour each day for several months.

John Bolton
Buderim, QLD

Dear Editor,

On the perils of neatness

As a former CSIRO officer, may I criticise one recent aspect of the CSIRO Board's policies, *viz* to rely too frequently on their advisers on business administration, particularly on matters concerning the work and location of some research groups. Such decisions seem to have been made solely for administrative 'neatness' and not necessarily for improved scientific research.

There is sufficient evidence from other countries to show that changes in the cause of 'neatness' are usually disastrous. An outstanding example sometime ago was the incorporation of the British Ditton Post-Harvest Physiology Laboratory into the nearby East Malling Horticultural Research Institute (EMHRI) despite warnings from leading food scientists. The EMHRI administration had little interest in, or knowledge of, post-harvest physiology, and within 10 years the work of this distinguished group ceased.

The transfer three years ago of the Tasmanian Fish Preservation Research Group led by a distinguished food scientist, Dr June Olley, from the Division of Food Research to the Division of Fisheries, has resulted in a serious decline in staff numbers from nine to two and a consequent decline in its effectiveness. One cannot blame the Division of Fisheries. Indeed, in a time of declining funds, it had an extra group thrust on it, particularly a group in which they had little interest. The group's work stood firmly in the field of food research and, for this reason alone, should never have been transferred.

Another group having an international reputation, the Post-Harvest Physiology Group of the Division of Food Processing, has recently been transferred to the Division of Horticulture, apparently because the administration or advisers believed that the group's interests lay in horticulture when in fact they lay firmly in food research. Their work was carried out co-operatively with the New South Wales Department of Agriculture whose horticultural advice was often sought and used by the post-harvest physiologists. One hopes that the result will not be as disastrous as that of the Fish Preservation Group, but present indications are doubtful.

J R Vickery
Strathfield NSW

Dear Editor,

I really must question the purpose and intent behind the inclusion of the 'Ad nauseum' article in the May issue of *CoResearch*. Not only was this turgid piece of verbiage both inflammatory and insulting, but the alleged 'wit' who composed this diatribe did not have the courage or courtesy to reveal him or herself.

Is *CoResearch* attempting to build bridges or barriers between scientists and administrators by the inclusion of this pompous and unnecessary piece of prose?

Gary J Biddle
Division of Tropical Animal Production

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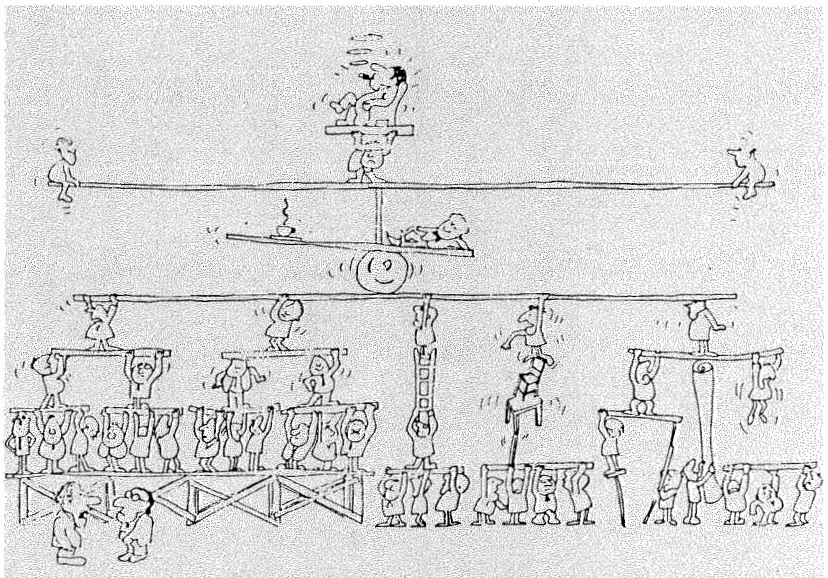
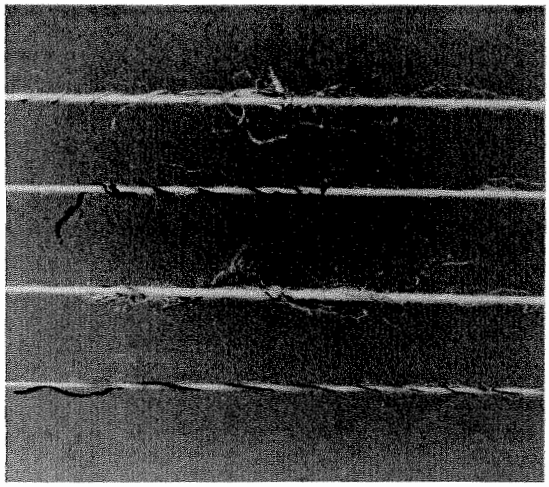
As I received no letters on CSIRO's budget and related matters, as called for in the April issue of *CoResearch*, there will be no special letters section in this issue on the subject.
Liz Tynan, editor.



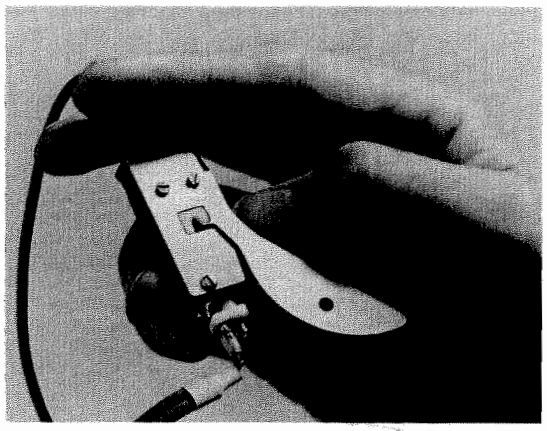
"Now that we're organized . . . . what the hell do we do?"

BLACK MOUNTAIN CUP

CSIRO's fun run, the Black Mountain Cup, is set for 12.30pm on Friday 21 July 1989, at the Centre for Environmental Mechanics, Black Mountain in Canberra. Will the prestigious Cup be retained by a Canberra Division or taken by one of the teams from Sydney or Melbourne? All entries to Greg Heath, 062-46 5692, or Will Steffen, 062-46 5648.



Above, wool yarns contaminated with dark fibre, vegetable matter and polyethylene. Below, the SIROCLEAR sensing unit.



###

Swiss manufacture for Wool Tech's SIROCLEAR

The Division of Wool Technology has signed an agreement with a Swiss company to bring SIROCLEAR to the international textile market.

SIROCLEAR is a remarkably simple and effective device which detects and removes coloured contaminants from yarn just after the spinning stage (see details below).

The agreement, signed this month with Loepfe Bros Ltd, based near Zurich, will bring royalties and other payments to the Division. But more importantly, it will add value to wool by allowing the production of yarn and fabric clear of impurities.

Loepfe is one of three major manufacturers of yarn sensors called 'clearers', also known as thick and thin place detectors. There are no Australian manufacturers of this equipment.

SIROCLEAR may be incorporated as part of the clearers or manufactured as stand alone units. It will be launched on the market at the major world textile industry machinery exhibition, ITMA, in early 1991.

A Senior Technical Officer from the Division, Mr Martin Prins, is in Europe participating in trials arranged by the International Wool Secretariat (IWS) at a German and an Italian mill.

The IWS and the Division have been responsible for negotiating the deal with Loepfe. It enables the company to produce and sell the device in return for a number of payments as certain sales goals are reached. In addition, a royalty will be paid on a sliding scale, starting at 12 per cent and reducing over time to five per cent.

Development of the device itself has been greatly helped by earlier work on splicing technology. Reliable joining of wool yarn during the production process has always been a problem. A significant improvement was made by a scientist formerly with the Division, Dr Russell Garnsworthy. He discovered that hot air changed some of the physical characteristics of wool, giving a much better splice. With the possibility of nearly invisible splices, scientists started to wonder whether removal of unwanted coloured matter would now be practical.

In 1984, Dr Dieter Plate, now assistant Chief of the Division based at Geelong, started examining ways of removing vegetable matter from the yarn. He was assisted in this work by Dr Lindsay Allan and Martin Prins. Dr Peter Lamb refined the concept and produced a miniaturised device, with the help of a range of people, particularly Martin and another technical officer, Steven Mihajlovic.

After a yarn is spun, it is wound onto large packages, and it is during this operation that thick and thin places and, now, coloured contaminants, are cut out and the yarn rejoined with a splice.

The key to the success of SIROCLEAR is in the illumination arrangement of its optical sensor which makes the yarn 'disappear'. When an undyed yarn is wound past the sensor there is essentially no change in reflected light, despite the continuous variations in yarn thickness and structure. When a contaminant such as burr or seed passes, there is a drop in signal and the cutting mechnanism is triggered.

The device is so sensitive it can pick up a single stained fibre in a yarn at speeds of up to 1600 metres per minute.

SIROCLEAR will offer substantial cost savings to producers of white or pastel wool fabrics, where dark fibres can be disastrous.

###

Wildlife's Deniliquin lab to close

The Division of Wildlife and Ecology's Deniliquin laboratory is to close by next July as part of CSIRO's strategy to reduce overhead costs in order to maintain vital research programs.

The Division's research at Deniliquin is concerned with the maintenance and restoration of semi-arid pastoral lands and their continued productivity.

The bulk of the work conducted from Deniliquin is based on a field site at Louth, near Cobar – seven hours' drive from Deniliquin – and hence just as accessible from Divisonal headquarters in Gungahlin, Canberra.

Deniliquin-based staff will transfer to Gungahlin to continue current research progams.

The move had been foreshadowed to staff last year but the decision at that time was to delay any move for five years when the field trials at Louth were completed.

The budget shortfall has forced the Division to act sooner, and it was with some regret that Division Chief Dr Brian Walker, announced the decision to staff in May.

'Deniliquin has been a wonderfully successful base for CSIRO research over many years,' he said.

Dr Walker told staff that he and members of the CSIRO Board and Executive Committee were aware of the considerable personal inconvenience the move would cause them and their families. CSIRO's latest budget shortfall, however, had made it essential to consolidate staff at fewer locations.

He said CSIRO's funding position was such that if research vital to the nation was to continue, it was imperative that action be taken to reduce overhead costs.

The six laboratories of the Division were reviewed and it was decided that relocation of the Deniliquin staff to Gungahlin was the only option which would enable financial savings without jeopardising research in progress.

'The research program currently operating out of the Deniliquin laboratory is a major investment in the nation's future and too important to lose. Our action to reduce overhead costs will ensure that we don't lose that investment,' Dr Walker said.

###

Industry award for John Kowalczewski

Dr John Kowalczewski, a post retirement research fellow at the Division of Building, Construction and Engineering, has been awarded the James Harrison Medal by the Australian Institute of Refrigeration, Airconditioning and Heating (AIRAH).

Dr Kowalczewski, who retired in 1985, worked for CSIRO for 30 years and has made many contributions to basic research in heat transfer and fluid dynamics, and applications in refrigeration, airconditioning and a number of other areas.

(Incidentally, he featured in *CoResearch* in 1979 when he survived an air crash in Greece which claimed 14 lives. He was then assistant Chief of the Division of Mechanical Engineering, on his way to a conference in China.)

He is shown above, left, receiving his James Harrison Medal from AIRAH Federal President. Doug Elms.

AIRAH Journal Photo

Teacher swaps classroom for lab at Environmental Mechanics

For Louise Rostron, working in a CSIRO research laboratory was an eye-opening experience in more ways than one.

Louise is one of three Canberra secondary school science teachers who participated in the ACT Schools Authority's 'Teacher in Residence' program. She was seconded from Caroline Chisholm High School for four weeks in April to work at the Centre for Environmental Mechanics.

It was a very busy month. In addition to taking part in research in the Centre's soil physics program, Louise developed a series of experimental projects to take back to her school, sat in on a meeting of the Centre's advisory committee and participated in the Centre's Women in Science program.

'Great' is how she describes her reaction to working in a research lab. 'It certainly has a different atmosphere to the classroom. One of the things I enjoyed most was the quiet – the opportunity to work without the noise, hubbub and frequent interruptions of the classroom'.

The Centre's Pye Laboratory provided other pleasant surprises.

'I had imagined that the scientists would be closeted away in their own little corners, but instead I found an enormous amount of interaction. There were frequent discussions in the Lab's tearoom and courtyards, a wide variety of laboratory and field experiments to plan and execute and a number of seminars to attend. There was always something going on.

'I was also surprised by the seemingly contradictory time scales of the research. Many research projects obviously have lifetimes of years, yet I could see real progress and solid output in just a few weeks.'

A good example is the work Louise carried out with Ian White and Steve Zegelin on the development of the TDR systems for measuring the water content of porous materials. Although the full development of the system will take several years, Louise's research – examining aspects of the TDR surface probe's geometry on its effectiveness – is a significant contribution.

By consulting widely with the Centre's research staff, Louise developed classroom experiments based on the Centre's work. She got a number of interesting suggestions, from studying wind in the human environment to determining just how wet the ground is. But it was Ian Webster's physical limnology program that provided the most fascinating possibilities.

'One simple experiment will study the effect of the turbidity of a water body on evaporation rate,' she said. 'And this is real research. It will be exciting for the students to do an experiment that is not "cooked", that really is a venture into the unknown.

'In another project we'll look at the thermal stratification of Lake Tuggeranong. That will give the students a chance to study a part of their own local environment.'

The opportunity to sit in on the Centre's advisory committee meetings dispelled another myth about CSIRO scientists. 'The presentations were very informative. Far from being "airy fairy", the people justified what they were doing in down-to-earth, understandable ways.'

During the last week of Louise's visit, 25 of her female Year 9 students came to the Pye Lab as part of the Centre's Women in Science program. They were given a brief tour of the Lab and discussed career paths and options with scientific and technical staff.

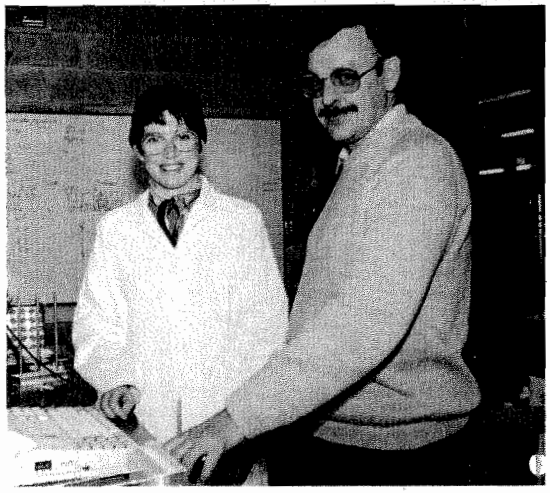
Encouraging girls to pursue studies in science and maths is part of Louise's job at Caroline Chisholm High. 'We have our own strategies, such as single-sex classes, journal writing and special events, to get girls to continue in science. It's a long term project; we try to monitor our success by following their paths through college.

'When I first heard that the Centre had a Women in Science program, I was sceptical. In such a male dominated workplace, I expected to hear a few derogatory comments about the idea. But I have sensed nothing but strong support of and commitment to the project.

'I really applaud CSIRO's effort to encourage more women to pursue careers in science. The more of it, the better.'

Refreshed by a month in a CSIRO lab ('...it was almost like being a uni student again...'), Louise is now back in the classroom trying to spread some of her enthusiasm, and that of the Environmental Mechanics staff, to her science students.

'...I could see real progress and solid output in just a few weeks...'



Above, Louise Rostron and Ian White testing new TDR probes at the Centre for Environmental Mechanics.

###

British scientist to head AAHL

The head of one of Britain's major animal research divisions is about to leave England for sunnier skies in Australia.

Dr Keith Murray has accepted the dual position of deputy Chief of the Division of Animal Health and OIC of the Australian Animal Health Laboratory at Geelong.

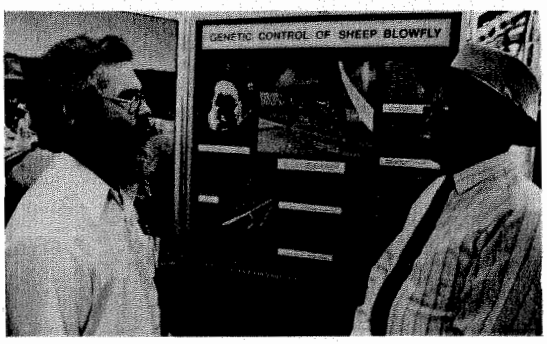
At present, he is in charge of the Division of Immunology and Pathology in the Pirbright Laboratory of the British Animal and Food Research Council's Institute for Animal Health. He is expected to take up his new appointment in October. Dr Murray will replace Dr Bill Snowdon, who retired at the end of April.

Woolexpo: you read the story; now see the photos

April *CoResearch* carried the story about CSIRO's involvement in Woolexpo at Armidale, but the photos took a little longer...

It may be 8 o'clock on Friday night at Woolexpo, but Dr Keith Dash, Manager of Rural Industry Relations for the Institute of Animal Production and Processing, is still hard at work seeking divine inspiration for words to express the CSIRO point of view...

...while Nancy Mills Reid, left, the Institute's Communication Manager, has a more earthly approach with Sally Donovan and Paul Joseph, principals of Pinnacle Promotions.



And after the razzamatazz of Friday night it was back to business on Saturday and Sunday. Here Dr Geoff Foster, left, of the Division of Entomology, expounds on the sex life of blowflies, and...

...Betty Hall, Elders Pastoral Veterinary Adviser, discusses another section of the CSIRO display in the Elders Pastoral Technorama with Mr Bob Gallagher of 'Abbey Green', Guyra.

Photos courtesy of Armidale Express.

New EEO program

First steps towards better conditions for disabled staff

For the first time in CSIRO's history, an equal employment opportunity project is focusing on the employment conditions of the Organisation's disabled staff.

The project will examine issues such as access to employment opportunities and whether conditions and career enhancement for people with disabilities are fair.

The CSIRO-wide assessment is being co-ordinated by CSIRO's Equal Employment Opportunity Officer, Ms Patricia Quinn-Boas, as part of the 1989 EEO program.

The aim is to achieve two goals by the end of 1989:

- the identification of a number of CSIRO employees who have disabilities, who are willing to act as consultants within the EEO program; and
- the establishment of a network of these employees enabling them to communicate with each other through regular meetings or newsletters.

Ms Quinn-Boas says the project, to be carried out state-by-state, will serve a number of purposes.

'It will identify the number of people in CSIRO who have disabilities; promote contact between employees and EEO officers; educate employers within CSIRO about the extent and magnitude of the problems faced by people with disabilities; and identify state contacts outside the Organisation who may be able to offer advice and help on disability issues,' she said.

The assessment has started already with a close look at conditions in Adelaide.

'What we glean will be applied throughout the Organisation. We are, in effect, establishing a framework for investigation,' she said.

Maximum output

A review will be made of current provisions or those which need to be made to enable any CSIRO employee with a physical disability to achieve maximum work output and job satisfaction.

Comments and recommendations are also invited on how people with disabilities can make the most of development and training opportunities, and career advancement in general.

'People with disabilities' is one of the four groups targeted by legislation, which became effective in July 1987, as requiring particular attention in employment. This refers not only to recruitment practices but also to the provision of support services and opportunities for staff development.

The other three targeted groups are women, Aboriginal/Torres Strait Islanders, and migrants with non-English speaking backgrounds and their children.

Under the legislation, CSIRO is required to submit its EEO Management Plan to the Public Service Commission for approval and report annually on progress. Statistics relating to employees in the target groups must also be submitted each year to assist in the Commission's evaluation of CSIRO's program as a whole.

'In the past the main emphasis has been on women, but since we have achieved many of our goals with that group, other groups can now be targeted,' Ms Quinn-Boas said.

The 1987 EEO census showed that 15 per cent of staff employed at that time had physical disabilities which people at work knew about.

However, Ms Quinn-Boas said there may be other disabled staff who did not declare their disabilities for fear that their work performance would be judged less favourably. Some also saw their disabilities as being irrelevant to their jobs.

The issue of social justice is considered in formulating an EEO program but there are other considerations also.

'Good management practice demands that an organisation make the most of each member of staff so it can benefit from their increased productivity,' Ms Quinn-Boas said.

Awareness of the handicaps of disability enables a 'reasonable adjustment' by employers. This is when an employer makes changes to the physical environment, work procedures or duties of a position, enabling an employee with a physical disability to achieve maximum productivity with minimum stress.

The costs of change are considered: whether they entail the purchase of equipment, the provision of special facilities or the use from time to time of other personnel.

THE ADELAIDE STUDY

The EEO Sub Committee of the Consultative Council decided to start the disability survey with a focus on a specific geographical area.

Adelaide was chosen, partly because of the enthusiasm of Adelaide-based EEO Sub Committee member, Mr Ralph Gilbert, who has a disability.

Dr Mel Hopgood, Adelaide Safety Officer, was also keen.

Notices were displayed telling of the EEO Officer's impending visit and inviting staff members of the various South Australian CSIRO work sites to meet her to discuss the issue of disability in the workplace.

'Surveys will enable us to people with disabilities and to gain better insight into what gain better insight into what needs to be done,' Ms Quinn-Boas said.

'One of the most useful aspects of the visit has been the identification of resources at state level which CSIRO can use,' she said.

'This is the beginning of an education campaign which will highlight the need for adaptation throughout CSIRO,' she said.

Above, Mr Ralph Gilbert on the ramp access to the Division of Soils building in Adelaide.

CSIRO's Executive Committee has approved a scholarship scheme for people with disabilities, developed as part of the 1989 EEO Program.

The scheme will operate in South Australia for six years. It involves the selection of two Year 7 students with an interest in and aptitude for scientific study to be supported by a text-book and equipment allowance each year of their secondary study.

They will also have the opportunity to participate in work experience programs at CSIRO during their secondary education and will benefit from interaction with CSIRO scientific staff during that time.

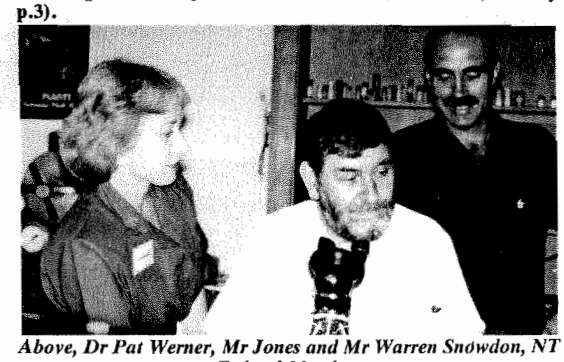
The proposal was received with particular interest by the South Australian government at a meeting held during the Adelaide visit.

The meeting was with the Disability Adviser to the Premier of South Australia, Mr Richard Llewellyn, and the Senior Project Officer (Disability Services) in the South Australian Department of Personnel and Industrial Relations, Ms Pamela Skardoon, to explain the project and explore current programs operating within the South Australian Government.

Investigations are now underway to establish a recruiting pool of potential students and set guidelines for their selection.

Barry Jones on the move

Science Minister Barry Jones made his 8 June visit to the Division of Wool Technology a 'hands on' affair. Mr Jones, right, is shown handling clumps of stained and contaminated wool automatically detected and removed from a processing line with technology being developed by Dr Grahame Abbott, left. As part of a whirlwind Geelong visit, Mr Jones spent two hours at the Division acquainting himself with a range of Wool Technology programs, including the recently commercialised Sirocler device (see story p.3).



Above, Dr Pat Werner, Mr Jones and Mr Warren Snowdon, NT Federal Member.

CSIRO staff in the Top End made the most of a recent five day visit by the Science Minister Barry Jones, devising a packed schedule to ensure he saw as much scientific work as possible.

It was the Minister's first visit to Darwin in almost five years. The trip included a visit to the Tropical Ecosystems Research Centre laboratories where Mr Jones held a 'Darwin style' media conference and met senior staff from each of the four divisions represented at TERC, as well as Siromath and Information Services Unit staff. TERC Director Dr Pat Werner was on hand to show the Minister around.

The Minister then spent a day at Kapalga, the Division of Wildlife and Ecology's 750sq km research station in Kakadu National Park, 160km from Darwin.

The wet season conditions didn't seem to deter the Minister, who showed great excitement when he held a frill neck lizard caught by one of the researchers.

It was then on to Katherine via the controversial Coronation Hill. At Katherine Mr Jones inspected the Tropical Crops and Pastures Katherine Research Station and met staff.

The Minister's visit proved a morale boost for staff, who said later they hoped it wouldn't be another five years 'before we see him in this neck of the woods again'.

Double Helix member champions CSIRO scientists

To Mr Hawke (Prime Minister)

I am writing to you about the conditions some C.S.I.R.O scientists are working in.

Last year Melbourne News and on Monday 8th May 1989 A.B.C T.V News there were stories on these conditions.

The weed researcher scientists were working in a Greenhouse called "unsafe" (an understatement) several years ago. In it they are doing important work on pest plants, that will benefit Australia in years to come.

Double Helix Science Club member Sher Ritchie, aged 13, feels so strongly about conditions for CSIRO scientists, she took the Prime Minister, Mr Hawke, to task over the matter. Her letter appears in full at left.

To Mr Hawke (Prime Minister),

I am writing to you about the conditions some CSIRO scientists are working in.

Last year, [on] Melbourne news and on Monday 8 May 1989 ABC TV news, there were stories on these conditions.

The weed research scientists were working in a greenhouse called 'unsafe' (an understatement) several years ago. In it they were doing important work on pest plants that will benefit Australia's farmers in years to come.

Last year's story showed some pest animal research labs. This report said sewerage regularly leaked in, and electron microscopes and other machines constantly broke down from lack of maintenance. Several scientists had retired early so assistants could keep their jobs.

These scientists are still working, but only on pensions.

If we want this 'Great Country's' science to improve, it might have more chance of doing so in better conditions.

These conditions could explain why so few people take scientific careers. They don't want to end up like this.

On 8 May you announced you would help the scientific community by:

A. starting a science committee with you at the head;
B. creating more university scholarships for science and technology subjects;
C. increasing government grants to industry research
D. and having a $¼ million prize each year for 'Great Australian Scientific Talent'.

I approve of all these measures except the last one (more on that later).

These show you and your government have a positive commitment to science in Australia. I believe B. and C. should have been done long ago.

Now to the $¼ million prize. I think this is somewhat ridiculous. Where is the money coming from???

I believe that money could and should be used to help the appalling conditions some CSIRO scientists are working in. If you arranged for the conditions to be repaired soon, you could still give out that science prize, only not for a few years yet.

Here are some suggestions I don't think would cost much but could help conditions:

1. get several large sheds built, one for each department with poor conditions. This would mean the scientists would work in a sturdy building that wouldn't be subject to flooding, coming to pieces or springing leaks at inconvenient times.

2. try and buy spare parts for the scientific machines cheaply, and keep them for when the machines break down.

What chance is there of Australia progressing in science of today and tomorrow if the conditions our scientists are working in are not even equal to standards elsewhere?

I know running a large country as Australia requires money and cutbacks have to be made. But please review some of your new proposals for science and use some of that prizemoney to repair conditions.

If you like, the $¼ million prize could be given in turn to the struggling weed and pest animal departments (not the public awareness dept) for two years as a reward for their service to Australia.

In the end it will surely benefit everyone: farmers, businesses and government.

Thank you, from

Sher Ritchie, age 13

Scientists in the honours list

Cont. from p.1

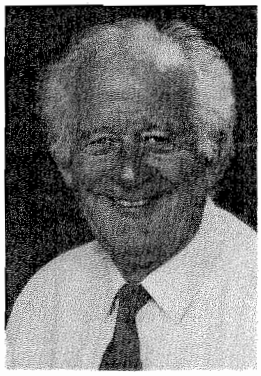
CSIRO scientists who were honoured in this year's Queen's birthday list were:

Dr Keith Norrish, who was made an Officer in the general division of the Order of Australia (AO), has made important contributions to the mining and agricultural industries, by pioneering the use of x-rays for chemical and mineral analysis. His development of x-ray fluorescence spectrometry has added enormously to the efficiency of the Australian mining industry.

Dr Ken McCracken, who was also made an AO for services to space science and technology, would be well known to *CoResearch* readers (most recently, a profile appeared in the May issue). Following a career as a physicist with the US space program, he became foundation Chief of the CSIRO Division of Mineral Physics in 1972, and COSSA Director in 1984. He received the CSIRO Medal last year.

Dr Bill Blevin has been awarded the Medal of the Order of Australia (AM), for services to science, particularly in applied physics. He joined CSIRO in 1953 as a research scientist specialising in photometry and radiometry. In 1976 he became the Division's Chief Standards Scientist and in May 1988 was appointed Chief. Dr Blevin is recognised internationally as an expert in measurement matters, and is a member of the board of the International Bureau of Weights and Measures in Paris.

Dr Katie Helms received her AO for services to agricultural research. She is a virologist and pathologist who continues her research at Plant Industry despite her recent retirement.



Dr Keith Norrish

Congratulations to Earle Smith, Divisional Administrative Officer for the Division of Tropical Crops and Pastures, for receiving an AM in the honours list.

His award recognised his lifelong service to the Surf Life Saving Association of Australia. Earle joined the Association in 1942 at Kirra and from 1948 onwards was associated with the 11 club Point Danger Branch in various executive positions.

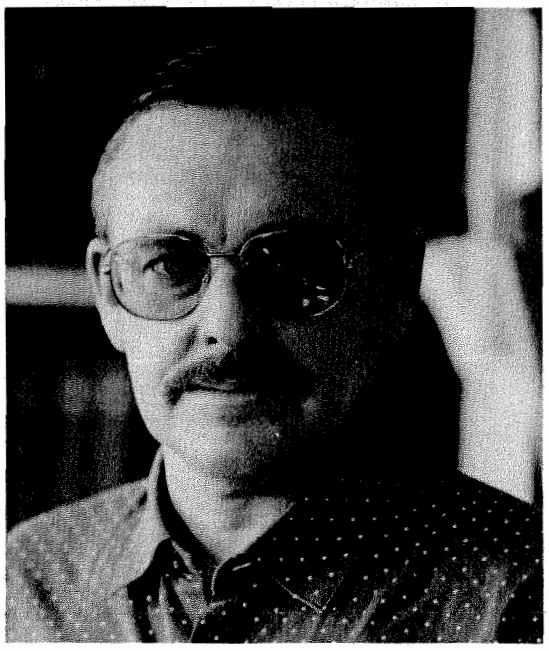
Although no longer in the 'first flush of youth', Earle continues to be active on the physical as well as the administrative side of surf life saving, and trains young swimmers and organises and referees surf carnivals.

The corner grocery and the railways

Dr Ian White of the Centre for Environmental Mechanics is well known around Black Mountain as a writer of poetry and short stories, many of which make some trenchant comments on the state of Australian science and CSIRO. His latest story will surely raise a few eyebrows, and perhaps hackles, around the Organisation. The story has also been accepted for publication in the exclusive literary journal of the Division of Plant Industry, *Meet Pi*.

Kirgle's grocery shop **is gone now, a victim of Coles' Brave New World Supermarket or the motor car. It was only ever a one-roomed weather board extension on the front of Kirgle's house, jutting out to the bare, compacted earth which served as a footpath in Stanhope Street. In its windown were a pyramid of faded Winning Post Chocolate boxes, flyblown Milo tins and a giant but yellowing Aspro box; the very basics of civilisation as we knew it then.**

In his declining years old Doug Kirgle grew quite bitter over the desertion of his customers and their new allegiance to the flash downtown supermarket, which didn't even home deliver. He would stand in his soiled white apron, just behind the tattered plastic fly strips at the door, muttering and glaring at the passers-by, reluctant even to let you in to the gloom of the interior. Inside, the shelves grew emptier and dustier as the years went by; with the sticky fly strips so old that the mummified flies would fall like autumn leaves at the slightest breeze. Even the famous and seemingly irrepressible Arnott's parrot on the biscuit tin appeared to lose its feathers. But it was not always so. Time was when old Doug could choose his customers.



Above, CSIRO's muse, Dr Ian White.

He was never a particularly friendly or rational character, but Kirgle's shop was mighty handy when you lived on the edge of town and didn't have a car. Doug was really peculiar. Once Uncle Bill went in to get half a pound of bacon for Sunday breakfast. Doug wouldn't sell it to him. It was all the bacon that was left and, as he explained to Uncle Bill, he couldn't possibly sell it to him because someone might come in who wanted it.

Doug developed a fascination, really an obsession, with the railways. He thought the railways were the epitome of good order, efficiency and modern civilisation. I doubt that he'd been on a train since he bought his Morris 10 delivery van. The carriages on our line were dog boxes made in 1894 and the trains were never on time. Doug drew up a very elaborate timetable for his family, based on the railways timetable. Every minute of their waking lives was specified. Sleeping, eating, washing, crapping – all to the metronome beat of the rail clock he kept in the hall.

Major problems first arose when Doug found out about the railways specified percentages. Actually Johnny Salt told him about them. Johnny got the intermediate certificate locally then went to tech. in Sydney and finally became 'something' in the railways head office. He was the town success story and a shining example of the power of secondary education. He was also a bit of a practical joker. John told Doug that the railways had determined that steam trains ran most efficiently when the load in the tender was 60 per cent by weight coal and 40 per cent water. All trains apparently had to aim to having these optimal, specified percentages at all times.

With some strange twist of logic, old Doug reckoned that these specified percentages should apply equally to human nutrition, 60 per cent solid food, 40 per cent fluids. Thereafter you couldn't buy two pounds of potatoes without buying a pint of milk; it was mandatory for every customer. This caused all sorts of headaches. Were, for example, fags a food? Were oranges solid or part solid/part liquid? Customers started to drift away as Doug's obsession with things railway intensified.

To make matters worse, Johnny let slip the 'fact' that the breakdown of monies paid into railways ticket offices was 70 per cent in bank notes and 30 per cent in coins. Salty claimed that the railways specified therefore that all ticket offices should have these percentages in the till at the start of each day.

If it was good enough for the railways, it was good enough for Kirgle's grocery. Unfortunately, Doug knew nothing about statistics, let alone the differences between railways and corner groceries. He applied these percentages to each every customer. That caused a major upheaval. For starters, a minimum purchase had to be about 14 and threepence ha'penny, to meet the minimum required ratio of notes to coins. Since a packet of fags cost two and six, this cut out a lot more of his loyal, but under age, customers. So trade withered, but not old Doug's enthusiasm for the railways and their specified percentages of 70:30 and 60:40. Before he passed on to that great marshalling yard in the sky, he infected his son, young Dougie, with this enthusiasm.

One of my cousins tells me that young Dougie, like Johnny Salt, has done very well for himself. Apparently he's got a top level job in some government organisation in Canberra. Now Canberra's railway station is tucked tidily, well out of sight and its population is said to be highly educated and sophisticated (it would have to be, just be able to vote there), so I don't suppose that young Dougie has had much opportunity to introduce those railways specified percentages there.

New agreement to research oil shale

The Division of Fuel Technology and the United States Department of Energy are looking to the future, with an agreement to co-operate on oil shale research.

The move reflects the view of scientists that governments should not be complacent about the current ample world supply and relatively low prices of crude oil. In fact, Australia is facing a serious decline in its crude oil self sufficiency, and which is predicted to stand at about 55 per cent of our consumption by 1990–91.

In the absence of major new oil discoveries, the decline will continue throughout the next decade. This trend will have a major impact on our unfavourable balance of payments.

Division Chief Dr Peter Alfredson said the new agreement was another step towards establishing oil shale as a viable alternative to petroleum.

The Division's scientists have always worked closely with colleagues in the US. Dr Alfredson said the latest agreement formalised this relationship and was expected to lead to much closer co-operation.

It covers analysis of mining methods, optimisation of oil production during retorting and studies of mineral reactions and their relationship to the control of air pollution.

The agreement follows a Memorandum of Understanding on Energy Research and Development signed in April 1988 by the Australian and US governments.

Australia's major oil bearing shales are in eastern Queensland and contain an oil supply equal to 20 billion barrels of oil — more than 10 times the remaining Bass Strait oil reserves.

The Division has researched the properties of oil shale since 1982. A report on CSIRO research in this area may be found in *Ecos* 58, Summer 1988/89.

The Fifth Australian Workshop on Oil Shale is being held by the Division at Lucas Heights 7–8 December. Full details of the conference program will be available in September, and enquiries should be directed to the Division of Fuel Technology, Private Mail Bag 7, Menai NSW 2234, opr telephone 02-543 3005.

Above, Division Chief Dr Peter Alfredson, left, and Mr Richard Williamson, Deputy Assistant Secretary for International Affairs, USDOE, at the signing of the oil shale agreement.

Above, seated, Dr Alfredson and Mr Williamson, and standing left to right, Dr Alastair Christie from the Department of Primary Industries and Energy, Mr Gene De La Torre from USDOE, Mr Thomas Timbario, Vice President of EA-Mueller Inc, Ms Elizabeth Buffum from USDOE and Dr Alfred Ekstrom, assistant Chief of Fuel Technology.

Obituaries

Dr Michael Jermyn

The recent death of Mike Jermyn at the age of 68 brings to an end a lifetime of scientific achievement and outstanding service not only to CSIRO but also to the community at large.

Mike was a Chief Research Scientist at the Division of Protein Chemistry (now Biotechnology) when he retired three years ago.

He served as Editor of the CSIRO Officers' Association Bulletin for a time and his literary creation, James Pond PhD was, for many years, an entertaining feature of that journal.

Sadly, he had been in poor health since his retirement and was unable to enjoy to the full his many interests.

Mike Jermyn was a New Zealander and he graduated BSc and MSc (First Class Honours in Chemistry) at Canterbury College (now the University of Canterbury). He first came to Australia in 1941 to work as a munitions chemist at the Explosives Factory, Defence Force Laboratories.

In 1946 he went to Cambridge University to study the cell wall changes which occur in ripening fruit and for this work he was awarded a PhD in 1948. After studying microbiology for a year he joined the Biochemistry Unit of the Wool Research Laboratories (later the Division of Protein Chemistry) and began his 35 year association with CSIRO.

His initial project was investigating fundamental aspects of the action of fungi on textiles and, in particular, the degradation of cellulose, with special emphasis on the enzymes of *Stachybotrys atra*. His research over the next 20 years encompassed general organic chemistry, carbohydrate chemistry, protein chemistry (particularly glycoproteins), plant biochemistry and microbiology. In recent years his research had centred on the lectins or phyto-haemoglutinins.

He discovered and characterised the beta-lectins and demonstrated their ubiquitous occurrence in plants, and the relationship between plant species and the particular lectins present.

He investigated the possible roles played by lectins in self-recognition by plants, particularly in the reproductive process. This research led to extensive collaboration with groups at Melbourne and La Trobe Universities.

Mike served as acting Chief of the Division on several occasions and represented the Division on various committees. His independence of thought made him particularly effective in his role as the Division's ombudsman, a duty he performed with tact and understanding.

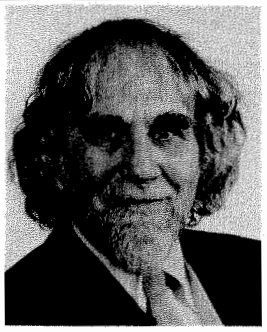
He contributed greatly to the life and character of the Division. He had an encyclopaedic memory and an outstanding general knowledge, which was always at the disposal of his colleagues. In matters pertaining to biology, his knowledge was astonishingly wide and varied. His dry wit and philosophical sense of humour will be long remembered.

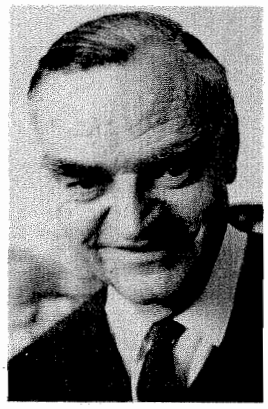
His wide range of interests included politics and he served as Councillor on the Northcote City Council, where his scientific background was invaluable to the inner city committee grappling with environmental problems.

He was a prolific reader, an art collector, a proficient painter and an enthusiastic cultivator of native plants.

He met and married Ida when they were both students at Canterbury College and they were a devoted couple. She and their son and daughter, survive him.

Dr J F K Wilshire





Above, Dr Michael Jermyn. Below, Mr W A Daunt.

Mr W A Daunt

The sudden death of William Achilles (Ach) Daunt on 30 April has removed from the scene one of the quiet workers who contributed to CSIRO's effectiveness in the decades after World War II.

In April 1946 Ach was appointed as a temporary clerk to the CSIR Section of Tribophysics, headed at the time by Dr Stewart Bastow and revelling in its new name after some years as the Section of Lubricants and Bearings.

As with many similar appointments, the temporary tag soon became farcical and Ach formally became permanent, and ultimately Divisional Administrative Officer.

For nearly 20 years he operated alone as the administration for the Chief, Dr Walter Boas (who became Chief in 1949), and some 50-60 staff, with responsibility for all the activities of estimates, finance, purchasing, stores accounting, travel, correspondence, leave records, etc, even down to the counting and delivery of the cash pay each fortnight.

In his own words, his philosophy was that '...the administration of the Organisation is not an end in itself but a means of making the maximum use of the funds available to the Organisation whose function is, in the main, research. Maximum use...implies not only the employment of the best research and administrative staff...but also...the production of a co-operative and congenial atmosphere' (CSIRO Div. Mat. Sci. Tech Archives, file PH/DAU/1).

Just how well Ach lived up to this philosophy is shown by the nostalgia with which his colleagues look back on those days with gratitude for the way they were able to get on with their tasks with the minimum of fuss. In his unobtrusive way, Ach was seen as a vital player in all the research teams.

In the early 1970s, the size of the Division was dramatically increased with a split of activities onto three sites in Melbourne and one in Adelaide. When the administrative staff also increased dramatically, Ach moved to Fishermens Bend in 1972 to look after the Engineering Ceramics and Refractories Group, a post he held until his retirement in 1975.

Ach's quiet mien, shy smile, generosity and gentleness belied the fact that during World War II he had served as a Flying Officer in the RAAF. After pilot training he ferried Beaufighters to the Middle East and operated them from Bengal to Burma before captaining Liberators over Burma and Siam (as it was then).

Apart from his official duties, Ach participated in Divisional social activities, particularly bridge and cricket. He was a regular member of the bridge set that met for games in most luch breaks during the 1950s and 1960s; here his occasionaly unorthodox bidding raised the odd eyebrow but never (well, hardly ever!) drew a cross word.

His pre-war experience in district cricket made him an essential part of the Divisional cricket team which regularly did battle with a mixed bag of chemists, etc, from Fishermens Bend.

His contribution as an opening bat was always vital and he top scored in the last two games of which records still exist. After retirement, Ach took great enjoyment in both his bridge and his golf, achieving proficiency in both.

Ach will always have a special place in the memories of all of us who had the good fortune to work with him.

J A Spink
J F Nicholas

Dr David Goodchild

Dr David Goodchild, formerly of the Division of Plant Industry, died after a long illness on 16 May 1989. One way or another, David touched most of us through his varied activities, many of which centred on electron microscopy.

David was born in Sydney in 1930. He undertook a BSc.Agr at the University of Sydney, graduating with honours in 1953. His PhD was done in the Faculty of Agriculture at the University of Sydney. Towards the end of his PhD work he went to UCLA and received an MA. In 1959 he joined the Division of Plant Industry as a grass virologist. Virology quickly led him to an electron microscope.

Over the next 30 years, David's research centred on structure-function studies of: legume root nodules; chloroplasts; and protein synthesis and accumulation in developing plant seeds.

Anything involving electron microscopy held intense attraction and his exceptionally wide reading made him an amazing source of information.

David had three periods of extended research overseas during his CSIRO years. Firstly, in the early 1960s in California, he 'learnt' electron microscopy. Then in 1969/70, his visit to San Francisco resulted in David establishing in Australia the new technique of freeze fracture. In 1980 in York he was also involved in low temperature studies.

In 1966, David joined colleagues John Farrant, D G Drummond, George Rogers and John Sanders on the Academy of Science sponsored National Committee on Electron Microscopy and in 1968 organised, with Barry Filshie, the first Australian Conference on Electron Microscopy. Many others followed.

In 1974, David was the Secretary of the organising committee for the Eighth International Congress on Electron Microscopy held in Canberra.

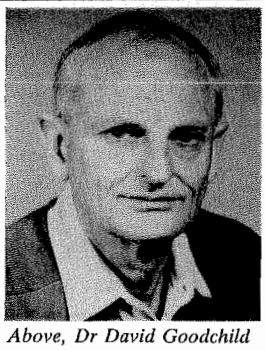
In 1968 he produced the first *Directory of Electron Microscope Users in Australia*, an invaluable directory which has flourished under Colin Beaton in recent years.

From 1980 to 1986 David chaired the National Committee and oversaw the establishment of the Australian Society of Electron Microscopy.

As many CSIRO people are aware, David's activities were not confined to microscopy. He was responsible, in 1968, for the establishment of the ACT branch of the CSIRO Benevolent Fund, and was its chairman for 17 years.

The confidential nature of this work means few of us will ever realise how many of his colleagues benefited from the Fund. He was also active in dealings with CSIRO Benevolent Funds throughout Australia and was considered a motivating force in this area.

In recognition of his many contributions, The David Goodchild Trust was set up in 1987. The Trust, funded from private and commercial donations*, will sponsor The David Goodchild Award. This will be made at each Australian Conference on Microscopy, and will support a young electron microscopist working in biology to attend an international electron microscopy meeting.



Above, Dr David Goodchild

We have lost a dear friend who was a constant source of comment and blunt, honest opinion. He was quick to criticise but also quick to be on hand when required. His recent letters in *CoResearch* on the corporate centre indicate how thorough he was in researching matters which concerned him.

To his wife Margaret and daughters Robyn and Libby, we offer our deepest sympathies.

Stuart Craig
Division of Plant Industry
& Liz Tynan

** N.B. The Trust is still accepting donations from individuals or organisations. Call Stuart at the Division of Plant Industry for details.*

***CoResearch* is produced by the Public Affairs Unit for CSIRO staff. Readers are invited to contribute or offer suggestions for articles. The deadline is the last Monday before the issue month. Editor: Liz Tynan, PO Box 225, Dickson ACT 2602. PH: 062-48 4479.**

CoResearch

No. 325 July 1989 CSIRO's staff newspaper

CSIRO AUSTRALIA

Opinion poll
OA overwhelmed by positive response to Australian R&D

A survey commissioned by the CSIRO Officers Association, which indicated strong community support for Australian R&D, will be used by the OA in its campaign in marginal electorates later this year.

OA President John Stephens said the McNair poll, which found over 80 per cent of respondents believed Australia should at least equal the higher spending on R&D by other countries, exceeded his 'wildest expectations'.

'We now have a clear statement of community opinion that cannot be denied,' he said.

Science Minister Barry Jones told *CoResearch* he was 'gratified', though not surprised by the poll. 'I had always thought there was wider sympathy for R&D in the general community than supposed by politicians, bureaucrats and the media,' he said.

He said the conventional wisdom that Australians were only interested in sport was false.

Although the general community, like politicians, bureaucrats and the media, did not have a real understanding of research, there was far more appreciation of its aims than found among the policy makers, he said.

'There seems to be a strong view in the bureaucracy that research is a form of middle class welfare – Balmain basket weaving for boffins – simply using public money to keep the scientists amused,' he said. This view clearly was not reflected in the community.

Mr Stephens said the results of the poll would be made as widely known as possible, and would feature prominently in its pre-election campaigning. The OA has targeted marginal electorates, mainly in Melbourne, to push the message that the Government is not doing enough to support Australian R&D and to rally further community support.

'The main aim is to put R&D high up on the political agenda so that all political parties have to respond to it at the forthcoming federal election,' he said.

The opinion poll of 1040 people was carried on 26-28 May out by AGB McNair as part of a national 'omnibus' survey which included questions about other subjects as well.

The interviews were conducted face to face with a scientifically selected random sample at numerous locations throughout Australia.

The first science question involved expenditure on R&D and asked people to indicate how much Australia should spend in comparison with countries such as the USA, Japan, West Germany, France and Sweden. Fifty three per cent answered that Australia should spend, per head, the same as these countries, while 18 per cent said we should spend a bit more and 10 per cent said much more.

Less than one in five people said we should spend less than we are now spending.

Another question asked about who should be responsible for funding R&D into six different areas. Of these, agricultural production, methods for discovering natural resources and the establishment of new, technologically advanced industries were mentioned by about half the respondents as being the equal responsibility of government and industry.

Research into bushfires, drought and soil erosion was seen as being mainly the responsibility of government, while about half the respondents said research into computers and robots should be the responsibility of industry.

Eighty-five per cent said scientists and engineers were best suited to determine the direction of Australia's R&D effort. Only two per cent said politicians were best suited to determine this direction.

The results have been analysed in various ways, according to demographic indicators such as age, marital status and education. Mr Stephens said it was significant that those groups who could be seen to be suffering most from harder economic times - e.g. young families - were almost as positive on the need for higher levels of R&D funding as other groups.

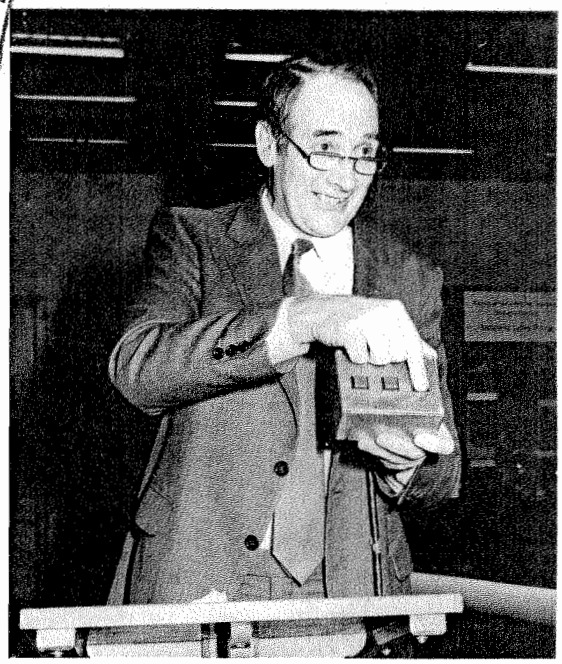
Mr Stephens said a possible interpretation of this strong support for R&D arose from a perception of science as a source of answers to both environmental problems and economic development needs. 'That is, we need research to resolve the problem of being "green" and "progressive" at the same time.'

###

Expenditure per head of population on scientific R&D

	Much more	A bit more	About the same	A bit less	Much less
TOTAL %	**10**	**18**	**53**	**15**	**3**
Area					
Sydney	13	19	51	14	2
Rest of NSW	7	14	54	19	4
Melbourne	12	14	55	17	2
Rest of Vic	10	18	49	16	4
Qld	8	22	52	14	4
SA/NT	9	20	57	8	4
WA	6	18	52	15	4
Tas	19	11	56	7	6
Sex					
Male	11	19	50	15	4
Female	9	16	56	14	3
Age					
Under 25	6	26	47	18	3
25-29	9	16	56	14	2
40-54	13	16	52	14	4
55 and over	11	14	56	13	4
Education					
Some secondary	10	17	53	15	4
Some tertiary	7	13	59	16	2
Completed uni	11	33	42	9	2

...three...two...one...blast off



Above, Dr Bob Brown, Chief of the Division of Manufacturing Technology, presses the button which activates the mechanism which officially opens new laboratory facilities at the Division's Sydney site. See over the page 'who' cut the ribbon.

Photo: Maria Basaglia

Sirodial service up and running

The long-held ambition of Sydney-based National Information Network regional manager Dr Yvonne Esplin, to establish an automatic national CSIRO telephone information service, has become a reality.

Sirodial is now operating, supplying frequently-requested information to the general public and school children on a variety of subjects (see list below), and more will be added next month.

Dr Esplin said the idea first arose from a telephone information service organised by Mr Bob Couper of the (then) Division of Building Research some years ago. However, that service was restricted to Melbourne and because of the technology available then was rather cumbersome.

But now Telecom has introduced a new '0055 facility' which enables a caller to ring from anywhere in Australia at a flat rate of 50 cents per minute.

Each CSIRO recorded message is about three minutes, so that works out at about $1.50 a call, of which CSIRO gets 25 cents.

Dr Esplin said Intelcom, a communications bureau owned by Consolidated Press, is handling Sirodial and will promote it as part of its extensive marketing program. The CSIRO messages fit in well with others in the Intelcom catalogue, which include those prepared by the Australian Medical Journal, the Australian Veterinary Association and the Dental Health Foundation. Intelcom's fifth digit, as the information provider, is the last '5', so that the prefix for Sirodial is effectively '00 555'

The CSIRO messages have been prepared by a number of people, including Dr Esplin herself, plus Mr Simon Grose of the Public Affairs Unit, Ms Beryl Morris of NIN in Adelaide, Mr Peter Rutledge from the Division of Food Processing, and others.

The subjects now available are:

Rising damp:	*00 555 2124*
Fleas & cockroaches:	*" " 2125*
Roof insulation:	*" " 2126*
Funnel web spiders:	*" " 2127*
Asbestos in the home:	*" " 2128*
Bushfire-proof housing:	*" " 2129*
Keeping outside noise outside:	*" " 2130*
Mould in the home:	*" " 2131*
The greenhouse effect:	*" " 2132*
Wood borers:	*" " 2133*
Lichen growth on roofs:	*" " 2134*

Further suggestions are welcome, and staff should contact Dr Esplin on 02-416 7441 if they wish to discuss Sirodial.

Those items in the pipeline include:

The ozone layer
'Dry rot' in timber
Low energy housing
Cholesterol
Vegetarian diets
Fibre in the diet
Is red meat good for you?
Spoilage of food
Storage of food
Composting
Growing earthworms
Land degradation
Space news

S-COR.

From the Chief Executive

A column by Dr Keith Boardman

The release by the Australian Bureau of Statistics of the latest figures on expenditure on R&D in Australia received widespread media coverage. Contrary to expectations, the figures showed a decline in R&D as a percentage of Gross Domestic Product and highlighted the reluctance of the Australian manufacturing industry to invest in the future.

Australia is falling further behind the advanced industrial nations in its expenditure on R&D, in spite of a tax incentive for R&D which is probably the best in the world. The decline in R&D as a percentage of GDP also reflects the cuts in appropriation funding for public sector research, particularly to CSIRO, which shows a reluctance of the nation itself to invest in the future.

Senator Button, in a media interview this month which was reported widely, attacked manufacturing industry for its attitudes, and honestly admitted that the Government's industry policies had failed to correct the damage done by decades of import protection. Australia has built manufacturing industries which on present trends will never be able to compete in world markets. Competitiveness of international trade is increasing and more dependent on science-based technologies.

The wide discrepancies between the skills required to create new products and win new markets and the realities generally within manufacturing industry make the task of identifying national research priorities a difficult one.

The CSIRO Board has been concerned for some time in identifying national research priorities, as a contribution to the efforts of the Australian Research Council and as a basis for the allocation of resources between the major sectors or technologies of CSIRO research. The Board formed a sub-committee, now chaired by Mr Ward-Ambler, to develop a framework for the intersectoral allocation of resources. This is being done in close consultation with the members of the Executive Committee. The Board accepted the principles in a paper prepared by Dr Gregson that National Research Priorities and overall priorities for CSIRO, including intersectoral priorities, require both 'bottom up' and 'top down' components. The 'bottom up' part flows basically from the program/project priorities of divisions/institutes and takes account of the advice, priorities and performance of stakeholders. The 'top down' part involves looking further ahead and assessing the relative merits of broad areas of research using criteria such as economic benefits, environmental/social benefits, R&D costs and transfer capacity.

The question must be asked, to what extent are industries/companies in Australia able to exploit successful research for the benefit of Australia? If the capacity is not there, could it be in the future and can the intellectual property be effectively exploited by Australia?

N Keith Boardman

Criteria for the Chief Executive

The CSIRO Board has adopted the following selection criteria for the Chief Executive:

The Chief Executive must convey a strong 'statesman like' image within the Organisation and to the broader scientific community – in fact the Chief Executive ideally should be a distinguished scientist and scientific leader. He or she must display strong leadership in promoting support for CSIRO and research within the Australian community and establishing CSIRO's strong role in Australia's future economic development – including a commitment to strengthening CSIRO's relationship with all industry sectors.

The Chief Executive must have strong human resource management skills including the capacity as a leader to promote corporate values and to develop and enthuse staff at all levels.

The Chief Executive must have flexible management skills to oversee the scale and diversity of CSIRO's charter and range of operations – specifically to concentrate on the broad policy and accountability responsibilities with effective delegation of much of the inter-related scientific, commercial, personnel and financial responsibilities.

The Chief Executive must have a capacity to interact constructively with the Board, Government Ministers and senior officials in the public and private sectors.

The Board believes that personal qualities will be of supreme importance in the final choice and would in particular be looking for intellectual honesty and a self critical approach to the position.

Letter to the Editor

Dear Editor,

I resent the 'administration bashing' which is in vogue at the moment in CSIRO and which is evidenced by articles and comments reported in *CoResearch*. Statements such as 'administration is the enemy'; 'administrators have a credibility problem'; 'a waste of money', are derogatory and demeaning to those of us who work hard to provide a high standard of support for our research effort.

Since the McKinsey and Pappas *et al* reviews, responsibilities for many jobs formerly under the control of the RAOs and head office have fallen on divisional administrative staff. While this has given these staff the capacity to provide a more efficient, streamlined service by allowing divisions local control, it has also meant increased responsibility and a distinct increase in workload. Indeed, from a personal perspective, administrative staff at this laboratory demonstrate a dedication and responsibility to their work that wouldn't be found easily in the much admired private industry workforce to which we are often compared.

If such comments and attitudes as appear in *CoResearch* are typical of the attitudes of the majority of our non-administrative staff, then I fear my career and those of many of my colleagues lie outside this Organisation.

Denise Redfern
Laboratory Secretary
Tropical Cattle Research Centre
Rockhampton

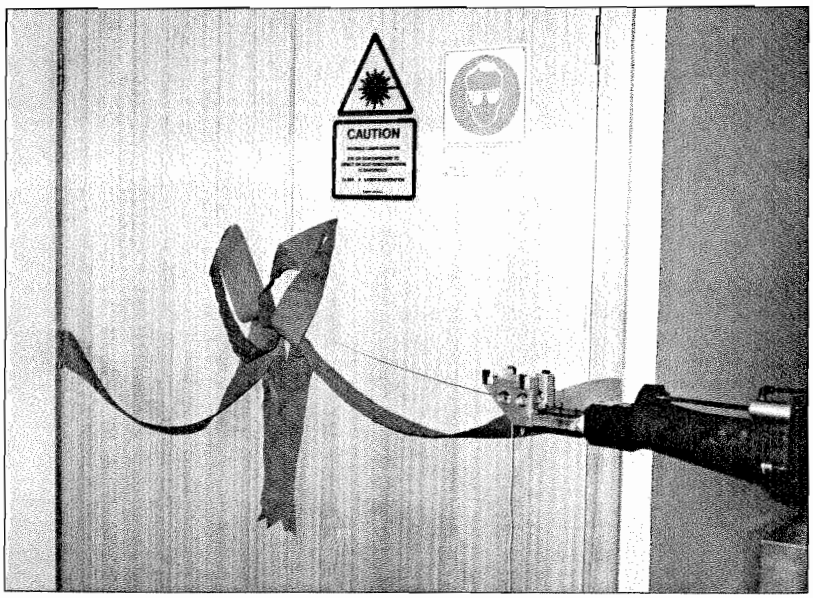
Experiencing the multiplier effect

CSIRO's Double Helix Science Club aims to stimulate an excitement about science in young Australians, and you don't necessarily have to be a member of the club to get switched on. Double Helix has been running for over three years and it's now at the stage where some members are actually moving out into the community and sharing their interest in science with others from beyond the club. You might call it a multiplier effect with Double Helix sowing the first seeds.

A perfect example of this was demonstrated recently by ACT Club member Kylie Catchpole. Kylie, 15, has taken her strong interest in electronics to a nearby primary school and shown year 3-4 students how to build their own crystal radio sets. Using only a block of wood, a few screws, a bit of wire and a couple of inexpensive electronic components the students at Hughes Primary School quickly assembled their radio sets and were tuning into the air waves.

Pictured above from left to right are Michelle Deady, 9, Jessica Dickerson, 8, Penny Hayden, 8, Alice Kingsland, 8, and Sam Haider, 10 – direct recipients of the Double Helix multiplier effect.

New use for CSIRO robot technology



Above, this robot arm was activated by the button pressed by Division of Manufacturing Technology Chief Dr Bob Brown (see p.1). The Division has expanded its Sydney operation, and for more details about its work there, turn to p.5.

Photo: Maria Basaglia

A Matter of Opinion

CSIRO'S REGREENING AUSTRALIA
Gaps in Science – and can we afford to be just green

by Dr Wilf Crane
Division of Forestry and Forest Products

'Tree loss has been at the core of almost every aspect of land degradation in Australia. Tree replacement will be essential if we are to redevelop the fertility of many of our degraded soils and maintain sustainable systems of agriculture.'

My own words, re-quoted from Richard Eckersley's Occasional Paper No.3, *Regreening Australia* and originally contained in the summary of *Trees: their key role in rural land management*, a submission by the Institute of Foresters of Australia to the House of Representatives Committee of Enquiry into Land Degradation in Australia, March 1989.

Understanding this role of trees, and particularly the relationship between trees and soil, is obviously the key to the success of a program to reverse land degradation (and some of our problems of society) based on regreening Australia. However, Richard has concluded on the basis of the best data and advice available to him that the relationship of trees and soil 'remains clouded in controversy and touched with mysticism. Our understanding of the basic process involved in the interaction between trees and soil and groundwater is still limited'.

Although the controversies are not detailed in Richard's paper, I am aware by involvement of some of the main issues. One fundamental question is: how important are trees in the formation of soil and sustained fertility? I maintain that deep rooted perennials – trees in particular, are, on many Australia parent materials, an essential agency of soil formation – especially in the duplex profiled soils. This implies that we may owe the thin mantle of fertile loam – the basis of our agricultural existence in Australia – to trees. Trees which produce fulvic acids and which are characterised by deep rooted cycling are associated with 'podsolisation'; that process which, by discovery, founded modern soil science in Russia and which is the fundamental process whereby a fertile loam can be developed apart from and in association with an underlying infertile clay, on what might be described in Australia as parent materials similar to toxic mine spoils. In the foresters' submission, this relationship of trees and soils is developed as being fundamental to all other roles of trees – including the fixation of atmospheric carbon and nitrogen into the soil and the relationship of tree management with the major soil degradations of erosion, salting and acidity.

What a remarkable situation in Australian science. In the face of *so* many previous warnings, such as E A Southwell's classical collection in 1950 of essays on 'Food, Soil and Civilisation', we have arived at his predicted point of crisis, with a scientifically elite society in charge of the world's most fragile ecosystems, but without the basic data or scientific consensus on which our future will be based. On face value, the $100 million regreening program and environmental strategy for the future of our land, to be announced on 20 July by the Prime Minister, may be based more on faith than on hard analytical science.

Thus one major contribution of Richard's paper is the identification of this gap. What is the relationship of trees and soils – are trees the answer?

The technological questions are just as important. What is the best stable land use for Australia? What agroforest combinations of tree, grass, beast and soil process are optimal? Might we be wasting $100 million in a vain attempt to replace native trees into the lethal environment which was the demise of the parent trees, i.e. rural dieback?

Two critical strategic questions arising from the paper are:

a. can Australia afford to be *just* green? The primary justification for the program of reforestation is environmental. The strategy does detail the fact that it will also have 'significant economic effects', but this is not a primary or equal-primary aim. The economics are listed more in terms of sustaining (our present?) agricultural productivity and an export industry in management skills and tourism.

Should we not be farming as much as greening, like the New Zealanders, with wide-spaced sylvicultures of commercially useful tree crops in agroforest combination with grazing? I could not find the commercial word 'agroforestry' in the paper. But agroforestry is the new, internationally accepted system and word for an analogue mimic of nature's 'savannah woodland'. In structure, savannah woodland (agroforest) is the environmentally stable system (usually including a duplex-profiled soil) which has been tested, by nature, over evolutionary time on much of arable Australia. 'Agroforestry' is specifically listed as one of the three major forstry/environmental pressures the Government recognises, as outlined in the recent 'Research Innovation and Competitiveness' statement by Mssrs Kerin and Cook. And agroforestry in theory, equally transcends the two separate corporations which Kerin and Cook have announced will administer forestry research in future: the Natural Resources R&D Corp and the Forest Industries R&D Corp.

But wide spaced sylviculture and agroforesty is also almost untested in Australia and the question again arises – might we see money misspent, not only in single purpose strategy but also due to a dearth of technology.

Cont. on p.8

Conference on crisis in science

The past 12 months has seen the emergence of many issues in Australian science, and often the question has been asked 'is there a crisis in science?'.

Reduced science funding, inadequate career paths, the rise of the science lobby and the the role of science in dealing with our environmental problems are at the forefront. Perhaps of greatest interest to the general public is the question of the environment. Politicians are taking more notice of this issue now that they see votes in it.

The degradation of the environment will not be averted without enormous input from the scientific community. The irony of the world environment problem is that, in large measure, it has been caused by the domination of the world by humans and the results of their science, and yet can only be solved by further scientific effort.

Where does this leave scientists? Often scientists are able to propose solutions but don't have the means to implement these solutions, or the necessary resources to do the research.

ANZAAS has organised a conference to look at some of these issues. The aim is to examine the position of science and technology in Australian society and to assess its perceived worth in the Australian community. It's hoped a document will emerge from it which will be presented to all major political parties.

The conference is aimed at working scientists and technologists. The program will cover the following topics:

1. Careers in science

Consideration of the career path, pay and working conditions of scientists in industry, government and universities. Comparison of the prospects and life earnings of scientists with other professions. Is there a problem in recruiting new scientists and if so what should be done about it? This should include the role of women in science.

2. Human resources

What are the human resource needs for scientifically trained people in Australia in the near future and the next century? How will people be trained and retrained?

3. Critical analysis of new government initiatives

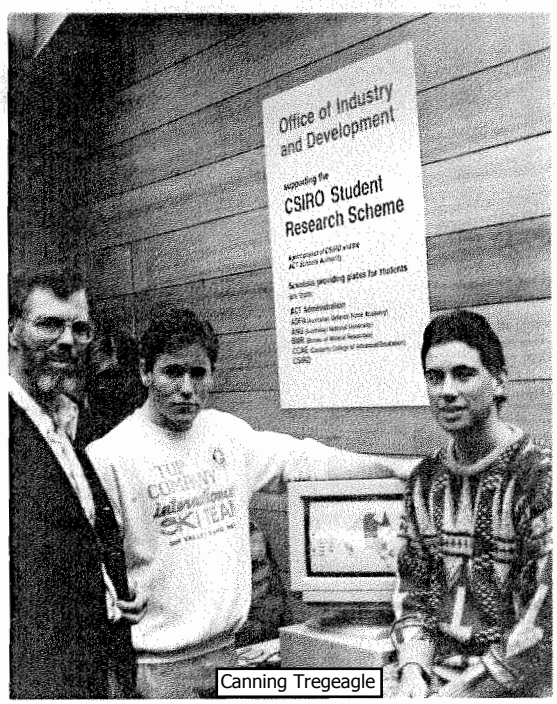
Are these enough and will they encourage new recruitment into science?

4. Public perceptions of the role of science and scientists in Australia

5. The changing role of science society.

Date:	**6 September 1989**
Venue:	**CSIRO National Measurement Laboratory, Lindfield**
Time:	**4pm-9.30pm**
Charge	**$35 including dinner**
Registration	**Contact Tony Cooke on 02-638 9727 during working hours or 02-872 1700 after hours or Janet Dash on 046-20 2134 working hours**

The present and the future



John Ive, left, of the Division of Wildlife and Ecology, with his student in this year's CSIRO Student Research Research Scheme, Ross Canning of Phillp College, centre, at the launch of the 1989 scheme in Canberra. A former participant in the scheme, Sean Tregeagle, right, now works with John as a direct result of his participation in the scheme in 1984. The CSIRO Student Research Scheme is a joint project with the ACT Schools Authority and this year is being sponsored by the ACT Office of Industry and Development. It has offered places to Year 12 students in Canberra since 1982 and now provides 40 positions in CSIRO, ANU, ADFA, BMR, the ACT Administration and CCAE.

LAWMAN disposes of waste problem

While we fret about what disasters the greenhouse effect may bring, there's a very real environmental problem causing havoc right now – solid waste disposal.

Sydney alone is generating over 2.5 million tonnes of rubbish a year, an increase of more than a million tonnes in less than a decade. And in Victoria, every man, woman and child generates over 800 kilograms of rubbish a year.

The quest for ways to dispose of rubbish efficiently has prompted the Division of Building, Construction and Engineering's software experts to come up with LAWMAN, as reported in the latest issue of the Division's magazine, *Focus*.

LAWMAN is a microcomputer package for regional strategic planning for solid waste disposal. It was funded by the Federal Office of Local Government and the Queensland Local Government Authority. The latter was interested in promoting a regional approach to waste disposal and needed to choose a suitable site from 12 or so in several municipalities, and asked for a tool which would give optimal configurations for up to 15 years into the future.

LAWMAN can come up with the most economically efficient transportation and landfill disposal methods for municipal and, if required, industrial, waste.

Forestry involved in major silviculture project in Victoria

Above, vigorously growing 30 year old silvertop ash. Good management of regrowth stands offers the opportunity to obtain sustainable yields of high quality wood supplies from this extensive resource.

The Division of Forestry and Forest Products is participating in the Victorian Government's multi-million dollar Silvicultural Systems Project in the Gippsland region of Victoria.

The research agreement between the Division and the Department of Conservation, Forests and Land (CFL) involves three projects for which CFL pays operating costs and the Division provides personnel. Dr Ken Old, the leader of the Division's Native Forests Program (NFP), described it as 'a good example of co-operative research'.

Several years ago Victoria produced a timber industry strategy. One of the recommendations was that there should be a scientific evaluation of the options for silvicultural management of the major forest types in the state.

These options included clearfelling and slashburning, and also selection and shelterwood systems.

Investigations are being carried out at a series of native forest experimental sites, including stands of alpine and mountain ash in the Great Dividing Range and a silvertop/stringybark forest in coastal East Gippsland.

The Canberra group of the NFP is working with CFL at the East Gippsland site near Orbost at Cabbage Tree Creek. A small laboratory on site is available to the group.

Work on the site, about four hours' drive from the ACT, offers a great opportunity to address key research questions generated by the management of this important resource.

Dr John Raison and Dr Partap Khanna and their group have made baseline studies of the soil nutrient levels and fluxes in the three soil types in the area. This has led to a study of the effects of some of the main treatments on soil fertility and tree nutrition. Identifying and reducing limitations on tree growth promises a higher yield of timbe from forests – the extent of which is subject to competing land uses.

Mr Jamie Hoare is studying coppicing capacity of silvertop and white stringybark after clearfelling and will study vegetation dynamics to assist managers to secure desired regeneration.

Dr Old and Mr Mark Dudzinski are looking at the consequences of stem wounding for the development of defect and decay of silvertop and white stringybark. An understanding of the factors influencing decay in trees will help forest managers to maintain more trees in the high-value sawing categories and to reduce waste.

'Native forest management is a crucial issue, especially in the south east of Australia,' said Dr Old. 'We have the opportunity to provide some of the data on which well-informed management decisions can be based.'

CD-ROM first for Information Services Unit

In an Australian first, the CSIRO Information Services Unit (ISU) has taken a mighty leap into the CD-ROM* publishing field.

What makes the exercise different and new is that this CD-ROM contains photographic images, while most CD-ROM's to date have been used in libraries to disseminate large textual databases – e.g. Medline, a medical database.

The ISU entered into a collaborative venture with Footscray Institute of Technology (FIT) and Royal Melbourne Institute of Technology (RMIT) to produce this disc with the prosaic title of 'VGA CD-ROM Sampler'.

CSIRO's contribution was 100 coloured slides chosen largely from those used in the Bicentennial Exhibition, but supplemented by some others from the Film and Video Centre, to represent the work of all divisions.

Some CSIRO theme music and textual information was added to enhance the versatility of the disc.

It's envisaged that such a product would be used for hands-on displays/demonstrations in the science education centres and at open days and other publicity functions. It also is a prototype for exploring the potential for CD-ROM for a number of applications, such as collections of vast numbers of objects such as slides, maps, remotely sensed images, electron micrographs, insects or plants could become easily managed and widely accessible.

All the photos on the disc may be viewed in both high resolution (640x400) or low resolution (320x200) VGA modes – hence the name in the title. Access to the various collections is driven by easy to use menu structures.

Hardware requirements are an IBM AT/XT, or compatible, with VGA card, CD-ROM player with Microsoft's CD-ROM extensions and colour monitor.

As part of the collaborative agreement in this project, the ISU has requested 50 copies of the CD-ROM disc, so a copy of the disc will be supplied to each division soon.

The driving force behind this product has been Dr Neil Shaw from Footscray Institute's Technology Based Training Group (TBTG), who provided the expertise, software and frame grabbing facilities to make the project feasible. The disc was mastered and replicated by Discetronics.

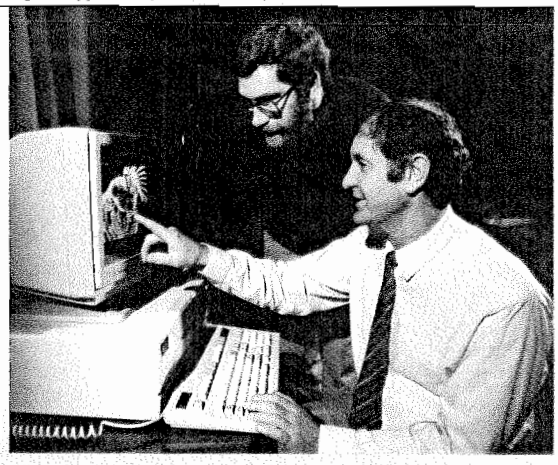
For the ISU, and in particular the staff involved in this project (Dr Bill Garland, Joy Sutton and Max McMaster), this has been an experience gathering exercise to explore applications in CSIRO.

For further information or to arrange a demonstration, call 03-418 7453.

(CD-ROM stands for Compact Disc – Read Only Memory.)*

Below, Max McMaster, Joy Sutton and Bill Garland of the ISU. Dr Garland is Manager, Retrieval Systems. Inset right, Max McMaster with Dr Neil Shaw, Group Leader of the Footscray Institute's Technology Based Training Group.

Photos: Malcolm Paterson



McMaster Sutton Garland Shaw

Laboratory craftsmen

First group to complete translation announced

CSIRO's laboratory craftsmen (LCs) work in a variety of roles supporting research and providing a central service. They are involved in duties such as the design and manufacture of novel equipment and the maintenance of sites and facilities.

The laboratory craftsmen translation (LCT) was established in 1986 for a number of reasons:

- to better reward the contribution of LCs
- to enhance their skills
- to overcome barriers in the promotion system that are not related to skills or achievements and thereby improve the career structure available to LCs
- to better utilise existing and potential skills in order to provide greater job satisfaction and achieve higher productivity.

To that end, LCs have had the opportunity to be involved in a computer-based training program designed to enhance their skills and enable transfer to technical designations.

About 150 LCs are still participating in the course, of which 50 are near completion. Congratulations to the first group to finish:

NSW

Bryce Roan
Graham Burke
Glen Cameron
Peter Sullivan
Heinz Reinemann
Terence Kinder
Ernst Wohlwender
Eric Green
Ronald Boelhouwer
Phillip Day
David Raynor
Peter Bernard
James Campbell
Bruce Egan
Keith Hodgson
Eliane Hokvoort
Bernard Lam
Kenneth MacLeod
John Mann
David Medlin
Doug Smith
Clarence Tillack
Steven Broadhurst
Paul Dalziel
Christiaan Kraan
Keith Tuckwell
Sidney Horner
Derek Fellows
Neil Mason
David Nation
Michael Lang
Harry Waldock
Gordon Hughes
Shane Colless
Robert Thomas
Bruce Campbell

ACT

Jacques Jaccoud
Maurice Mill
George McEwan
Bob Edmonds
John Pocknall
Ged Warren
Claude Eayrs
Raffaele Tammaro
Egons Eversons
Imants Skriveris
Herbert Valerius
Roger Hatton
Lindsay Onton

VIC

Trevor Pearce
Robert Vandijk
Geoffrey Shugg
Robert Unwin
Edwin Brownbill
Russell Elbers
Ronald Gardner
David Kingston
Laslo Sabo
Ian Brittle
Alan Easdon
Cecil Hoyten
Greg Lupton
Alan White
Jeffrey Baum
Salvatore Lentini
Michael Degendorfe
Robert Johnston
Alexander Scamangas
Ross Leggatt

SA

Bob Adey
Ron Geach
Norman Copping
David Darrell
Peter Knott
Brian Murphy
Ronald Johnson

TAS

Terence Byrne
David Kube
Neal McQueen

Monograph series starts with primitive ghost moths

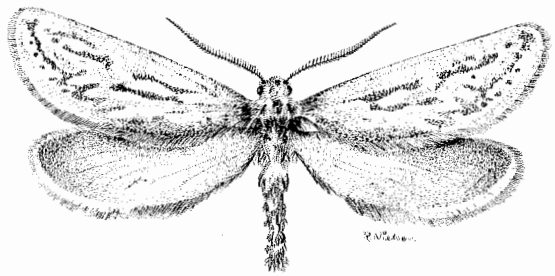
The first in a series of monographs on Australian lepidoptera (moths and butterflies), published by CSIRO, is due for release next month.

Volume one is entitled *Primitive Ghost Moths* and has been compiled by Dr Ebbe Nielsen from the Division of Entomology, and Scandinavian colleague Dr Niels Kristensen. Dr Nielsen is Curator of Lepidoptera at the Australian National Insect Collection.

Publications in the series will cover a range of subjects concerning Australian moths and butterflies, of interest not only to professionals but also amateur lepidopterists and in some cases the general public.

There is considerable interest in Lepidoptera in Australia, said Dr Nielsen, but a dearth of comprehensive published material on them.

Primitive Ghost Moths will appeal particularly to scientists and to knowledgeable amateurs who are interested in seeing the results of research. The volume, while adhering rigorously to scientific accuracy, will not be as technical and esoteric as a scientific journal. CSIRO's Editorial Services Manager Mr Paul Reekie, who has handled the publishing side of the project, describes it as a top quality publication which will become the benchmark for people working in the area. He said without Dr Nielsen's energy, enthusiasm and exceptional international reputation, the monograph series would not have been possible.



In the first volume, more than 3000 specimens in 25 species are described, distribution maps and flight period maps are clearly illustrated, the biology, behaviour, distribution and phylogeny summarised are discussed, and much more.

The 230 page volume has 220 line drawings and 215 black and white photographs and will sell for $60 dollars (some future volumes will have colour as well as black and white). Titles now in preparation include *Biology of Australian Butterflies* (designed to have wider general appeal), *Splendid Ghost Moths* and a *Checklist of Lepidoptera of Australia*.

The latter will be the definitive list of 22 000 Australian lepidoptera species and has been years in preparation. Work is continuing and it should be available next year. The first edition will be simply a checklist, but future editions will carry descriptions as well.

The monograph series is the first ever devoted to Lepidoptera fauna in Australia and adjacent areas. Each hardcover volume has been refereed by an international editorial board. The volumes will appear at irregular intervals, but at least one per year is planned.

The monographs will be marketed worldwide through a variety of channels, such as major scientific society meetings and specialist suppliers in the US and Europe.

The print run of the first volume is 1000 and in the first year Mr Reekie said at least 500 will be sold, probably more.

CSIRO staff may obtain *Primitive Ghost Moths* (and later volumes) from:

CSIRO Publications,
314 Albert Street,
Melbourne VIC 3002

A discount rate of 25 per cent applies to all CSIRO staff.

More stories on Dr Nielsen's work at ANIC are scheduled for later this year.

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DMT expansion in Sydney...

Above, what better way to serve the drinks at a celebration for the Division of Manufacturing Technology than using a robot. From left to right, Dr Bob Brown, Dr Bill Blevin, Dr Hartmut Kaebernick and Professor Jim Piper from Macquarie University.

Photo: Maria Basaglia

The first stage of the Division's Sydney lab was opened in September 1985, and since then the small group of researchers has been active in assembly automation and robotics, and industrial lasers.

Headed by leading German industrial researcher, Dr Hartmut Kaebernick, the group has now expanded to 15 and larger facilities were required. The new facilities have been set up in the same way as a manufacturing company's industrial laboratory, with mainly machine tools and lasers.

The assembly automation and robotics research forms part of the Division's Integrated Manufacture Program. It involves the development of software tools for the manufacturing environment and the application of robotics to manufacturing processes. The group is led by Dr Simmy Grewal.

The industrial lasers group is part of the Manufacturing Processes and Materials Program and is engaged in R&D of applications of laser material processing of significant commercial interest, including laser welding and laser drilling of metals, plastic and ceramics. The group is led by Dr Milan Brandt.

An article on the work of the Division's Sydney laboratory is scheduled for later this year.

Correction

In the Queens Birthday Honours List story in the June issue of *Co-Research*, it was announced that Dr Bill Blevin had received the Medal of the Order of Australia, when in fact he had been made a Member of the Order of Australia. The error was in the information supplied.

Science: a photo opportunity

By Simon Grose, CSIRO Public Affairs Unit

CSIRO's Australian Tree Seed Centre received some great publicity earlier this year. Articles in *The Good Weekend* (inserted in *The Age* and *The Sydney Morning Herald* on Saturday), *Time* and the *Pacific Islands Monthly* reported on the Centre's seed gathering work in Papua New Guinea. Raising the articles out of the ordinary were high quality photographs.

Q: How did those bushies from Forestry and Forest Products put that one together?
A: By paying for the travel and living expenses of the photographer, nothing more.

Publicising science is not the easiest job in the world. Journalists often avoid it as 'too hard'. When they do tackle it they often get the facts wrong or drastically skewed.

Slowly this is changing. Science journalism is gaining more importance in all media, from television to the tabloids. To capitalise on this trend, those of us involved in publicising science should be working harder to widen the niche.

This new opportunity to push the message of science is offered by Wildlight Photo Agency. A small group of professional photographers based in Sydney, Wildlight provides cost-effective publicity through its contacts in the national and international print media.

How? In return for travel and accommodation, Wildlight will provide a photographer whose photographs are used to interest editors in the story. Often a journalist is recruited to write an article as part of a complete package. Because the photographs are of the highest quality they give any story a head start.

Wildlight makes its money by selling the photos to magazines and newspapers. The group which covers the costs gains the publicity, as well as free use of the photos in its own publications and advertisements. Beyond this, reproduction rights are retained by Wildlight.

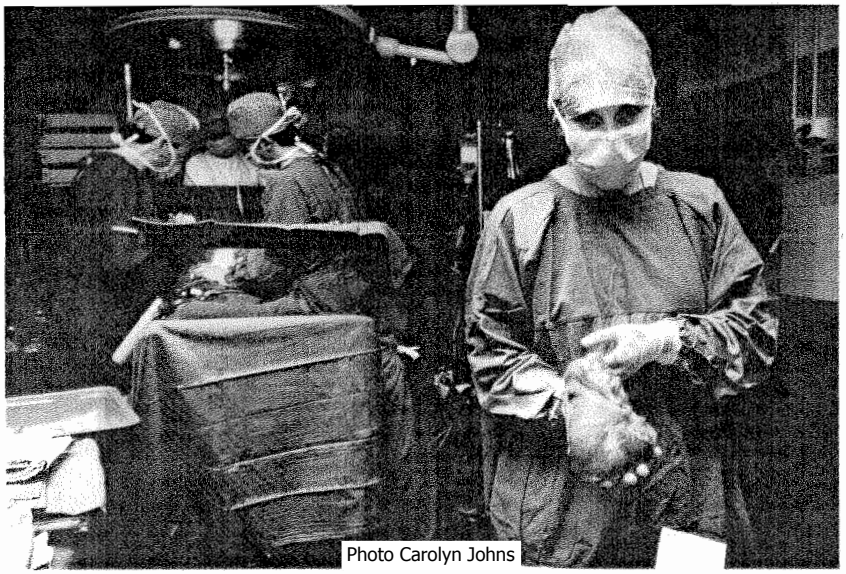
The value Wildlight offers is in the quality of the photography and a wide network of contacts throughout the media. Also, because the group only makes money when it sells photos, there is a great incentive to actively market the story.

Stephen Midgely, OIC of the Australian Tree Seed Centre, recommends the services of Wildlight. He says the publicity gained through the one set of photos has more than repaid the cost. A Wildlight photographer is travelling on the Centre's next expedition, along with a Beyond 2000 television crew.

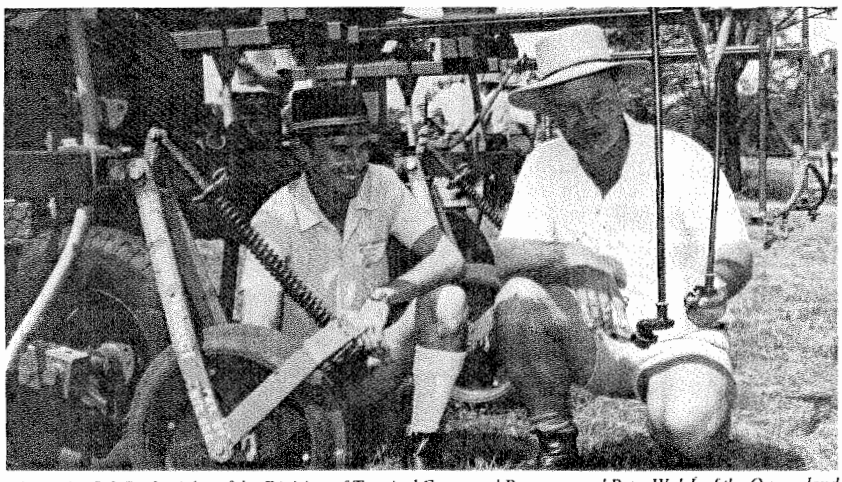
The Public Affairs Unit also has suggested topics to Wildlight after discussions with the divisions concerned.

Any CSIRO project which has potential for this kind of treatment and could benefit from publicity should contact Wildlight on 02-30 1737. Oliver Strewe, Carolyn Johns and Philip Quirk are the principle photographers. They will assess the potential of the story and you can take it from there.

A free in-house pre-feasibility study for all CSIRO projects may be obtained by calling Simon Grose on 062-48 4478.



Above, an example of the work of Carolyn Johns, one of the principal Wildlight photographers. This photo is from 'Nursing for Life', a report on the health care crisis. The theatre sister pictured is holding an enlarged heart which has ceased to function and has been replaced in a transplant operation. It is three times the size of a normal heart.



Above, Dr Sid Cook, right, of the Division of Tropical Crops and Pastures, and Peter Walsh of the Queensland Department of Primary Industries, with an experimental band seeder being demonstrated.

HENGIST THE BOLD

Those who reacted to the article 'Discounting Eternity' which appeared in the March issue of* CoResearch, *pointed out that it failed to distinguish between value and cost. To rectify this, David Erskine has submitted the following:

'What will you do with your share of the proceeds, Thor?'

'Retire. I am 22, with more gold and silver than you can shake a stick at. Retirement is the only decent thing to do. And you, Hengist?'

'I do not know. I have this magnificent house, a table loaded with the best to eat and drink, a flock of concubines. The last two raids on the English coast have been beyond our wildest expectations. I feel that such great wealth beckons us to great deeds.'

You could mount lavish raids on the north European coast, or do as some have done, and sail to the Mediterranean. Is that what you have in mind?'

Not exactly. It would be good to feel that I had done something of lasting value. Making better longships, for example. Supporting craftsmen who had ideas for improvement. That is something I could leave behind as a legacy.'

'Nobody can easily pass on the means to adventure or glory. If craftsmen were able to craft a whole world, rather than just ships or swords, I would like them to fashion a world of warm freshwater seas where longships could roam at will.'

'These are dreams, not plans, Hengist.'

'Of course. But our powers have been rising. Rome fell 400 years ago, yet our ability to move about the sea is greater than even the Romans possessed. Given time, plenty of it, who could say what may be possible.'

'Thousands of years. Maybe tens of thousands of years.'

'Everything has a beginning. I would be prepared to support craftsmen in the improvement of their craft if I felt confident that they could use patronage to good effect. Not crafting the world, of course, that is for the far future.'

'You aspire to the powers of the gods, Hengist. Even if such boldness was successful the cost would be enormous. The outcome is uncertain and uncertainty is a form of cost.'

'The cost would be enormous, but the value of improving our powers is almost infinite.'

'Anyway, money spent now for a payoff in the far future is a poor investment.'

'Wealth and immortality, Thor. I have surplus wealth. We all have some form of immortality in the future of our kind. The question is not whether we spend on long term improvement, but how much.'

'Have some more mead, Hengist. It's cost and value are both modest.'

David Erskine
Water Resources, Griffith Lab

###

Band seeder sparks grazier interest

A commercial partner is now being sought for production of the band seeder developed by Dr Sid Cook of Tropical Crops and Pastures and Mr Peter Walsh of the Queensland Department of Primary Industries.

Grazier interest in the device has continued since it was first demonstrated at the Narayen field day (see *CoResearch* 323, May 1989).

A number of farmers have indicated they would like to either make or buy the machines, and some have already come back to Narayen for a second look. Sid and Peter say they know of at least two machines which have been built by farmers since the field day.

So far, development has concentrated on sod-seeding legumes into native speargrass pastures. However, the technology also has been successfully tested on clay soils. Future developments will aim at getting grasses established.

Key features of the machine include its rugged design, ability to penetrate hard soils and drill seed at a consistent, shallow depth even in rough terrain, as well as the ability to spray a band of herbicide either side of the row to control plant competition.

Soil disturbance is minimal, making the technology ideally suited for revegetating degraded areas where soil erosion is likely to be a problem.

Another feature is the use of a wide row spacing (1.5m) to minimise inputs of seed, fertiliser and herbicide.

The device has been well publicised since the field day, featuring in the Machinery Annual section of *Queensland Country Life* and the *Graingrower*. It will feature soon in 'Cross Country', a new rural program to be shown on commercial television throughout rural areas of Australia.

A manufacturer is now being sought to produce and market the seeder, and a number of companies have confirmed their interest following recent publicity. It's hoped some machines will be available for sale in the coming summer.

CWG
'Communication is THE issue'

It's a fact of life – 'communication' (or the lack of it) lies at the heart of every single problem CSIRO faces today.

So one of the biggest challenges for the Communication Working Group (CWG) is trying to educate people throughout the Organisation that 'communication' doesn't just mean public relations. It is a process that has to be an integral part of successful management and can't be separated from day-to-day staff activities or from planning and policy development.

Two further challenges – which are being met successfully – have been the establishment of more effective co-ordination of CSIRO's public events and developing communication plans in close collaboration with divisions. The first of these plans, the Promotional Communication Plan, has just been endorsed by the Board and will be distributed widely within the next few weeks.

The CWG was set up in July 1988, replacing a public relations committee which did not include institute representatives. Peter Dunstan, then Director of Public Affairs, was CWG Chair until January this year.

All six institute public affairs/communication managers belong to the group. Other CSIRO sectors with one representative each are the Office of the Chairman, the Office of the Chief Executive, the Public Affairs Unit and the Corporate Services Department.

The terms of reference and names of members appear below:

TERMS OF REFERENCE

The role of the Group is to provide expert advice to the CSIRO Executive Committee on communication issues and to provide a forum for effective co-ordination of CSIRO's communication activities.

The Group's functions may be classified into three major categories:

- development of a communication plan for approval by the Chief Executive and Directors and assistance to them in implementing the approved plan;
- identification of key communication issues; and
- establishment of effective lines of responsibility between institutes and the corporate centre.

In this context, the Group will also make recommendations to the CSIRO Executive Committee on communication issues relating to key goals.

1. Communication plan

- draft a plan for the Organisation, reflecting the needs of all institutes and the corporate centre and effectively addressing the main target groups/stakeholders for the Organisation;
- incorporate in the plan internal communication mechanisms for the Organisation, including direction and co-ordination of PR activities, approval of communication-related policies and effective reporting mechanisms from the Group to other areas in CSIRO;
- assist senior management to implement the plan following approval by the Executive Committee.

2. Relationships between institutes and the corporate centre

- formulate working guidelines for corporate communication activities and monitor their direction and focus, including the level of financial and staff resources;
- advise on communication issues for the CSIRO internal budget process.

3. Identification of key communication issues

- issue management – identify public issues where CSIRO should state its position, both for the public and its own staff, and recommend action;
- communication processes – identify successful methods and promote their use to senior management.

COMMUNICATION WORKING GROUP MEMBERS

Wendy Parsons (chair)	Institute of Natural Resources and Environment 062-48 4615
Ian Sutherland (secretary)	Office of the Chairman 062-48 4695
Lyndal Thorburn	Institute of Information and Communications Technologies 062-48 4339
Nancy Mills Reid	Institute of Animal Production and Processing 02-887 8256
Chris Priday	Institute of Minerals, Energy and Construction 02-887 8247
John I'Ons	Institute of Plant Production and Processing 062-48 4582
Irene Irvine	Institute of Industrial Technologies 03-542 2894
Lindsay Bevege	Public Affairs Unit 062-48 4631
Jim Lumbers	Corporate Services Department 03-418 7230
Beth Heyde	Office of the Chief Executive 062-48 4630

Castanospermine
Research on anti-AIDS alkaloid gathers international momentum

The world scientific community is becoming excited about the potential therapeutic benefits of castanospermine – an alkaloid which may play a role in treating AIDS.

Dr Merv Hegarty of the Division of Tropical Crops and Pastures in Brisbane was part of the team of researchers which first isolated castanospermine from the seeds of the Moreton Bay chestnut, or black bean tree (*Castanospermum australe*), back in 1980 (see *CoResearch* No. 308, Dec. 87/Jan. 88).

Dr Hegarty's work on castanospermine has now ceased because of a lack of funds and his main involvement is as an observer. However, he said castanospermine research was at 'the most exciting stage it has ever been', with new analogues and alkaloids from *C. australe* being isolated and investigated – overseas.

Castanospermine is a glucosidase inhibitor and has been shown, *in vitro*, to change the surface sugars of the human immunodeficiency virus (HIV), preventing it from binding to a host cell, or replicating itself. Not just AIDS, but a range of viral illnesses, and other diseases like diabetes, may be treatable with glucosidase inhibitors, and research is gathering momentum overseas.

The US drug company Merrill Dow has shown great interest in castanospermine, and its scientists are now working on ways to improve on the properties of the natural alkaloid. A paper published this year by a team of Merrill Dow scientists indicates that a new analogue of castanospermine, 6-0-butyryl, 'had almost 20 times the activity of castanospermine' (*The Lancet*, 27 May 1989).

Dr Merv Hegarty

'...there is still time for CSIRO to make important contributions to this research...'

Clinical development

The Merrill Dow researchers are proposing further clinical development of the analogue. Dr Hegarty said he was disappointed that no Australian company had shown any similar interest.

His concern was that, once again, Australia's research advantage would be lost to an overseas company and we would then have to buy the resulting drug back at high prices. Apart from a couple of small South American countries, Australia is the world's major source of castanospermine. Extraction of the alkaloid has been achieved on a commercial scale by the Australian owned company Phytex Australia, Sydney, which is supplying research organisations. It would make sense to develop and produce the drugs here, he said.

Castanospermine may not necessarily provide any 'wonder drugs' – a lot more research still needs to be done – but some very interesting results are appearing in the literature. For example, an exciting development is the discovery that castanospermine apparently reacts synergistically with AZT to better combat AIDS. At present, AZT is the only drug on the market to treat AIDS sufferers. However, it has some unpleasant side effects and, more disturbingly, there is increasing evidence that varieties of the AIDS virus are appearing which are resistant to AZT.

The work on the synergy between the two substances was conducted by a research team in the United States. The results showed that 'in acutely affected ...cells, combinations of [castanospermine] and AZT...inhibited HIV-1 synergistically', without apparent toxicity (*Antimicrobial Agents and Chemotherapy*, Jan. 1989).

Meanwhile, a paper published last year in *Tetrahedron* Vol. 44 No. 18 described the isolation and properties of the first of an entirely new type of alkaloid from *C. australe*. Dr Hegarty said that other new alkaloids have been isolated, and all biological testing is being done overseas.

And another report, this time in *Antiviral Research*, said 'although not yet full determined, glucosidase inhibitors were well tolerated in animals...and man...and are of interest as potential antiviral agents'. A paper in the *Journal of Acquired Immune Deficiency Syndromes*, 1989, concluded that 'castanospermine is an active antiviral agent in animals and that prolonged oral administration is tolerable...'. The field is obviously ripe for research.

Dr Hegarty believes that there is still time for CSIRO to make important contributions to this research for the benefit of Australia if it were to be given a sufficiently high priority.

In May this year he presented his argument for more research on obtaining drugs from plants, as guest speaker at the World Wildlife Fund's launch of a campaign to preserve biological diversity.

He said in the US about 25 per cent of prescription drugs contained substances were derived from plants, while almost 40 per cent of drugs used to treat cancer came from plants.

Despite the world's reliance on plants for medicinal purposes, only 5000 of the 250 000 flowering plants had been analysed for their medicinal potential, he said.

Conference reminder

The 1989 SSA/IMACS Biennial Conference on Modelling and Simulation is being held at the Australian National University in Canberra 25-27 September. The theme is 'Natural systems management: approach, methods and applications'. Papers on other aspects of modelling and simulation will also be presented. For further information contact: Expert Conferences, PO Box 150, Lyneham ACT 2602, PH: 062-47 7084.

Caption competition
'What did Dr Philip say?'

This photo was taken about 15 years ago, of Dr Keith Boardman and Dr John Philip. Note also a youthful Dr David Smiles, now Chief of the Division of Soils. But what was Dr Philip saying to our future Chief Executive? A FREE mention in CoResearch *for the most original and witty suggestion.*

Seminar on French/Australian co-operation in soil and water science

The Division of Soils hosted a conference on co-operative soil and water science at the suggestion of Professor Michel Ronis of the French Embassy. During June three French scientists visited and worked with scientists at Soils and one visited the Division of Water Resources. Pictured above are the participants.

###

Grants and fellowships

The A W Howard Memorial Trust is now inviting applications for travel grants.

The Trust was established in 1964 by the Australian Institute of Agricultural Science to perpetuate the memory of Amos Howard who fostered the use of subterranean clover as a pasture plant in Australia.

Recipients of the grants will receive assistance to attend overseas conferences relating to research in the natural and social sciences, including economics, which relate to the development, management and use of pastures.

Application forms are available from Dr Peter Gibson, Secretary, Howard Memorial Trust, South Australian Department of Agriculture, Box 1671, Adelaide 5001, PH: 08-226 0454. Applications must reach the secretary by 30 August.

The Government of Japan is offering a number of fellowships and travel grants, to promote international scientific co-operation.

These include: Science and Technology Agency Fellowships, offering overseas researchers the chance to carry out research at Japan's national non-university laboratories for six months to two years; Monbusho Fellowships, providing an opportunity for research at academic institutes; Foreign Research Invitation Program for research in the field of industrial science and technology; and Japanese Government Research Awards for Foreign Specialists, for Federal or State Government employees who have worked as researchers for no more than three years.

Further information is available from: Japan Policy Section, DITAC, GPO Box 9839, Canberra ACT 2601, PH: 062-76 1254.

IEAust award for Dr Harrison

Dr Alex Harrison of the Division of Applied Physics has been awarded the inaugural Bulk Materials Handling Award by the Institution of Engineers Australia.

The award is in recognition of Dr Harrison's contribution to belt conveying technology.

The aim of the award is to recognise professional excellence in bulk handling technology and to draw attention to Australia's expertise in the area. It was introduced on recommendation of the National Committee on Bulk Materials Handling.

A Matter of Opinion
Cont. from p.3

b. should a strategy of Regreening Australia be solely Government (and direct grant) based, and perhaps Government backed and led? An alternative is to place major emphasis on the landholders of Australia. This is much more a question of policy and a consequence of the question of multiple or single purpose as above. Nonetheless, as Richard makes plain, the problem is one for every Australian now and in the future. In the words of Sir Ninian Stephen when launching the Australian Sylvaspade (tree planting spade) in the Bicentennial year:

'If we, the custodians of this land in 1988, are to leave it to future generations as a land worth living in, 'sylviculture' (the growing and tending of trees) must become a word familiar to us all'.

What is the essence of CSIRO's Occasional Paper No.3? Certainly a faith in trees, now endorsed by CSIRO. We have become latter-day St Barbe Bakers (founder of the 'Men of the Trees' society) – the concept should appeal to a wide range of faithful. But as Richard Eckersley says (*CoResearch* 324), the paper does not pretend to be merely an objective statement of facts, although there are plenty of facts therein, rather a propaganda document aimed to set out the strongest possible case for large scale reforestation.

This is an unusual role for CSIRO. The gravity of the threat to our future as a society would appear to warrant the action. But we should not forget that St Barbe Baker misspent money with green visions which were not sufficiently backed with science or technology. My mother was one of his 'men'! And although he contributed enormously – as no doubt will CSIRO's paper – to the cause of trees, some of his major schemes such as regreening the Sahara failed.

I believe a major value of the paper – in addition to the political force it immediately carries, is its value in pointing out the enigma and dearth of the science of soils and trees.

As we regreen Australia on the basis of faith and principle, let us back the effort with a major effort to de-mystify both the science and technology of combining trees, soil and a profitable, stable agriculture in Australia. Few scientists could disagree with Richard: 'CSIRO should be uniquely placed to present convincing arguments for change – backed up with solid scientific data'.

Vale Bill Cobbett

Bill Cobbett died on 1 June after a protracted illness. He had been with CSIRO since 1974.

He left AAHL in January 1987 after seven years as its founding Laboratory Secretary. He made major contributions to the development of policy and establishment and operation of AAHL.

Bill wrote the part of the Fenner Committee Report (1983/84) that discussed options for the future operation of the Laboratory, detailing financial and staffing implications. It was the subsequent acceptance by Cabinet of the Report that established the Laboratory's role and staffing levels.

Bill had a detailed understanding of AAHL and a clear vision of what the Laboratory could achieve for Australian and world agriculture. He was a highly respected and committed manager who led by example in the 'hot house' environment during the Laboratory's creation.

Bill was keen to implement staff policies and structures to ensure the potential and working life of AAHL staff could be maximised. CSIRO is now moving to adopt these same structures and principles.

For all his achievements and personal attributes, Bill did not believe his own contribution was significant. I know, however, through all the politicking and controversy, he was pleased with the successful creation of the Laboratory.

Bill will be remembered for his integrity, belief in principles and enjoyment of life. His interests in skiing and and wider issues of CSIRO led him to be liked and respected in other parts of the Organisation, both as a colleague and a friend.

Our appreciation is extended to Ian Parsonson for his comments and for reading a eulogy, prepared by Bill Snowdon, at Bill's funeral.

D Richmond
AAHL

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CoResearch

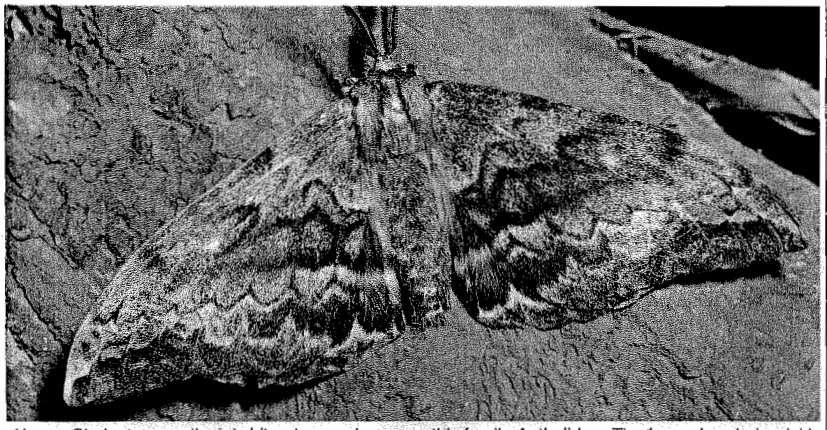
Souvenir Edition

No. 326 August 1989 CSIRO's staff newspaper

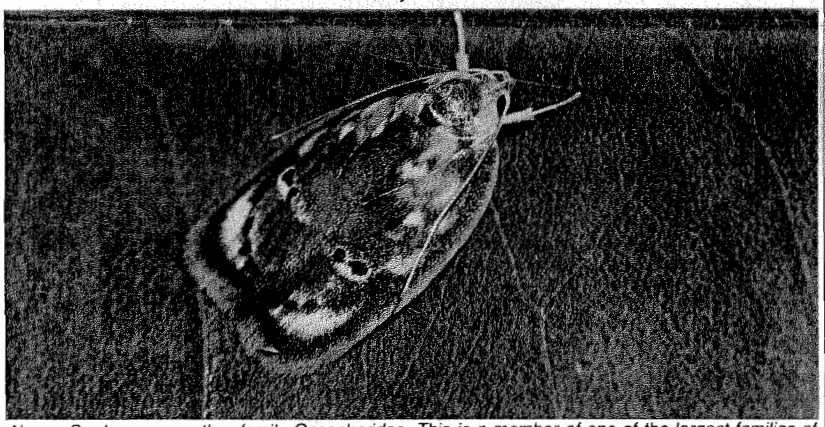
CSIRO AUSTRALIA

Superb slide collection bequeathed to ANIC

The Australian National Insect Collection contains the most comprehensive record of this country's unique insect fauna. The collection has been enriched enormously by the contributions not only of professional entomologists but also of a number of amateurs, many of whom have donated or bequeathed valuable material. The slides of moths on this page represent a small sample of the exceptional Lepidoptera photography by Mr Bob Jessop of Wollongong, whose superb collection was passed to ANIC when he died. Turn to page 6 for more about the collection.



Above, Chelepteryx collesi *(white stemmed gum moth), family Anthelidae. The large, banded, prickly caterpillars are common on eucalypts in the spring time and the large grey adults fly in autumn but are rarely seen.*



Above, Garrha sarcoxantha, *family Oecophoridae. This is a member of one of the largest families of moths, with over 5000 species in Australia. It feeds as a larva on living eucalypt leaves, but many others make an important contribution to the breakdown of eucalypt leaf litter on the forest floor.*

Above, Acropolitis hedista, *family Tortricidae. This species is a member of large family of great economic importance as pest species, including such well known species as codling moth and light brown apple moth.*

Federal Budget:

The May Statement re-visited

The Federal Government's budget announced on 15 August contained little news for CSIRO. Decisions on CSIRO's budget for the next three years had already been announced in the Government's Science Statement last May.

Unlike the recent Environment Statement, the Government's Science Statement was not touted as the world's greatest — there was no promise of a billion test tubes.

But it was the Government's definitive word on science for the next five years. Years tend to be but a moment long in politics, but for what it's worth, here's a recount of what was confirmed in the August budget.

The Government's appropriation for CSIRO in 1989–90 will be $371·66 million including capital items. This figure will rise to $377·88 million for the subsequent two years in constant dollar terms, and compares with a budget of $349·64 million in 1988–89.

The increases result from the additional $14 million for '89–90 and $19 million in subsequent years announced in the May statement. These increases do not show up by simply subtracting one year's total from the next, because of variations in capital expenditure and such items as the efficiency dividend.

The dividend is a 1·25% reduction and is applied irrespective of agreed increases — the Government giveth and the Government taketh away.

This year marks the first real turn-around for CSIRO since Government appropriation to the Organisation went into a tail-spin in 1982–83.

At that time, a philosophy came into vogue in Canberra that CSIRO could be "forced" to get closer to Australian industry by cutting its Government money and making it earn this money back from industry.

Unfortunately, this policy operated concurrently with a view in the Department of Finance that any external earnings made by the Organisation belonged to the Commonwealth, so CSIRO lost these too.

Both these policies were supposed to be rational economics. They had little to do with either rationality or economics, but that's another story.

Scientists demonstrating in the streets and the closures of potentially valuable scientific programs finally persuaded the Government that enough was enough.

Sadly the relief came as but a glass of water to a man dying of thirst, to paraphrase one Chief, and CSIRO faces considerable hardship and further research cutbacks before real growth in its research effort will again be possible.

The essence of current Government policy for CSIRO is guaranteed funding over three years and the right to retain external earnings.

Guaranteed funding should facilitate the long-term planning research needs. The right to retain external earnings provides incentive to earn money from industry and other external sources of Government funds such as GIRD, NERDDC, the RIRFs and the new Australian Research Council.

These Funds were the big winners in the May Science Statement, receiving increases of up to 40%. This reflected the Government's preference for competitive bidding for research funds rather than recurrent expenditure to single organisations like CSIRO.

But the big money remained in incentives to industry such as continuation of the 150 per cent tax incentive, the MIC scheme and the offsets scheme.

Therein lie the Government's main hopes — Senator Button's recent despair notwithstanding — for industry to finally lift its game in investing in research.

In that quixotic quest lies CSIRO's future.

From the Chief Executive

A column by Dr Keith Boardman

The launch at Parliament House of the Gene Shears Company, a joint venture between CSIRO and Limagrain, a very significant French company, but with provision for the entry of an Australian entity as a third partner, provided an occasion for a successful media conference.

Enormous interest was shown by the media representatives in the nature of the discovery made a year ago by two scientists from the Division of Plant Industry, Dr Wayne Gerlach and Dr Jim Haseloff, and its exploitation. Gene shears, the elimination of the expression of unwanted genes, has widespread potential application in many biological areas including plant agriculture, animal husbandry, human disease therapy and industrial microbiology. Barry Jones thought the hour-long media conference which followed the official launch of the company by Senator Button was the most successful he had attended on a scientific topic.

A disappointing feature of the launch was the absence of an Australian partner, and the Australian speakers, Mr Wran, Mr Jones and Senator Button, strongly attacked Australian industry for its failure to recognise the significance of the discovery and provide risk capital to exploit it for the maximum benefit of this country. To match the input of $22.5 million over five years by Limagrain, an Australian company, taking advantage of the 150 per cent tax concession for R&D, would be required to provide $9.34 million over five years.

A promising outcome of the media publicity, which highlighted the poor response from Australian industry, was a number of enquiries from Australian companies about possible participation in a joint venture with Limagrain and CSIRO.

Recent trends in the economy, including the failure of the private sector to lift its R&D game, and the need to balance environmental protection against economic growth, have raised the image of CSIRO as a world class science and technology organisation.

There is developing in government and the community a much greater appreciation of CSIRO as a vital national resource which must be supported and used for greater benefit to the nation. This attitude is reflected in the survey commissioned by the CSIRO Officers Association, reported in the July issue of *CoResearch*.

The Executive Committee had a very successful meeting with the three Government Ministers with the strongest concern for the health and performance of CSIRO; Senator Button, Mr Jones and Mr John Kerin.

Senator Button said the Government considered CSIRO to be an independent body which, however, should take account of Government policy directions and the world environment for Australian industry. He said there was a role for CSIRO to contribute to policy development in the Cabinet process and for CSIRO to be consulted in the development of policy and other issues. In particular, CSIRO should have more opportunity to contribute to environmental policy development. Senator Button gave as an example the Wesley Vale pulp mill as an area where CSIRO consultation was both proper and profitable. Mr Jones and Mr Kerin supported Senator Button's views. Mr Jones said it was essential that CSIRO had a major input into matters considered by the Prime Minister's Science Council. Mr Kerin strongly supported the liaison arrangements between CSIRO and his department in the rural, minerals and energy areas, and appreciated the periodic individual meetings between himself and the Chief Executive and the relevant Institute Directors.

The Executive Committee also had a successful meeting with Mr Michael Keating, Secretary of the Department of Finance, during which Mr Keating suggested that CSIRO could do more to publicise its achievements. The Executive Committee extended invitations to senior officials in the Department of Finance to visit CSIRO Divisions and learn about the work of the Organisation. Mr Keating accepted the offer, and visits will be organised following the completion of this year's budget.

M Keith Boardman

EDY scholarships

CSIRO staff who have been awarded scholarships under the Executive Development Year (EDY) scheme 1989/90 have been announced.

They are: Dr Barry Hoschke, Assistant Chief of the Division of Wool Technology; Dr Graham Price, Program Leader at the Division of Geomechanics; Dr Merilyn Sleigh, Acting Chief of the Division of Biotechnology; Mr Kevin Howard, Business Manager at the Division of Human Nutrition; and Mr Ian Sutherland, Assistant Secretary, CSIRO Board.

The EDY is a management education program run in each state and territory by the Institute of Chartered Secretaries and Accountants and the Australian Graduate School of Management.

Letters to the Editor

Dear Editor,

I have mused for some years over the reactions to demands for greater efficiency of both British and Australian (i.e. CSIRO) research organisations. The reactions are fairly consistent and are, at least partly, encapsulated in my own versions of the Dismal Theorem and the Utterly Dismal Theorem.

1. The Dismal Theorem

Efficiency must first be studied, then managed and finally demonstrated. So, workshops are held, committees created, individuals appointed. Responsibility for managing efficiently is pushed further and further down the line. All these activities require effort which is then not available for productive science. The Dismal Theorem therefore states that:

'the reaction of a research organisation to external demands for improved efficiency is to become less efficient.'

2. The Utterly Dismal Theorem

Individuals within an organisation react to this state of affairs in a variety of ways. Two common reactions are: active promotion of the decrease in efficiency, taking advantage of the new career opportunities that have been created; passive acquiescence, following the line of least resistance. The Utterly Dismal Theorem states that:

'(on the average) the action of individuals within an organisation is to promote the decrease in efficiency.'

These two theorems lead to a Truly Hopeless Conclusion. Oh dear!

Mac Kirby
Division of Soils

Dear Editor,

The first issue of *Human Links* [newsletter of the Human Resources Branch of the corporate centre], while interesting, did not mention one of the most burning issues confronting many CSIRO staff – of both genders.

The lack of child care facilities.

There has been talk and talk and...for the past three to four years about CSIRO setting up a child care facility at North Ryde. Many people initially were filled with enthusiasm and worked hard on the committee to look into setting up the centre.

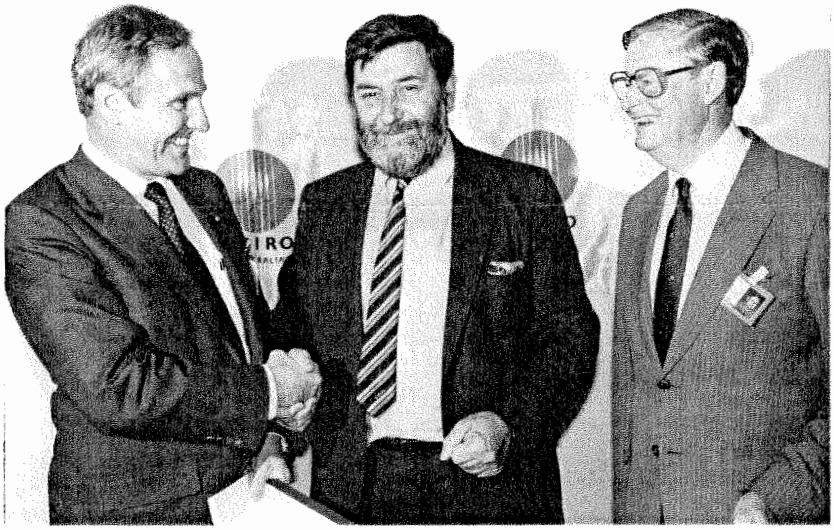
To what purpose?

For CSIRO staff there are no compensations for working in Sydney, the most expensive city in Australia in which to live. A child care facility would be a good start.

I am interested in human resource issues, and provision of child care is one of the most pressing human resource issues in Australia today. *Please*...can something be done about the North Ryde child care facility, before I become a grandparent.

Helmut Panhuber
Division of Wool Technology

CSIRO/Boeing research agreement



A Memorandum of Understanding was signed recently between CSIRO and aeronautical engineering giant Boeing, which will lead to joint research worth $11 million over three years. The work will mainly be conducted by CSIRO, with appropriate Boeing support. Pictured above at the signing are, left to right, Mr Bert Welliver, Boeing's Vice President Engineering and Technology, Science Minister Mr Barry Jones and CSIRO Chief Executive Dr Keith Boardman.

Just briefly...

• Dr Graham Harris has been appointed Director of COSSA. Formerly head of the Division of Fisheries' renowned remote sensing group based at the Marine Laboratories in Hobart, Dr Harris takes over as head of COSSA from Dr Ken McCracken, who retired in May for health reasons.

###

• New guidelines on public comment by CSIRO staff are being considered by the Executive Committee. These will replace the guidelines issued in 1985, and will contain the requirement that staff may comment freely on their areas of expertise, however if they wish to involve themselves in political and public issues they must clear their statements with line management.

###

• A book examining the life of Edwin Roberts CMG has been released. Roberts was at one time on the executive of CSIRO, and became a member of the Advisory Council in 1957. The book was written by his sister-in-law, Mary Roberts.

###

• There are some changes to details of the conference on the crisis in science announced in the July issue of* CoResearch*. The conference, being organised by ANZAAS, will cost $45 (not $35) for participation and dinner. Also, the correct working hours number for Janet Dash is 046-20 3134.

###

• A certain CSIRO staff member at Port Melbourne has been heard uttering a word which seems perfect to describe those who make life difficult: 'crocodills'. According to the Port Melbourne newsletter, 339, 'it is supposed that a crocodill is a crocodile with a low IQ and a desire for human victims'.

A Matter of Opinion

This month's point of view column comes from Dr Art Raiche from the Division of Exploration Geoscience.

MYTHS FOR MISMANAGEMENT

There appears to be a great deal of antipathy between the scientists in divisions and the corporate visionaries in Limestone Avenue. I believe this is mostly due to the fact that Limestone Avenue propounds doctrines and myths which conflict with the way the science of CSIRO actually works. It is partly due to the failure of scientists to understand the uses of a lean, properly responsive corporate function. With characteristic modesty I have taken it upon myself to discuss some of these myths in a public forum, with the hope that real debate will result.

MYTH 1: ***CSIRO needed to be reorganised so that it would better respond to the needs of industry and the country. It did not have the ability to respond to changing times.***

CSIRO badly needs a good historian because those who espouse this myth are, quite simply, ignorant of our history. Our whole culture is one of applying scientific expertise to the needs of the nation. One has only to look at the names of the divisions to see this.

CSIRO had a policy of reviewing divisions every few years. We have a history of dissolving and creating divisions to respond to national needs. We have a history of strong involvement with agriculture, mining and industry. Even our more 'blue sky' divisions such as Radiophysics have achieved stunning technological successes. If we were academic and irrelevant, how could we be held in such high regard by the ordinary people of Australia?

As I see it, the problem is the failure of many of our industries to take up the innovations which we have pioneered. It seems bizarre to criticise CSIRO because of the technological timidity of some sectors of Australian industry.

MYTH 2: ***The research of CSIRO is organised from the top down. Let's begin with a case study.***

When Ken McCracken founded the Division of Mineral Physics, he recruited the best scientists he could find. Since very few of them had had any experience in this area, their education involved visiting exploration and processing operations and talking with a cross section of industry personnel. McCracken pointed them at general areas and waited for them to come up with projects. He made it clear that his role was to provide resources and to fight the administrative battles necessary to clear the path for the work to be done. He provided seed funding for each of the scientists. Rather than seek the advice of corporate planners, he had a simple rule for budget changes. Successful projects, or projects which showed signs of success, were given increases as needed. Projects which lacked promise had to fight hard to avoid being cut. Other than within his own project area (the development of Sirotem), he did not direct research. Instead, he led by example.

One of his examples was in raising money from industry. He encouraged his scientists to have direct contact with industry personnel and to try for some degree of at least symbolic funding. Smaller amounts grew into larger amounts until we came quite close to the 30 per cent now seen as a requirement.

There were two crucial points. Firstly, relevant research was being done, all without the benefit of corporate planners. Equally important, it was being done for a mature industry which had the capacity to pay.

In my 18 years of experience with CSIRO, top down planning consisted of the institute director (or in the old days the laboratory director) visiting each site and reviewing the scientific work being performed. Then, in consultation with the chief, the projects were put into a pigeonhole structure that could be reported as an institute (or laboratory) research plan. The job of our 'planner' was to keep these reports up to date. I believe that one of the main reasons for the success of the minerals divisions was that research plans were set by the scientists who both knew their science *and* their industry. The role of our managers was in providing assistance and upward reporting capability as well as fighting off bureaucratic interference.

The above case study will come as no surprise to CSIRO scientists because much of the Organisation has always worked in this way. Indeed, whenever the work of a division receives a bad review, it is almost certainly one with a very heavy top down management.

What is enormously frustrating is that in all my dealings with corporate centre (or headquarters, or whatever name Limestone Avenue chooses to be known by next), there is the assumption that planning is done top down and that CSIRO will achieve great success if only we can give corporate planners the tools they have read about in management books. Despite many examples of the practice and benefits of bottom up planning, corporate centre fails to acquire an understanding of how CSIRO science actually works.

The crucial point is that I do not see any role for corporate planners in CSIRO. We already know what the basic industry groupings are in Australia. Most of us know what the problems are in the industries closest to us. We already know where the outside money is and where

Cont. on p.4

COMCARE system now being implemented

Far greater emphasis will be placed on returning staff to work in a healthy state following injury or illness, rather than so often resorting to invalidity retirement, under the Government's new COMCARE system.

COMCARE has advised that it is not acceptable to 'use the CMO as an agent of management', according to Edna Salt, Co-ordinator of the system in CSIRO. Appropriate use of the the CMO service will be in occupational health and advice and liaison with treating doctors.

Edna has been running seminars for CSIRO staff around Australia, to introduce COMCARE. It is a statutory requirement that CSIRO adopt COMCARE, although details of its implementation have been left to CSIRO. (The scheme was outlined in *CoResearch* 316, September 1988.)

Under the system, a range of health professionals (including occupational therapists, physiotherapists and psychologists as well as medical practitioners) will be contracted to provide ill or injured staff with professional assessment and care to enable them to come back to work, even if it involves temporarily assigning them to different duties or a different workplace to take account of their incapacities.

There will also be an emphasis on preventative occupational health and safety, so fewer people reach the point of being unable to work through illness or injury in the workplace, or through conditions such as work-related stress.

Work related

When a staff member stays away from work, on sick leave, for a minimum of 20 working days, it will be up to the staff clerk at that person's place of work to notify the appropriate CSIRO 'case manager' (see right). The case manager will assess whether the prolonged absence is work-related, and whether the person would benefit from rehabilitation and the services of the health professionals available.

The aim, apart from providing a service to CSIRO staff, is to minimise the cost of workers' compensation and especially invalidity retirement which are a drain on any organisation. COMCARE is funded by CSIRO on a levy system, based on occupational risk and rehabilitation performance.

If a staff member does become seriously ill, and the problem is chronically debilitating, invalidity retirement will still be available, but only as a last resort if rehabilitation is unsuccessful.

Edna believes the new system 'is integral to effective changes to work practice' and is 'tailor made to the needs of individuals'.

While the seminars have indicated support in theory for the new scheme, many people have expressed concern about the degree of responsibility being required of divisional staff, to intervene in a case of injury or illness of a particular staff member.

Edna said three 10-minute videos are available to explain COMCARE to interested staff and case managers have responsibility to provide education and support to staff clerks and management.

There are 10 case managers, with areas of responsibility throughout the Organisation (the names and contact telephone numbers are listed on this page). In those divisions which don't have a case manager, Edna will carry out the role in liaison with the staff clerk.

The case managers deal with staff clerks, known under the scheme as claims managers, at individual divisions and sites.

CASE MANAGERS

NAME	ADDRESS	TELEPHONE/FAX
Don Benjamin	NML, PO Box 218, LINDFIELD 2070	PH: 02-467 6497 FAX: 02-457 1902
John Carlton	Black Mtn GPO Box 1700 CANBERRA 2602	PH: 062-46 5090 FAX: 062-47 0217
Mick Crowe	Yarralumla Lab PO Box 4008 Queen Vic Terrace ACT 2600	PH: 062-81 8357 FAX: 062-81 8312
Linda Cox	Floreat Pk Lab Private Bag, WEMBLEY WA 6014	PH: 09-387 0714 FAX: 09-387 6046
Sandy Doull	Highett Lab PO Box 56 HIGHETT VIC 3190	PH: 03-556 2211 FAX: 03-553 2819
Don McDonald	Clayton Lab Private Bag 10 CLAYTON VIC 3168	PH: 03-542 2432 FAX: 03-543 6613
Mel Hopgood	Adelaide Lab Woodville Nth ADELAIDE SA 5000	PH: 08-268 0194 FAX: 08-268 6757
Caroline Langley	Marine Labs/ Tas Regional Labs HOBART TAS 7001	PH: 002-20 6245 PH: 002-20 1444 FAX: 002-24 0530
Graham Rockwell	IMEC Site Service PO Box 136 NTH RYDE NSW 2113	PH: 02-887 8616 FAX: 02-887 8909
Mac Story	Cunningham Lab 306 Carmody Rd ST LUCIA QLD 4067	PH: 07-377 0211 FAX: 07-371 3946
Edna Salt	Co-ordinator PO Box 225, DICKSON ACT 2602	PH: 062-48 4153

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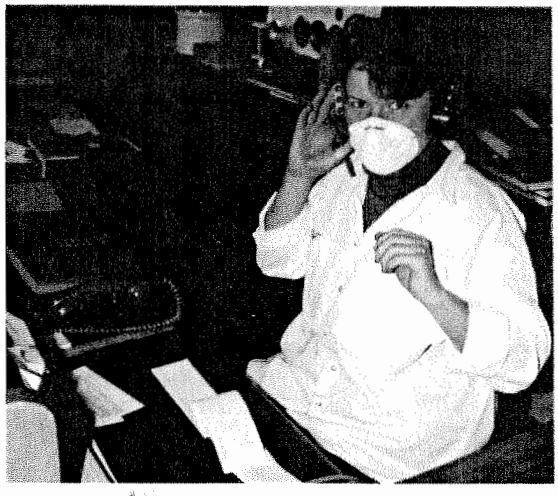
...and speaking of health & safety



Gagged at Headquarters. New receptionist, Ingrid Jarrett, found working conditions quite difficult in the foyer of CSIRO Headquarters when new desks were being put together. A mask was needed for the choking sawdust and ear muffs helped with the noisy sanders.

A Matter of Opinion
Cont. from p.3

it isn't. We already understand the research problems associated with our industries. We don't need the MBA style of expertise. What we need is the opportunity to continually develop our scientific and technical expertise to be able to solve these problems. Spending time doing management courses is a way of avoiding the real work of acquiring technical knowledge and applying it to real world problems.

It is my firm belief that corporate planners at both HQ and institute level represent a net drain on CSIRO's resources, as well as a source of frustration and irritation to working scientists because they do not know the industry/research problem interface as well as do the scientists. Here is a test for my belief: suppose we were to put all the planners in a separate division and require that this division earn 30 per cent of its revenue from industry. Here is the solution: suppose we could replace all nonscientific planners with people adept at getting into boardrooms and raising patient money for CSIRO. The important point is that the future cannot be understood by feeding past statistics into demonstrably inadequate models.

The future can be understood by spending time in places where much of it is fashioned: in the boardrooms and budget discussions of industry.

MYTH 3: ***As soon as CSIRO is able to come to grips with applying the McKinsey Report, we will be on the road to success.***

The biggest problem with McKinsey was that it did not understand the nature of a scientific organisation and how it differed from industry and business. An example of this was the recommendation to abolish discipline-based divisions in favour of industry sector ones. The main target was the Division of Mathematics and Statistics.

PreMcKinsey, this Division played an enormous role in the success of CSIRO. With a mixture of ESs trained in routine statistical analysis and a gifted group of research statisticians and applied mathematicians, the Division made major contributions to research programs across Australia, as well as publishing many research papers of significance. One of the great 'successes' of implementing the McKinsey report was the export from Australia of a group of some of our best mathematicians and statisticians to other countries. We are thankful that not all of them went quietly.

It has been claimed that as a result of the report, we are now more aligned to the needs of industry. I think the opposite has occurred. It is true we now do a lot more short term work at the expense of strategic research, but is this really serving the Australia economy? I think not.

MYTH 4: ***(This one is held by many scientists). Professional management will see the ruination of CSIRO.***

There are many lessons to be learned from management studies. The problem is that very few MBA graduates seem to be able to understand and apply them.

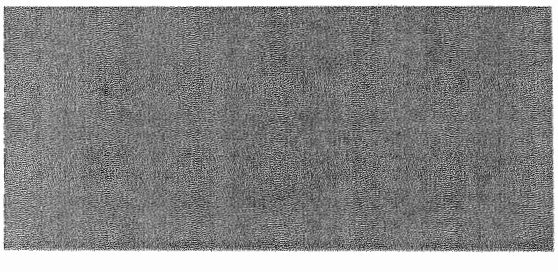
Case studies involving Avis and Scandinavian Airlines show the importance of making management into a service role for those who actually perform the work in the organisation. Our preoccupation with top down planning seems to fly in the face of this. These case studies show the importance of even top management serving at the customer interface to gain first hand knowledge of their industries. If we were to apply this, we would require all corporate centre personnel to serve a six month apprenticeship in the divisions so they might gain an understanding of how to align the jobs they do with the main work of CSIRO.

At any given time there should be three or four scientists on six month secondment to corporate centre to work on specific projects. These should be chosen from both senior and junior levels with the understanding that any seconded scientist who acquires and habitually uses management jargon should be returned to the home division before the maximum six month period. Corporate centre and the scientists should work as a team, not adversaries who know nothing of each other.

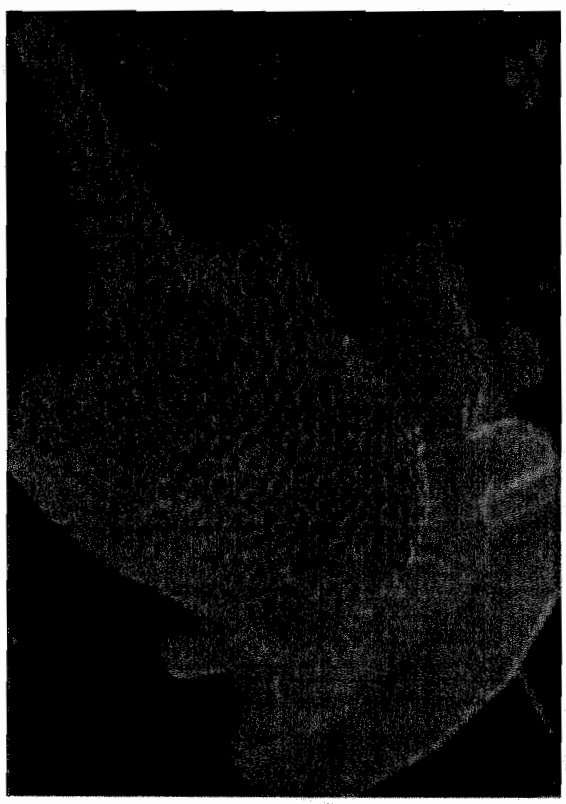
Case studies are useful – if you study the right cases. Do not compare CSIRO to a business. If you want to change CSIRO, first study other institutions which are *both* scientifically and commercially successful. Thus, study Lincoln Labs, JPL, MIT Labs, etc. Study NASA as an excellent counter example.

Consultants are useful if the right ones are hired. For a start, corporate centre could do no better than to have Ken McCracken give a week long private seminar, for corporate centre personnel only, on how to set up conditions for successful research. Let's stop wasting the enormous amounts we spend on outside consultants who know next to nothing about research organisations except what we teach them.

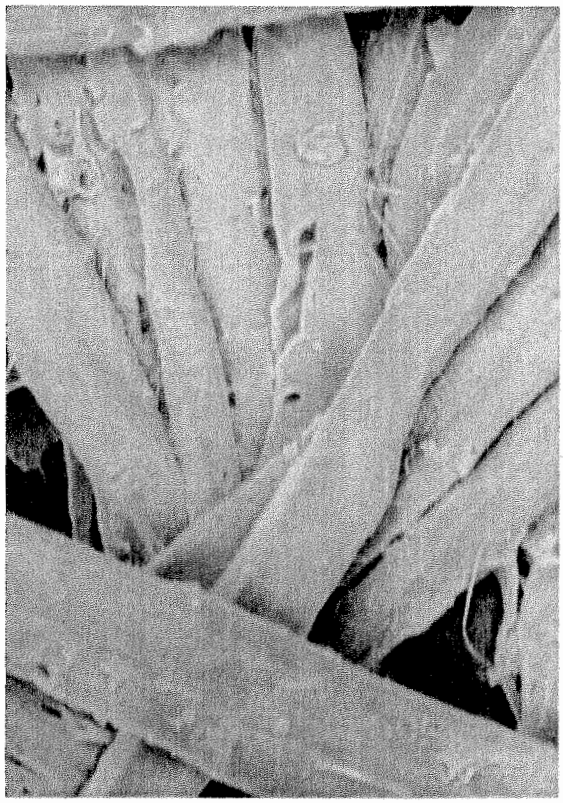
SUMMARY: ***Effective cooperation between corporate centre and working scientists requires that they share a common value system. In other words, corporate centre will have to learn how the science of CSIRO works. Scientists will have to learn to use services which a responsive corporate centre could provide. I invite public and private comment on this paper, but I find letter bombs most disheartening.***



Real time colour comes to e



Above, marine plankton: Silicoflagellates, 50 microns in diameter. Below, the surface of paper made from Pinus radiata *thermo-mechanical pulp.*



The Division of Forestry and Fores
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The micrographs are by J Ward and R McNamee from the Division of Forestry and Fore
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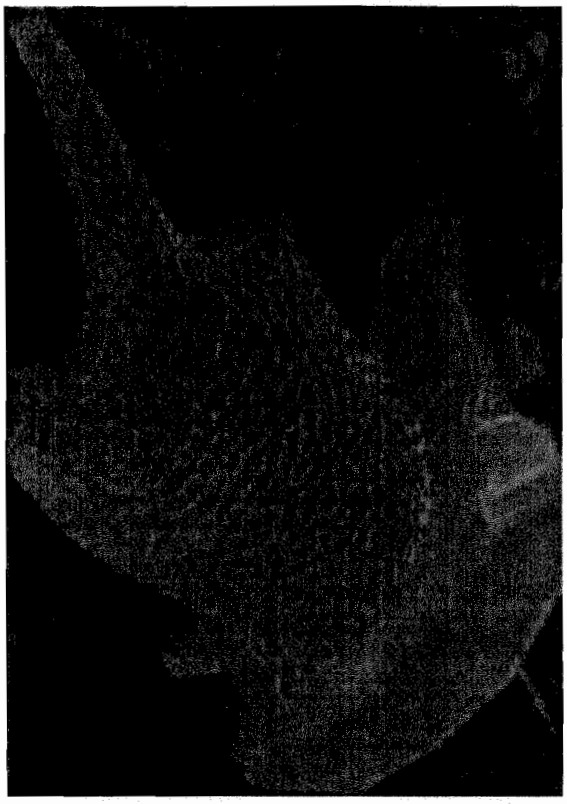
Real time colour comes to electron microscopy



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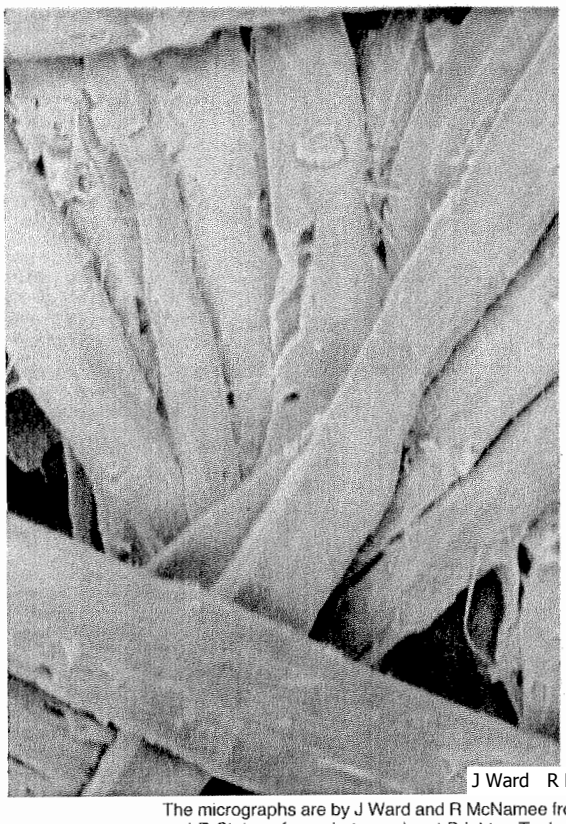


The Division of Forestry and Forest Products has developed a method for colour imaging using a scanning electron microscope.

The images, some of which are reproduced on this page, may be viewed in real time on a colour monitor or transferred to hard copy – either a colour slide or a photograph.

The SEM has become one of the most versatile and powerful tools in modern science. It enables us to view objects far smaller than may be seen under an optical microscope.

A beam of electrons (primary electrons) is focused on to a sample to attain a resolution of better than four nanometers, together with a large depth of field (some 500 times greater than that of an optical microscope). The result is stunning images in three dimensions.

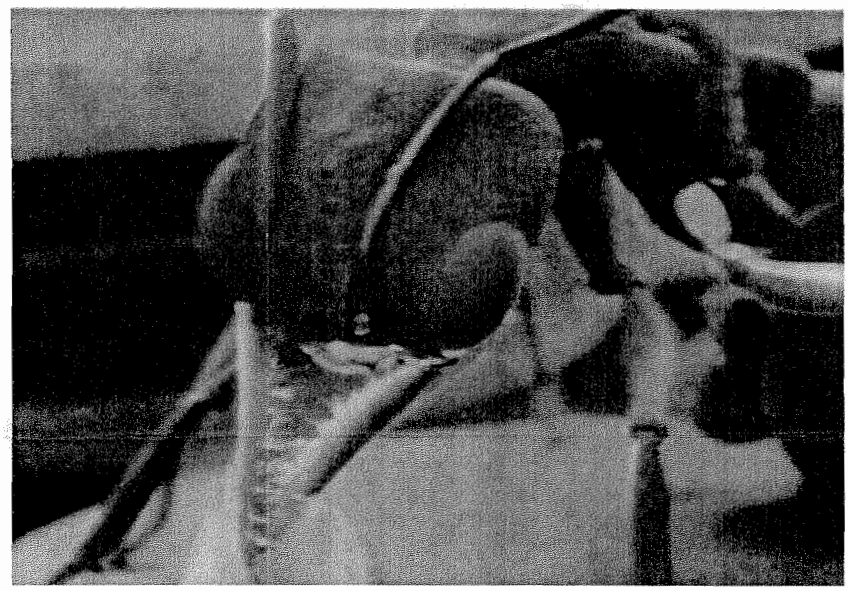
There are various sources of information available simultaneously in the SEM – the most commonly harnessed for imaging purposes being the secondary electrons (those excited from the object by the primary electron beam) and the backscattered electrons (primary beam electrons reflected back from the object without appreciable loss of energy).

The secondary electron signal mainly provides information about the surface structure together with topographic contrast. The backscattered electron signal provides atomic number contrast and may be used for enhancement of topographic contrast.

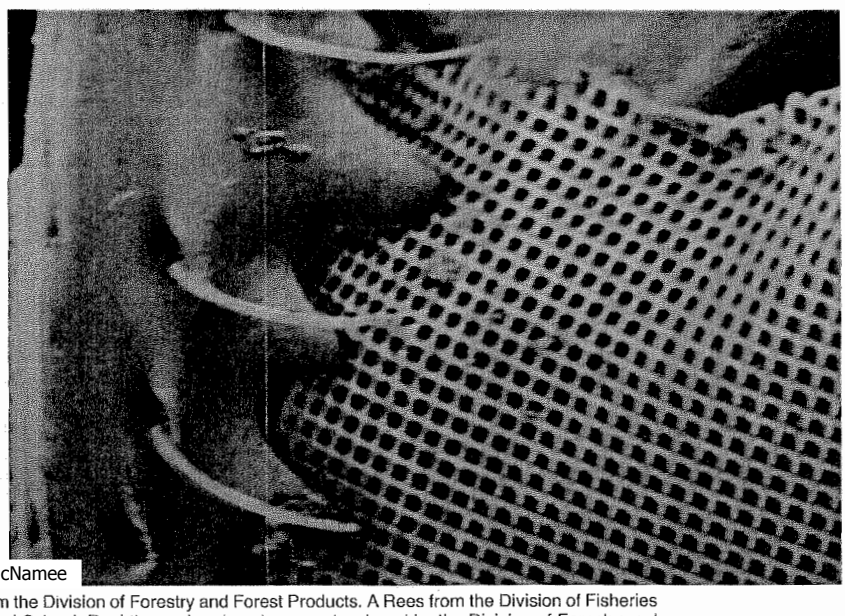
The Division has applied for patents on its SEM Real Time Colour Imaging. The technique uses information from secondary, backscattered and any other available sources, which is then fed into the real time colour processor and manipulated to provide topographical contrast, surface structure and elemental contrast in colour. The resulting colours, although not real (as electrons don't cover a range of wavelengths as light does) can be altered to approximate the real colour of the object if desired, or changed to enhance certain features.

With a black and white image, the eye is capable of distinguishing up to 16 grey levels at any one time, whereas with colour images the eye can distinguish 16 shades of a single colour together with at least 10 different colours.

So the use of colour can increase the information content of images many times over, enhancing interpretation.



*Above, a jumper ant (*Myrmecia sp.*) holding a transmission electron microscope grid in its mandibles. Below, a close up of the grid in the mandibles.*



J Ward R McNamee

The micrographs are by J Ward and R McNamee from the Division of Forestry and Forest Products. A Rees from the Division of Fisheries and R Staines from photography at Brighton Technical School. Real time colour imaging was developed by the Division of Forestry and Forest products, J Ward and R McNamee. The technology has been used on a variety of Scanning Electron Microscopes, these being done on a Cambridge 250 Mk3 and a Philips 515 SEM. Negotiations are underway with a commercial partner for the manufacture and worldwide marketing of this technology.

ectron microscopy

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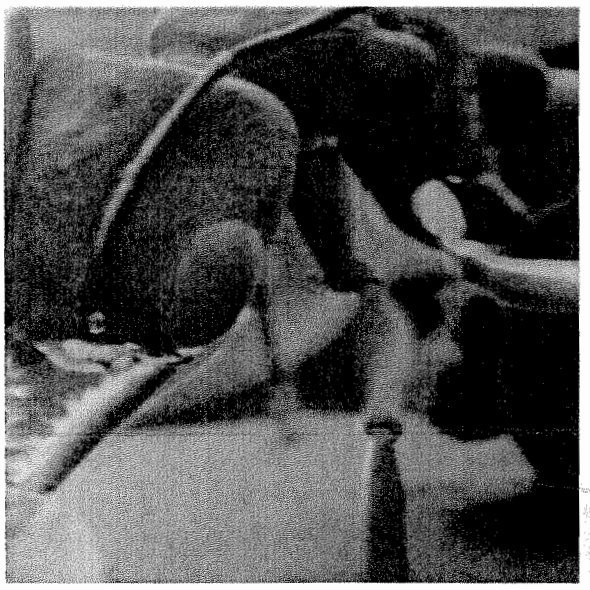

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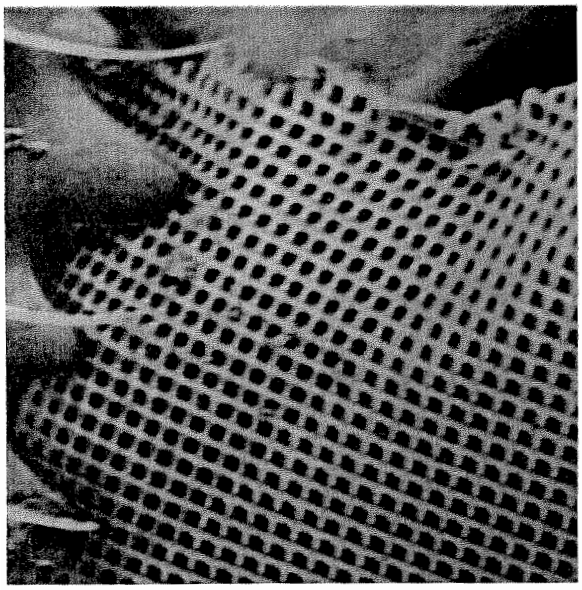

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'Hygral expansion'

Research into making light wool clothes look better

Research at the Division of Wool Technology in Geelong has led to a method for preventing the distortion by moisture of lightweight pure wool garments.

There is a continuing trend toward lightweight wool apparel, however it is difficult to produce tailored jackets with good appearance from these fabrics.

Poor appearance is caused by the flexibility of the fabrics, as well as their inherent dimensional instability. The flexibility of a fabric increases with decreasing fabric weight.

The greatest cause of dimensional instability is a phenomenon called 'hygral expansion'.

Hygral expansion is a unique property of wool and cotton fabrics. These textiles can absorb relatively large amounts of water, and this is accompanied by fibre and yarn swelling which in turn causes an expansion of fabric dimensions.

Moisture is readily absorbed from humid air as well as when the fabric becomes wet. On drying, the fabrics revert to their original dimensions.

Hygral expansion creates problems in tailored jackets, which are usually constructed under conditions in which the fabrics contain 2-10 per cent moisture. In wear, the moisture content may rise to 20 per cent under humid conditions or up to 34 per cent if the garment becomes wet.

As garments absorb moisture in excess of that present when they were made, they want to increase in size. However, the inextensible parts of the garments such as seams and interlinings prevent this. So puckering develops along the seams and around areas where interlinings are fused to fabric panels. This puckering doesn't entirely disappear when the fabric dries out because the wrinkles become 'set' in.

Distortion around fused panels is only seen in the backs of jackets because it is here that fused areas are adjacent to free fabric. The front panels are usually fully-fused and so do not exhibit distortions except where bubbles form due to the fabric breaking away from the interlining because of its continual attempts at movement.

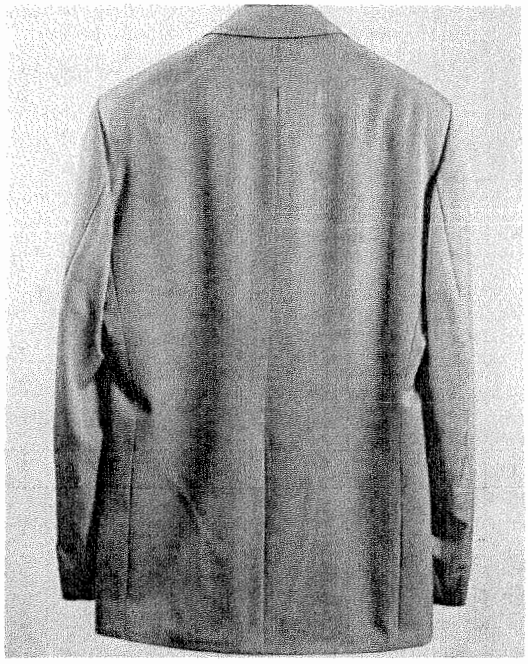
Obviously, the problems will be greater with those fabrics having the greatest magnitude of hygral expansion. In practice, fabrics vary considerably in their hygral expansion behaviour, although it is especially a problem for fabrics which are dyed in fabric form (as opposed to dyeing at the yarn stage).

A significant proportion of wool fabrics are dyed in fabric form to take advantage of delayed decisions on colour. Work at the Division has been directed at reducing the amount of hygral expansion produced in fabric dyeing. Certain chemical agents added to the dyebath restrict the chemical reaction (known as permanent setting) which is responsible for the increase in the hygral expansion of the fabric. As a result, a jacket made up from fabric dyed in a modified dyebath containing an 'anti-setting' agent maintains better appearance than the jacket made from fabric dyed in the normal manner.

At present, the Division is unable to disclose just how this can be achieved, as it is negotiating an agreement on commercialising the anti-setting agent. An announcement is expected soon.

Another approach to reducing hygral expansion is to lightly mill or felt the fabric. Work is continuing to optimise the compromise between gaining maximum effect in reducing hygral expansion while retaining the smooth surface appearance associated with woven worsted fabrics.

The research into the processes of hygral expansion has been carried out at the Division by Dr Peter Cookson and Mr Andrew Wemyss, while the associated research into the anti-setting agent has been the work of Dr Rex Brady, Dr Cookson, Mr Keith Fincher and Dr David Evans.



The consequences of spraying a pure wool jacket with a fine mist of water. Above, before spraying. Below, after spraying.

Lepidoptera in the wild

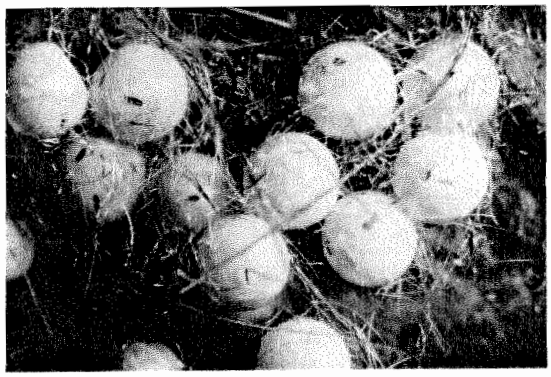
Jessop slides bring moths to life

Many of Bob Jessop's colour transparencies document full life histories, such as those shown here in black and white, reproduced by Mr John Green of the Division of Entomology.

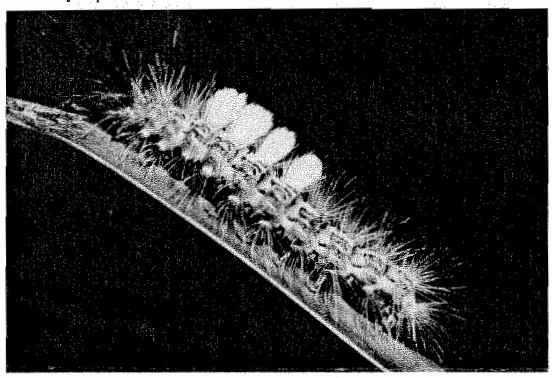
Bob Jessop, who owned a photographic shop in Wollongong, was a keen photographer of Australia's beautiful and diverse Lepidoptera. For many years he had considerable contact with the Australian National Insect Collection (which is held at the Division of Entomology as a national resource), and his work was well known there.

Following his death, ANIC received the collection last year. Curator of Lepidoptera at ANIC, Dr Ebbe Nielsen, said it represented a remarkable photographic record of Australian moths and butterflies in their natural state. Mr Jessop was particularly interested in photographing live insects.

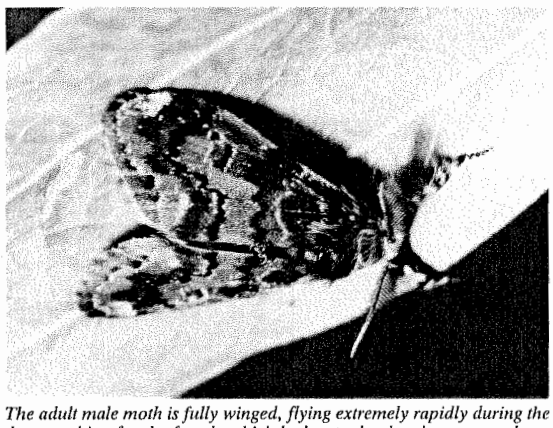
The Jessop collection comprises just under 2000 colour slides. Dr Nielsen said they would be put to good use, and in fact some have already appeared in the very popular CSIRO poster 'Australian Moths and Butterflies'. Another poster featuring moths is in the pipeline. A stunning booklet called *Beautiful Australian Butterflies*, also featuring Bob Jessop's work, has recently appeared. Mr Jessop's colour slides also will be used in other publications and will prove a valuable aid in increasing understanding and appreciation of our vast insect fauna.



Above, The eggs are laid in the silk and cast larval hairs of of the female's cocoon for protection.



The larvae feed on many different plants and are armed with many irritant hairs. The toothbrush-like tufts are characteristic of lymantriids.



The adult male moth is fully winged, flying extremely rapidly during the day searching for the female which he locates by the pheromone plume she releases.

The female moth is wingless and emerges from the cocoon to lay a full complement of eggs after attracting a male. She is unable to feed or drink.

What's happening?

The following calendar has been prepared by Wendy Parsons of the Institute of Natural Resources and Environment.

CALENDAR OF PUBLIC EVENTS

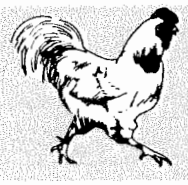
Date	Event	Venue	Audience	Contact
1989				
18 August	Visit of French Prime Minister to CSIRO	Canberra HQ	Media	Jenifer North 062-48 4545
24-25 August	Tracking of Voyager Flyby of Neptune	Parkes, NSW		AT/Radiophysics Raymond Haynes 02-868 0276
27 September	Sir Ian McLennan Achievement for Industry Award	Darling Harbour	Industry, Media	Hermina Martz Public Affairs 062-48 4640
1-9 Sept	Division of Human Nutrition display	Royal Adelaide Show	Community	Jan Stokes Human Nutrition 08-224 1800
5-7 Sept	Farmfest Field Days	Toowoomba, QLD	Rural/Industry	Annette Halliday Tropical Animal Production 079-36 0111
September	Field day for farmers and consultants (DAP)	Yallanbee Field Station, WA	Farmers/ Industry	Terry Leche 02-631 8022
20-22 Sept	Annual General Meeting of the AMLC/AMLRDC & Open Day	TCRC Rockhampton	Rural/Industry	Annette Halliday DTAS 079-36 0111
Nov/Dec	CSIRO Medals ceremony	TBA	Industry/media/ academics	Jenifer North Public Affairs 062-48 4545
Early Dec.	Climate Research: Towards a Co-Operative Program	Melbourne Uni	General	P G Baines/ Val Jemmeson Atmospheric Res
4-8 Dec	'Greenhouse and Energy' Conference, Coal Tech/ Atmospheric Research	Macquarie Uni	Scientific/ Media	Chris Priday, IMEC 02-887 8197 David Williams, 02-887 8666
July 1989 Onwards	Establishment of up to four research centres between IICT and universities	TBA	Academia/industry media/govt	IICT 062-48 4339
1990				
19-20 Feb.	Symposium 'Geophysics at the Boundaries'	Australian Academy of Science	Scientists/ Environmental Consultants	Phillip Ford 062-46 5857

Rumours of peerage for Dr Boardman 'greatly exaggerated'

CSIRO Chief Executive Dr Keith Boardman last month denied that he had resigned as chairman of National Westminster, Britain's largest bank. In fact, he said he didn't know he was chairman until he saw the* Financial Review *of 27 July.

The paper carried a line drawing to illustrate its story on the resignation of the real Lord Boardman in London. Unfortunately for the paper, it got its pictures mixed up, elevating our own Chief Executive to the peerage.

Lord BOARDMAN



New generation poultry vaccine research made possible by Websters

Chickens are intensively farmed throughout the world, and they fall prey to a wide variety of afflictions from which they must be protected. The poultry industry consumes over 95 per cent of all veterinary vaccines.

A new agreement between the Division of Animal Health and Australian-owned company Arthur Webster's aims to launch a new generation of chicken vaccines onto the market, through research into avian viral vectors.

Chickens and their eggs are big business and the demand will probably grow. Protecting the annual worldwide commercial flock of 10 billion chickens from devastating diseases is not only lucrative for the research and the pharmaceutical organisations, but means greater productivity for the farmer. The market is huge, but these new products are still only on the drawing board. This support for basic research is where Webster's stands apart from other Australian companies.

Webster's spends an incredible 12 per cent of its gross earning on technological advancement. In addition to its own R&D it has had many collaborative projects over the years, and many of these have been with CSIRO divisions.

However, the latest deal is probably the biggest commitment it has made to CSIRO research, and significantly the project is still at the pre-commercial stage.

Program manager Dr Kevin Fahey and his team have embarked on an investigation of using recombinant gene technology to create new and powerful vaccines cheaply and easily. To do this, Webster's will provide a total of $2.5 million (to be matched by CSIRO), including $80 000 to refurbish the Division of Animal Health's rather antiquated Parkville poultry labs.

A youthful research and technical team has been recruited for the project, with no-one aged over 35. Most team members are being funded by Webster's, including Dr Fahey's personal assistant Ms Naava Soudack.

1. Infectious Bursal Disease

The viral vectors program follows the successful research to develop a genetically engineered vaccine for Infectious Bursal Disease Virus (IBDV), an immunosuppressive disease which costs the poultry industry millions each year.

Funding was obtained from the Government's Industrial Research and Development (GIRD) Board, and the work was carried out in conjunction with Webster's and the Division of Biotechnology. It is now being scaled up to commercial levels and a vaccine should be on the market in the early 1990s. Scientists from the Division of Biotechnology involved in this project were Dr Ahmed Azad, Dr Ian Macreadie, Dr Colin Ward and Dr Paul Vaughan, while the project in the Division of Animal Health was led by Dr Fahey.

Although fundamentally different to AIDS in humans, IBDV has a similar effect in chickens, suppressing the immune system and leaving the birds open to opportunistic infections.

While AIDS affects the T cells (white cells) created in the thymus, IBDV infects the organ in chickens known as the bursa of Fabricius, where B cells are produced. B cells complement T cells in creating a wall of immunity to viral, bacterial and parasitic infections. Diseases such as AIDS in humans or IBDV in chickens break down this wall.

IBDV affects newly hatched chicks, and even those which do survive respond poorly to subsequent vaccines for other avian diseases because of damage to their immune systems. Cumulative losses to the world's poultry industry as a result of the disease are estimated at $50 million each year.

The problem is at its worst in the United States, where vaccines have been used against the disease, and have led to the emergence of some hypervirulent varieties. US authorities have expressed considerable interest in the research done in Australia, and Dr Fahey said the team had been able to obtain a US variant of the virus which was now being 'sequenced' at the Division of Biotechnology. This process determines the unique arrangement of genes within the DNA molecule. It's likely a version of the IBDV vaccine tailor-made for the US variant will result from this research.

Existing vaccines have been effective in inducing the chicken to create protective antibodies, however they are expensive to produce as they are actually 'made' in the bursae of specially bred pathogen free chickens, which are deliberately infected with the virus.

Genetically engineered vaccines, however, are cloned in laboratory cultures (or hosts) and provide a purer and more uniform product. In the case of the IBDV vaccine, a fermentation culture has been found to be the ideal method, after the abandonment of initial investigations into using *E. coli*.

Antibodies attack certain key proteins of invading viruses or bacteria, preventing the cells from attaching to other body cells and doing damage. The genetically engineered subunit vaccine for IBDV will be injected into breeding hens to enable them to produce and pass onto their chicks sufficient antibodies to prevent infections.

Once this vaccine is released, it is likely to be only the second genetically engineered subunit vaccine of its type on the market. The first was the recombinant hepatitis B vaccine released recently in the United States.

A second generation recombinant IBDV vaccine is already being planned. The gene for the protective viral protein of IBDV will be inserted into another mild or vaccine virus in such a way that infected chickens will not be damaged, but will produce antibodies to the viral protein produced from the inserted IBDV gene. This, very simply, is the basis of the vector delivery technology being developed by Dr Fahey's team in the Division of Animal Health at Parkville and at AAHL.

2. Avian Viral Vectors

CSIRO is already out front in research on avian viral vectors. Dr David Boyle at the Australian Animal Health Laboratory (AAHL) at Geelong, is a world leader in researching the use of fowl pox viruses as vaccine delivery systems.

Dr Boyle started work on pox viruses in 1982, at the John Curtin School of Medical Research at the Australian National University, as a CSIRO employee. He was later joined by Dr Barbara Coupar, Dr Marion Andrews and Dr Sharad Kumar.

That early work concentrated on vaccinia, the virus which forms the basis of the smallpox vaccine. For various reasons, a few years later it was decided to include the fowl pox virus in this study.

Fowl pox is one of three viruses being examined in the avian viral vectors project for which Arthur Webster's is providing $2.5 million, as possible delivery systems for vaccines. The other two, being examined at Parkville, are types of adenovirus and herpes virus. The whole project is being managed by Dr Fahey at Parkville.

Dr Boyle and his colleagues have been the first to prove in the laboratory that fowl pox is suitable for genetic engineering in order to create a vaccine, and to publish their findings. Their basic research in this area is internationally recognised.

Meanwhile, at Parkville six years of study on the virology and immunology of infectious laryngotracheitis herpes virus (ILTV), primarily by Ms Jennifer York, Dr Fahey and Dr Trevor Bagust, enabled Dr Fahey to convince Webster's of the utility of the virus as a vaccine vector. It's development as a vector is now being undertaken by Drs Mike Sheppard, Kritaya Kongsuwan, Mike Johnson and Chris Prideaux.

Royalties earned for CSIRO from the bursal disease vaccine and any products resulting from the avian viral vectors project will probably be channelled back into more research.

Dr Fahey said he hoped his colleagues would like to see more equipment purchased or more staff hired if possible. The money would be difficult to distribute as a monetary 'reward' for individual team members.

'The things that motivate people to be scientists are different to those in business,' said Dr Fahey.

'We would rather do more research'. He said one of the most important things for scientists was to publish internationally recognised papers. This was becoming difficult because of commercial agreements. 'It's the major unresolved issue between us and commerce,' he said.

'The only real compromise that works is to put your faith in patents then publish in 1218 months after patents are lodged.'

Similarly, because of the lack of molecular similarity between avian and mammalian adenoviruses, the past two and a half years' research by Ms Katrina Erny at Parkville has placed CSIRO at the forefront of the molecular characterisation of fowl adenoviruses and has enabled her and Dr Sheppard to proceed onto the engineering of a fowl adenovirus vector.

Viral vectors could be powerful tools for delivering the vaccines safely and effectively to counter a range of illnesses in animals and humans – indeed, veterinary medicine has a long history of leading to advances of direct benefit to humans.

Dr Boyle pointed out that these possibilities only become apparent through much painstaking basic research. Vector technology has been fuelled by continuing research into the smallpox vaccine, the world's first vaccine. If scientists had just been content to conquer smallpox and not look further into the mechanisms at work, these wider possibilities would have been neglected.

The basic concept of vaccines – using small quantities of the virus itself to stimulate the body's immune system – is now being extended to make vaccines which contain only the tiny portion of the viruses' genetic structure needed for the body to create antibodies or initiate a cell mediated response – the two weapons in the immune system armoury.

Normally, just a few molecules on the surface of the infecting microorganism trigger an immune response. In traditional vaccines, most other molecular components are therefore redundant, and sometimes cause side effects. With certain vaccines, those which use 'attenuated', or live (though weakened) virus, there is a very slight chance that the disease itself may take hold.

Therefore, a genetically engineered vaccine which is comprised only of protective immunogens (those molecules which stimulate an immune response, rather than cause the actual illness) would obviously be superior. These 'subunit' vaccines comprise just a few different molecules from the original microorganism, and genetic engineering offers a way of producing them cheaply and easily.

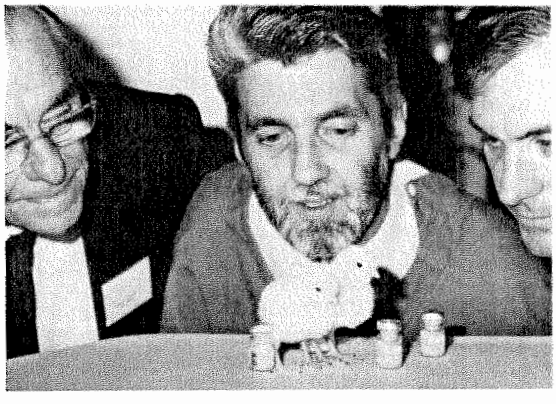
Each virus must be studied in detail to locate genes that aren't needed for the virus to replicate or infect chickens. It is also necessary to locate genetic elements that will promote the production of the special foreign gene products to be introduced.

The three viruses being studied in the project each have different properties which make them useful.

Fowl pox virus has the capacity to carry a large amount of foreign DNA at nonessential sites on its genetic material. This makes it suitable for multivalent vaccines, i.e. those which may counter several different diseases with one shot, although it must be injected into the skin.

The herpes virus (ILTV), replicates in the respiratory tract and may be administered as an aerosol or in the drinking water. It can carry a moderate amount of foreign DNA.

Fowl adenoviruses on the other hand can only carry a limited amount of foreign DNA, although different vector viruses may be mixed before administration. Adenoviruses colonise the gastrointestinal tract – in common with the trachea, an area often affected by various poultry diseases – and induce both local and circulating antibody responses.



Above, Mr Arthur Webster Snr, Dr Kevin Fahey and Mr Arthur Webster Jnr, with the creatures causing all the activity.
Photo. Bob Campbell

New program

CSIRO goes Cross Country

'At 9.30 each weekday morning, it seems all hell breaks loose.' With Neil Inall's description of the trading floor of the Chicago Board of Trade, the first instalment of 'Cross Country', a new series of weekly half hour programs, was off and running.

CSIRO staff in non-metropolitan locations will benefit from the program, which covers rural issues, including research.

Cross Country, which is hosted by Neil Inall and Niree Creed, is shown only on regional television stations across Australia (see below for details). As well as international and local market summaries and weather reports, the program includes science feature stories.

The program and its associated newsletter provide the latest news and information to people involved in Australia's major resource and export industries – farming, grazing, mining, forestry and fishing. Viewers (and readers) are encouraged to write in for more information, and over 1400 of them did just that in the first four weeks.

Principal underwriters for Cross Country are the Australian Meat and Livestock Corporation, the Australian Wheat Board and the Department of Primary Industries and Energy.

Among the co-underwriters are divisions in three CSIRO institutes covering agriculture and related processing industries and the environment. Their involvement is proof of the way divisions are responding to change by actively working to increase their use of television and radio.

The aim is to fill the Science Report segment with some of the best of CSIRO stories, together with stories from the Australian Meat and Livestock Research and Development Corporation and the Dairy Research Council.

Cross Country will bring divisional achievements and capabilities to the attention of a wide audience with broadly-based rural and environmental interests.

The program's science and technology reporter is Lucy Broad, whom many will remember from Country Wide. She will be working from a basic list of CSIRO topics compiled by Nancy Mills Reid (Institute of Animal Production and Processing), John I'Ons (Plant Production and Processing) and Wendy Parsons (Natural Resources and Environment).

Stories covered since the program first went to air on Sunday 2 July include the Division of Tropical Animal Production's cattle tick vaccine and its work to find a 'drought vaccine'; the Division of Entomology's biological control of Paterson's Curse and the SIROFLO process for disinfesting stored grain; and the Division of Food Processing's long life mutton sausages.

Still to come are dietary fibre, fish oils and many others.

Cross Country is also keen to hear of possible CSIRO news items, especially where 'interesting' film footage already exists.

Staff with ideas for news items are encouraged to contact their chiefs or divisional communicators, or Nancy, John or Wendy. Nancy is CSIRO's representative on the program's Editorial Committee which meets monthly in Sydney.

N.B. Would-be viewers in Sydney can take heart. According to a reliable Cross Country source, a good quality UHF aerial pointed towards Wollongong or Newcastle and tuned to Channel 58 will enable reception of Prime Television.

Cross Country may be seen on the following stations:

NQTV Townsville, 7.30am Sunday
NQTR Cairns, 7.30am Sunday
QSTV Outback Qld, 7.30am Sunday
RTQ Rockhampton, 5.30pm Sunday
SEQ Wide Bay, 8.30am Sunday
SUN60 Sunshine Coast, 8.30am Sunday
MVQ Mackay, 8.30am Sunday
ITQ Mt Isa, 10.30am Sunday
NRTV Nth East NSW, 7.30am Sunday
VISION TV Sth East Qld, 7.30am Sunday
PRIME Orange/Dubbo, 12 noon Sunday
PRIME Tamworth/Taree, 12 noon Sunday
PRIME Wollongong, 12 noon Sunday
PRIME Canberra, 12 noon Sunday
PRIME Albury, 12 noon Sunday
MTN Griffith, 12 noon Sunday
RTV Ballarat/Shepparton, 12.30pm Saturday
THE SOUTHERN CROSS NETWORK, 7.30am Sunday
TNT Launceston, 7.30am Sunday
TVT Hobart, 7.30am Sunday
SES Mt Gambier, 12.30pm Sunday
RTS Loxton, 12.30pm Sunday
BKN Broken Hill, 1.00pm Sunday
IMPARJA Alice Springs, 12 noon Saturday
OUTBACK SA, NT & NSW, 12 noon Saturday
BTW Bunbury, 5.00pm Sunday
GSW Albany, 5.00pm Sunday
VEW Kalgoorlie, 5.00pm Sunday
GTW Geraldton, 5.00pm Sunday
WAW The Satellite Service, 5.00pm Sunday

Above, Cross Country presenter Neil Inall and reporter Niree Creed.

NSTC 'friends' scheme available

Since opening last November, Questacon/The National Science and Technology Centre has become one of Canberra's major educational and tourist attractions.

The Centre has established a membership scheme and is now seeking 'friends' around Australia. The scheme aims to establish a group of people who support the Centre's philosophy of promoting a greater awareness and understanding of science and technology.

Members will receive free admission to the Centre during normal opening hours, as well as a variety of other privileges. A discount of 10 per cent applies until 31 August 1989. For further information contact: NSTC Membership, The National Science & Technology Centre, PO Box E28, Queen Victoria Terrace ACT 2600. PH: 062-70 2800.

Forestry claims BM Cup

Above, the winning team from the Division of Forestry and Forest Products. From left, John Raison, Ralph Curnow, Mick Crowe and Randall Faulkner.

The team from the Division of Forestry and Forest Products' Canberra laboratory has won the 1989 Sirocredit Black Mountain Fun Run.

Fighting off a stiff challenge from two CSIRO teams from Sydney – Animal Production and the Lucas Heights Research Laboratories – and from the Canberra Divisions of Plant Industry and Entomology, Forestry won the Cup for the second time in three years.

Paul Quilty of the Black Mountain Library was the first CSIRO runner across the line, followed by Mick Crowe of Forestry and Forest Products and Ray Clark of Animal Production. Quilty's time of 20min 41sec was one only three seconds slower than that of Phil Haeney (ANU), the outright winner.

The first woman home was Plant Industry's Elaine Cooper, who, having never previously trained on the hilly, difficult course, recorded a very quick 24.30 for the 5.6km circuit.

With unusually sunny and mild Canberra winter weather on the race day, 11 CSIRO teams and a hundred individuals took part in this year's Cup.

Vale Dr Alan Robert Haly

After a short time in Concord Repatriation General Hospital, Bob Haly died early on Friday morning, 14 July 1989.

Above, Dr Bob Haly

Bob joined the Organisation in 1952 as a Technical Officer after graduating at the University of Queensland in Mathematics and Physics. He became a member of the team of scientists that established an international reputation in fibre science for the Division of Textile Physics.

He was seriously wounded on active service during World War II and suffered great discomfort and constant medical treatment during his professional career. He married Eunice, the nurse who attended him during his post-war recovery, and they had two daughters, Susan and Judith.

His term as Chief from 1976 to 1984 was during a difficult time because of shortages of wool funds arising from a decline in wool prices which started in the early 1970s. He had the responsibility for deploying scientists to non-wool areas, and developed a number of highly successful initiatives, culminating in the formation of the Physical Technology Unit that eventually separated from the Division.

Although his interests lay primarily in fibre physics, he also was a strong supporter of wool measurement and saw some of the most outstanding triumphs of the Raw Wool Group during his time as Chief.

Bob was a keen contributor to Divisional social activities and was the leading light in the Division's famous Revues. The last revue in 1984 was produced in honour of his 65th birthday and his subsequent retirement.

A man of few words, Bob was extremely modest about his personal and scientific achievements, but firm and scrupulously objective in his position as Chief.

A tough, kindly, highly intelligent and cultured Australian, Alan Robert Haly will be missed by his many friends and colleagues.

Ken Whiteley

CoResearch is produced by the Public Affairs Unit for CSIRO staff and interested outsiders. Readers are encouraged to contribute or offer suggestions for articles. Stories may be reproduced, provided acknowledgement is given to both *CoResearch* and CSIRO. The deadline for contributions is the last Monday before the issue month. Editor: Liz Tynan, PO Box 225, Dickson ACT 2602. PH: 062-48 4479. FAX: 062-48 4641.

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CoResearch

No. 327 September 1989 CSIRO's staff newspaper

CSIRO AUSTRALIA

CSIRO's Mayor Stephens

Above, Larry Stephens of the Division of Manufacturing Technology, was recently elected Mayor for the City of Heidelberg in Melbourne. *Turn to p.8 for his story.*

New technical officers
Craftsmen make the translation

The first group of joint RMIT/CSIRO certificates for the Assessment and Training Program were presented to ex-craftsmen, now technical officers, at the Division of Plant Industry on 13 September.

CSIRO Chief Executive Dr Keith Boardman congratulated all craftsmen who had successfully completed the translation and pointed out that the program was at the leading edge of training and career enhancement schemes being adopted by Australian industry.

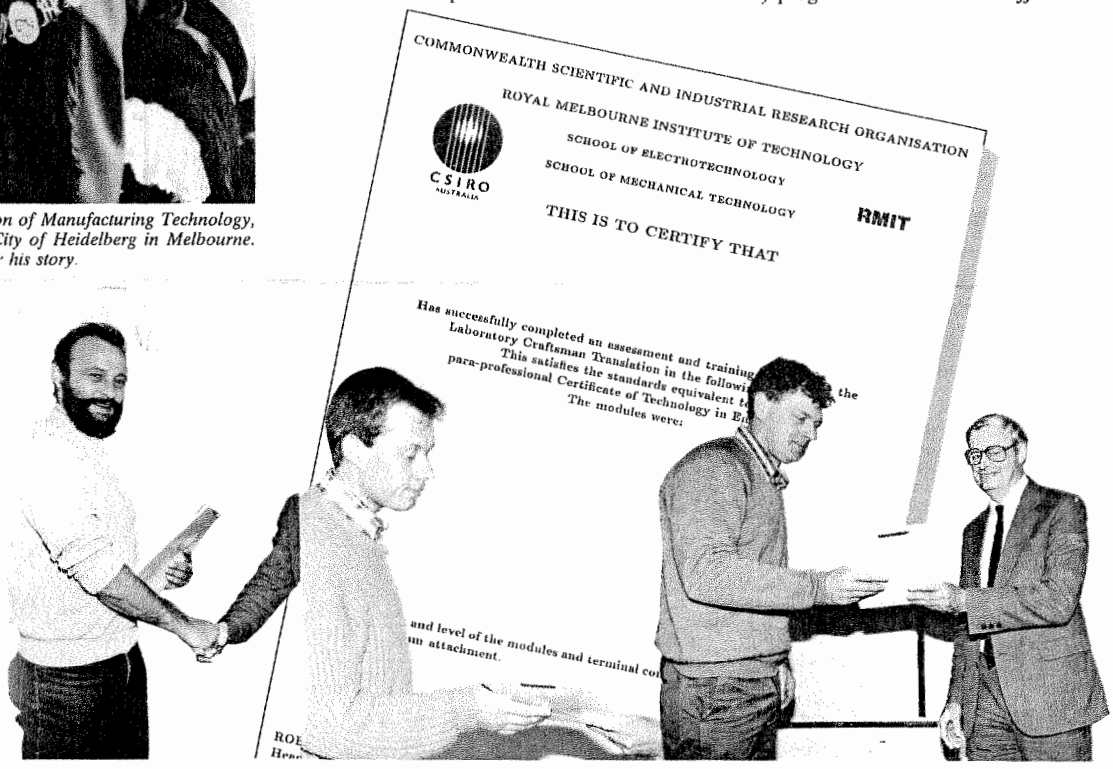
At the time of 'close down' of the PLATO computer based learning program, 200 craftsmen had completed the study requirements for the Certificate.

The aim of the translation project was to provide the opportunity for laboratory craftsmen to function and develop their careers as technicians, while supporting research projects, research facilities and site engineering services.

The Australian Institute of Engineering Associates has indicated that the study program is likely to satisfy the examination requirements for their mature age (over 35 years) entry to membership.

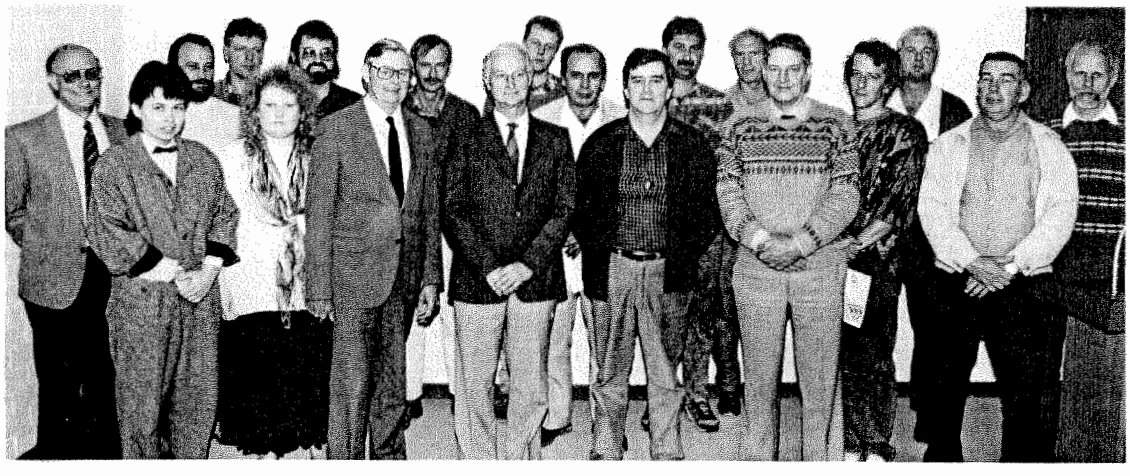
The success of the program is the result of contributions from a number of people, from divisions, the Human Resources Branch and RMIT.

** N.B. As yet, not all craftsmen who have completed the study program have become technical officers.*



Right, among those who received certificates from Dr Boardman were, left to right, Don Wigham, Martin Tendam and Michael Hauptman.

Right, below, those who attended the certificate presentation at Plant Industry, left to right, Noel Tarbotton, Nikki Gordon-Smith, Don Wigham, Michael Hauptman, Patricia Roche, Garth Chisholm, Keith Boardman, Bruce Billings, Don Spencer, Martin Tendam, Leo Trujillo, Derek Love, Bruce McNeil, Barry Hulse, Basil Bautovich, Bruce Lindsay, Chris Hunter, Gary Dinnerville and Chris Rath.



Thomson

STOP PRESS

***Congratulations to Dr Norm Thomson of the Division of Plant Industry's Cotton Research Unit at Narrabri, for winning this year's Sir Ian McLennan Achievement for Industry Award. A story and photo will appear in the next issue of* CoResearch.**

From the Chief Executive

A column by Dr Keith Boardman

Scientific and engineering bodies are expressing increasing concern about the poor career image of science and engineering among school students, and the lowering of standards for entry into many science courses in tertiary education institutions.

At the same time, there are clear indications that Australia will face a serious shortage of well-trained scientists and technologists in many areas of vital importance to Australia's economic performance and community well-being. Several CSIRO divisions have expressed concern that the Organisation is likely to experience increasing difficulty in attracting qualified scientists and technicians in several areas.

To assist in the training of researchers and overcome perceived deficiencies in the skill base required, divisions are supporting or hosting a number of post-graduate and undergraduate students. For example, in 1988 CSIRO jointly supervised 281 postgraduate students and made 55 postdoctoral and postgraduate awards.

At the first meeting of the Co-ordination Committee of Science and Technology, which was established following the Government's May Science statement, several members spoke of the difficultly of attracting sufficient well qualified people. The Committee agreed to make human resources and career structure a priority item for consideration.

Improving the standard of science teaching in schools and making students aware of the excitement and satisfaction of careers in science and technology are important factors in attracting students to careers in science and engineering.

The Double Helix Club (now with BHP sponsorship), the Science Education Centres and 'Women in Science' are among CSIRO efforts to stimulate greater interest in science and technology and encourage the most able students to take up careers in science. CSIRO scientists have an important role in science education generally, by communicating their work to a wider audience.

Major impediments to persuading the more able students to select careers in science and engineering are the poorer job prospects and monetary rewards, compared with many other professions. Unless scientists and engineers receive greater recognition and status in industry, commerce and the community, with better career prospects and monetary rewards, it will be an uphill task to persuade the most able students to select careers in science and technology. Some positive signals, such as a substantial increase in the number of scientists and engineers on Boards of major companies and better appreciation by Boards of the vital role of technological innovation to their longer term prosperity, would assist the upgrading of science and engineering.

I am pleased that CSIRO has reached substantial agreement with the CSIRO Officers Association to improve job prospects in the Organisation. Indefinite employment will be the usual form of employment in CSIRO and not dependent on the source of funds. The agreement specifies the conditions for term appointments, e.g. postdoctoral fellows or where the job is clearly short term.

From the date the agreement is accepted by the Industrial Relations Commission, existing term staff with more than six years' service, are to be converted to indefinite. The agreement will provide for a new redundancy award, which is still being negotiated with the OA. I am hopeful that agreement can soon be reached with the other unions.

The tenure agreement should go a long way to removing the dissatisfaction of non-tenured staff with job prospects in CSIRO, although a necessary trade-off for a high percentage of tenured staff will be the need for greater mobility of staff between projects and programs.

M Keith Boardman

Exhibit celebrates Aust flora

Some of Australia's oldest scientific treasures are on display in a joint CSIRO/National Library exhibition featured in the program for Canberra's annual spring festival, Floriade.

Flora – The Art of Botany, described as a 'celebration of the beauty and diversity of the Australian flora' is on display in the library's foyer. It presents, from the vaults of the Australian National Herbarium (located in the Division of Plant Industry), original material from the first scientific collections of Australian plants.

These were gathered in 1770 by Joseph Banks and Daniel Solander on the *Endeavour* voyage and by Robert Brown on the 1802-1805 *Investigator* voyage by Matthew Flinders around the Australian coastline.

Arranged next to the specimens are rare prints and reproductions, from the library's collections, of corresponding botanical sketches by artists on the two voyages. These include colour prints of the

Cont. on p.3

Letters to the Editor

Dear Editor,

On 1 July, without announcement to either its staff or to the general public, CSIRO began to pay excise on petrol. This amounts to a 40 per cent price rise. Since no compensating increase in budget was given, this results in an additional direct cut in available CSIRO appropriation funds. Some time ago, and also without announcement, CSIRO became liable to import duty, increasing the cost of imported equipment and supplies by 25 per cent in some instances. Most scientific equipment and supplies are imported, so this too amounted to an unannounced cut in available appropriation funds. It is CSIRO management's duty to maximise our ability to conduct research, and this requires money. Why do we not hear them publicly condemning such back-door cuts to our budget?

Alister K Sharp
Vice President NSW Branch,
CSIROOA

Dear Editor,

Is the print advisory service a real service?

That's the question I'm asking after receiving the latest promotional brochure. They state that a free design service is available, but they only want the good quality design. Well, I ask what kind of service is that? Obviously they only want to polish the car rather than getting themselves involved under the bonnet. As most graphic designers within CSIRO know, a small percentage of our work is of this quality, a great deal of our work requires a fair amount of mundane charts and graphs, etc.

If the print advisory service is fair dinkum, they should give some serious thought to providing a real service to divisions by providing art work of graphs and charts, and I guarantee they will never have to promote themselves again.

Vlad Mosmondor
Graphic Designer,
Division of Forestry and Forest Products

Dear Editor,

A new CSIRO logo

What with more budget cuts and the announcement in April that 'appropriation supported staff' will be reduced by 500, and the continuing emigration of scientists in search of better working conditions, perhaps a more appropriate CSIRO logo would be:

CSIRO
AUSTRALIA

Melissa Roffey
Division of Materials Science and Technology

Dear Editor,

I had great pleasure in attending a barbeque lunch at the Division of Entomology at Black Mountain in Canberra on 31 August. The occasion was the translation of the laboratory craftsmen from that Division into the technical grades. It was truly a proud and rewarding experience for the craftsmen, the personnel staff and for Geoff Fenwick who is credited with the project's conception, and for me as a member of the project team during 1987/88.

The translation followed completion of the assessment and training program with external accreditation from RMIT, which tailored course modules and applied them to work requirements at the level of technical contributions. It acknowledged work experience for credit and facilitated the consolidation of specialist knowledge and skills as well as the acquisition of new ones. The aim of the translation was the recognition and provision of opportunities for applying trade specialist skills together with the integration of engineering research support to Divisional objectives.

Dr Max Whitten, Chief of the Division of Entomology, congratulated the craftsmen and wished them every success in achieving their own expectations of the new role and those which the Division has of them. He acknowledged the tremendous effort put in by Geoff Fenwick and his team during the creative and developmental phase, as well as the staff of Entomology, particularly Lyn Wojtaszak, for implementing the program on site. John Pocknall's spontaneous response, 'Sir will do!' to his Chief who apologetically called the group 'craftsmen' instead of 'technicians' denotes that touch of humour which so often reflects the refreshing rapport that is part of the way this group operates.

In Future's 'Lifelong Education Revisited – Australia as a learning society' (13 July 89, pp.17-24) acutely reminded me of Professor Jevon's (ASTEC) remark in June 1987 that the CSIRO translation team members were pioneers in facilitating adult education in the workplace through using TAFE for subject specialist input to a program aimed at meeting objectives identified by the employer. It was about linking reskilling and job design and about collaboration between the industry/employer client and the education consultant.

In Future's article is a summary of the discussion paper prepared by the Lifelong Education Project. It opens with the significant statement that 'We have entered a period of change so rapid that half of a worker's knowledge and skills may become obsolete in three years'. It contends 'that it is not a matter of offering short term training solutions to immediate needs; to maximise our human resources we must cultivate in all citizens such qualities as confidence, commitment to self improvement, ability to make decisions, willingness to try new ideas'.

It is here that the original objectives of the Laboratory Craftsmen Translation were aimed and CSIRO played a vital role as an organisation in the front line of education. This role is to be played more and more by Australian organisations if their workforce skill formation needs are to be met.

Congratulations to the laboratory craftsmen of CSIRO who have demonstrated outstanding application and perseverance to complete this unique program of study. It is hoped that you are able to pursue opportunities for optimal productivity.

In appreciation, Dr Whitten, for your support of a team charged with implementing a new and difficult change program which certainly is one answer for bridging the gap between research and industry.

Well done!

Edna Salt
Corporate Centre

Dear Editor,

The OA has proudly announced 'Breakthrough on Tenure' and the Human Resources Branch 'Major Progress on Tenure Agreement for CSIRO'.

Unfortunately, the negotiations that led to these claims did not include consultation with those line managers who are given the responsibility to make the new system work: divisional staff who attract CSIRO's non-appropriation funds.

We are now told 'there will be no link between fund source and tenure'. This means that the 12 of my project staff (out of 19 by the end of 1989) who are employed on two to three year industry contracts or RIRF grants would be indefinite appointees under the new scheme. The only significant criteria that could exclude indefinite status are postdoctoral fellows (one out of my 12) and 'on the balance of probabilities, the skills being sought for the work will not be required after the work is completed'. We can each decide what this means. To me it seems so vague that it can only result in a large influx of lawyers to the Human Resources Branch to deal with appeal cases.

But even more seriously, how will I and my fellow project leaders cope with the situation? We have three options:

1. Avoid the problem by not seeking non-appropriation funds. Consequences: disillusioned research managers, less employment, *less research*.
2. Continue as now, assuming that we will attract comparable funds in all future years. Consequences: constant pressure on me to raise funds, not time for research leadership, *less research*.
3. Continue as now, assuming that headquarters will step in to fund the 'indefinite' staff when I fail or quit for a more realistic opportunity outside CSIRO. Consequences: you tell me, Human Resources Branch! You tell me OA!

Sadly, the 'major progress on tenure' is ill-conceived, at best well intentioned. Human Resources Branch and OA, please, please look to the future and don't saddle CSIRO with a naive scheme born out of lack of consultation with research managers.

F John Ballard
Division of Human Nutrition
Adelaide

Dear Editor,

We all know that CSIRO is in a ferment of change and we all hope that the new revised CSIRO will be an outstanding success.

Cont. on p.4

A Matter of Opinion

This month's point of view column comes from CSIRO staff member Liz Tynan

In the August issue of *CoResearch*, the Matter of Opinion column came from Dr Art Raiche, who had some strong words to say about the 'corporate visionaries' of Limestone Avenue. He said at HQ, doctrines and myths were propounded which conflicted with the way the science of CSIRO actually worked.

Variations on Dr Raiche's views have been aired both publicly and privately for some time to my knowledge. Maybe they have become a little more public lately, rather than just muttered around the tea table in divisions. Certainly, a number of letters in *CoReseach* in the past couple of years have indicated the level of 'us and them' antipathy.

It is hardly a desirable state of affairs, but what can be done about it? These issues are being addressed by people in the Organisation, but the problem remains.

Without wanting to interfere in a contentious and complex problem, I do have a suggestion which may help ease some of the problems, or at least create a better climate for easing problems.

I don't claim ownership of this idea – I have discussed it with some scientists I know, and they think it might work.

It is simply this: every employee of the corporate centre, from the top down, should spend one week (per year perhaps) working in a division, doing something useful for the research effort.

Too often, I believe, people in the corporate centre lose sight of the fact that the reason they are here is to support the research. Administration is not an end in itself. Also, too often people in divisions forget that people in the corporate centre are human beings who work hard and are often dedicated, enthusiastic and have some good ideas.

Why not get them all together for a little mutual education. The corporate workers would see what research is really about and the divisional people would see that staff from HQ don't each have three heads and no brains. When you meet people face to face it is much harder to be rude and critical about them than if they are just faceless sources of irritation.

This principle is used by big companies such as Budget Rent A Car, to 'keep management close to the customer'. The company has had this policy for more than 10 years and a spokeswoman said it had been very successful. Once a month, senior managers spend one day behind a Budget rental car counter. Not only does it help them appreciate the real world of the car rental business, but it also makes for better staff relations.

I'm not saying that CSIRO is like a car rental company, but the principle of involving staff who would normally not have 'hands on' contact with the real work of the organisation seems sound.

Comments on this subject would be most welcome. Please write to* CoResearch *at the address shown on the back page.

###

AT wins engineering award

The Australia Telescope has won an award from the Institution of Engineers, Australia (Newcastle Division).

In the Institution's words, 'The new antennas form a striking testimonial to the capabilities for high quality and expertise by Australian industry'.

The Institution gives Engineering Excellence awards at both regional and national levels. The AT won in the Newcastle Division (Engineering Products) category. It will now be entered in the national competition.

The award was presented at Newcastle town hall on 7 September by the Lord Mayor of Newcastle, Mr John McNaughton. It was accepted by Dr Bob Frater, Director of the Institute of Information and Communications Technologies, on behalf of the Division of Radiophysics, the Australia Telescope National Facility and the engineering firm Macdonald Wagner Pty Ltd (now Connell-Wagner).

Flora

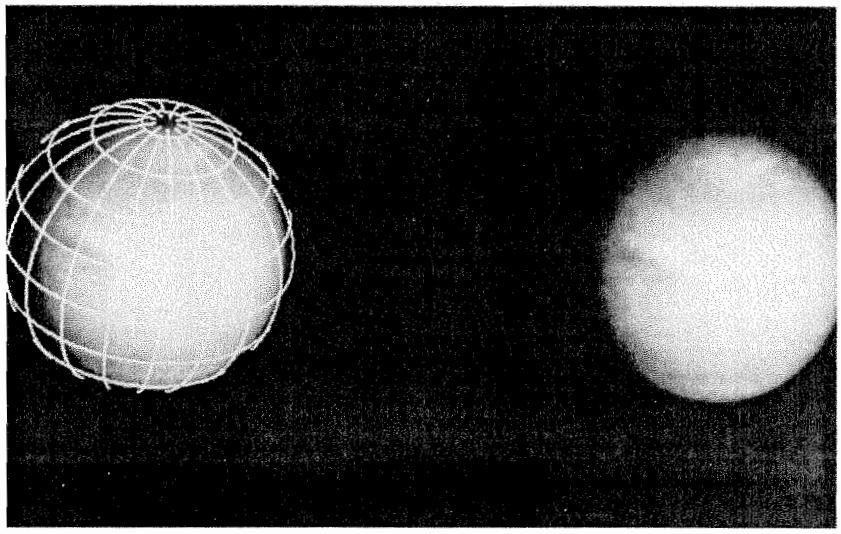
Cont. from p.2

work of Sydney Parkinson, botanical daughtsman on the *Endeavour* and reproductions of drawings by Ferdinand Bauer, botanical artist on the *Investigator*.

Completing a representation of Australian botanical art from three centuries are original watercolours, also from the library's collections, painted early this century by Adam Forster, a Prussian immigrant who developed a deep love for the Australian flora.

The exhibition was opened by CSIRO Chairman Neville Wran in June, and runs until 31 October.

Voyager 'calls home' from Neptune



The role of CSIRO's Parkes radio telescope was crucial to the phenomenal success of the Voyager II encounter with Neptune last month.

NASA's worldwide Deep Space Network provided the main contact with the spacecraft as it approached the distant planet. Parkes also received the craft's signals, which were combined with those from the Tidbinbilla space tracking station near Canberra to amplify the signal from deep space.

The technical expertise of the CSIRO scientists, supported by the excellence of the telescope itself, helped make history as Man reached further than ever into space.

CSIRO has a long history of support for space missions. The recent 20th anniversary of Neil Armstrong's walk on the Moon focused attention of Parkes' similar role in support of that achievement. The telescope staff at Parkes and a crew of engineers from the Tidbinbilla and (the now defunct) Honeysuckle Creek tracking stations shared the responsibility for mission support.

Voyager has gathered data on Neptune's atmosphere, magnetosphere, partial ring system and moons. Previously, only two moons were known to orbit the planet; Voyager already has discovered another four. Pictures of Neptune have revealed its secrets, including its cloud systems and large storms, and the spacecraft's instruments have detected a strong magnetic field around the planet. A partial ring system also has been discovered. Voyager made its closest approach to Neptune on 24-25 August.

Parkes has been dedicated to support of the Voyager mission since March 1989. Tidbinbilla was able to track Voyager for 12.5 hours each day and Parkes for nine hours a day, whereas NASA's northern hemisphere facilities were able to 'see' it for less than this. NASA has paid CSIRO $1 million to support the Voyager mission.

Prof pits strength against supermagnet

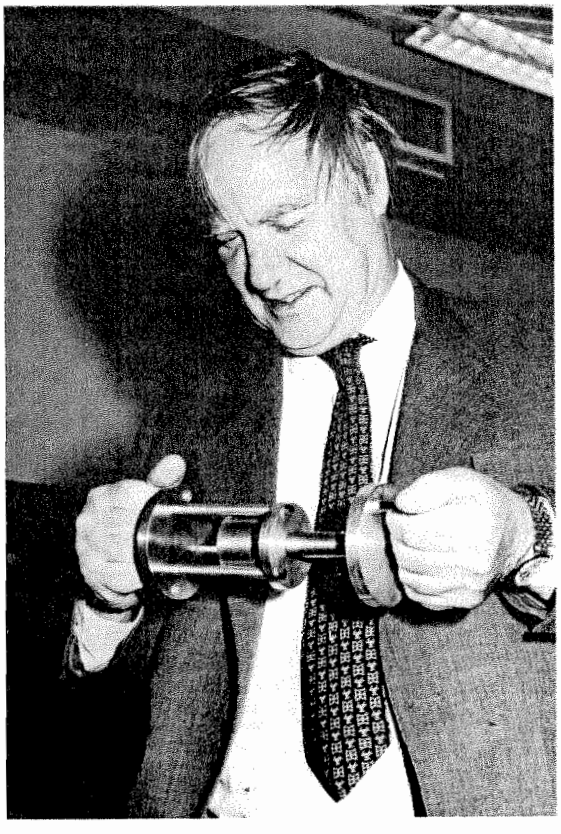
Professor Sergei P Kapitza, the most widely known populariser of science in the USSR, is shown testing his strength against a rare earth 'supermagnet' during a recent visit to the Division of Applied Physics.

Professor Kapitza holds the Chair of Physics at the Moscow Physicotechnical Institute and leads the laboratory of applied electrodynamics and accelerator development at the Vavilov Institute of Physics Problems, USSR Academy of Sciences.

In addition to his regular Soviet TV program 'Seeing is Believing', with an estimated audience of 40 million viewers, Prof Kapitza writes and speaks widely on science and science-related issues, particularly in relation to world affairs and disarmament. He is a member of the Pugwash Movement and the Club of Rome.

His major research interest has been in the development of the microtron accelerator, operating up to energies of 40 MeV. These accelerators act as injectors to synchrotrons and storage rings, used for such tasks as non-destructive testing, medical radiography and neutron and isotope production.

During his visit, Prof Kapitza toured the Division's high temperature superconductivity and rare earth magnet projects and visited the CSIRO TAFE Science Education Centre.



Gluyas Fellowship for Dr Taylor

CSIRO pasture scientist Dr John Taylor has been awarded a 1990 Churchill Fellowship.

Dr Taylor's Fellowship was sponsored by the estate of the late Samuel and Eileen Gluyas, well known graziers in the Richmond area, through their Trustees Mr Bert Field and Perpetual Trustees Queensland Ltd.

The sponsorship furthers the Gluyas' life long interest in development of the tropical grazing industry.

A pasture ecologist with the Division of Tropical Crops and Pastures, Dr Taylor is working on how cattle grazing behaviour affects the pattern of use of large paddocks, and, in the long term, the stability of pastures and animal production.

Under the Fellowship, he will visit Massachusetts, Texas, Colorado and New Mexico to investigate developments in landscape scale grazing research leading to better understanding and sustained use of extensive grazing lands.

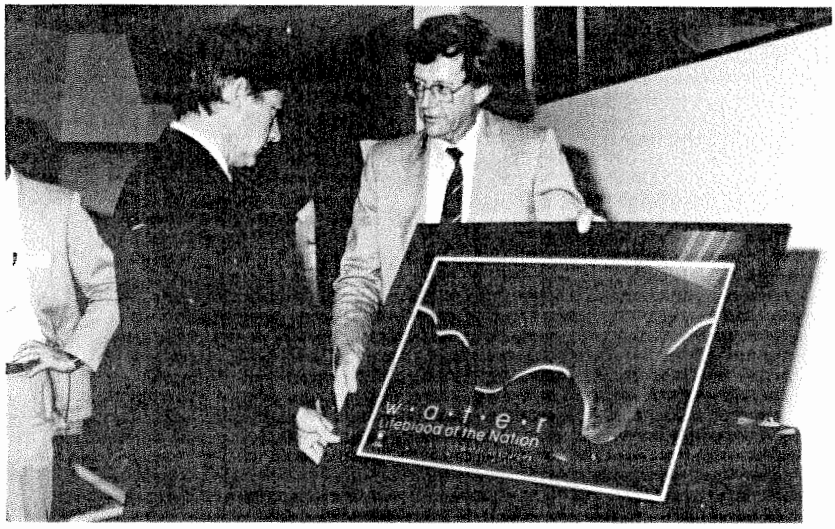
• Meanwhile, the Churchill Trust is calling for applications for 1991 Fellowships for overseas study.

Details are available from:

The Winston Churchill Memorial Trust,
218 Northbourne Avenue,
BRADDON ACT 2601

Completed applications forms and reports from three referees must be submitted by 28 February 1990.

Climate research funding from WA Govt



Above, in recognition of the Government's commitment to environmental issues, Dr Graham Allison, Chief of the Division of Water Resources, presented the Premier with a photograph for his office. In modern art form, the Division's photographer Bill van Aken gives a powerful message about the importance of water. Photo: W van Aken

Graham Allison

CSIRO research on climate change and the greenhouse effect recently received a boost in funding.

A function was held on 16 August in the main entrance foyer to the CSIRO building at Floreat Park, during which the Premier of Western Australia, the Hon Peter Dowding, presented Dr Graeme Pearman of the Division of Atmospheric Research, with a cheque to fund research on climate change in WA.

The WA Government has approved a bilateral agreement with CSIRO, which provides $390 000 to Atmospheric Research over four years.

It will make possible a range of research projects focusing on determining the nature and impact of climatic change expected for the State over the next 40 years.

The WA funding is complementary to the recently announced Federal funding for a number of climate change research projects in CSIRO and the Bureau of Meteorology.

Mr Dowding said 'CSIRO is one of the very few units in the world capable of undertaking the research and analysis necessary to create credible atmospheric models and predictions of future climates.

'By participating in the program, we will be able to bring CSIRO's extensive experience and research to bear on the State's most critical climate concerns, including study into climate patterns for the south west of the State and the probability and frequency of cyclones in the North.'

Following the ceremony, guests were invited to meet Division of Water Resources staff and discuss recent research initiatives.

The occasion was an excellent opportunity for the Premier's staff and the Greenhouse Effect Committee to be better acquainted with CSIRO's research.

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Farm scientist becomes farmer

Dr Ralph Laby, a senior scientist with the Division of Animal Production, is 'defecting'. He has decided to retire and take up farming instead.

After 24 years with CSIRO, during which he made significant contributions to its research, he has chosen to become a pastoralist. No doubt his vast knowledge of chemistry and animal physiology will help him manage his cattle with care and efficiency.

In Australia, most sheep, cattle and goats are kept in large paddocks at relatively low stocking rates. As a result, they are brought into the yards only very occasionally for shearing, drenching, pregnancy testing, etc. More frequent yarding usually would be impractical. But for control of some diseases it is best if the treatment is given at least daily.

When presented with this problem, Dr Laby decided to try to find a way of doing this more efficiently.

By applying his training in physical chemistry, he was able to develop several devices with the desired characteristics. These are able to control internal parasites or provide trace elements to avoid deficiencies, prevent bloat or allow scientists to measure feed intake of grazing animals. Thanks to Dr Laby and his collaborators, these capsules are now commercially available and some are being marketed overseas as well.

During the course of this research, Dr Laby published almost 50 scientific papers and was granted 10 patents.

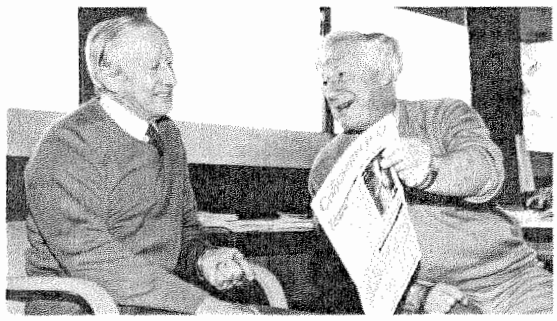
As a result of these accomplishments, Dr Laby has received a number of awards, including an MBE. He recently also became Chief Research Scientist, the highest scientist level in CSIRO, in recognition of his contributions to Australian science and agriculture.

Caption comp difficult to pick

The caption competition in the July issue of *CoResearch* attracted a number of responses, some of them quite libellous. It was difficult to choose the most apt while still staying within the law. But in the end, a short and sweet entry from Lynn Pulford of Education Programs won with: 'Lord Boardman I presume'. (see Aug 1989 *CoResearch*).

Runners up were: an anonymous entry from Deniliquin, which had Dr Philip saying 'Keith, when you're Chief Executive, will you fund me to go back to Deniliquin to do the field validation of the infiltration equation, and for young David here to be my TA?' and from Richard Merry at the Division of Soils, '(Philip to Boardman: "You use the old digit here to stem the tide. You know, just like the boy and the dyke in Holland". (Smiles, thinking): "Now that's an interesting idea! I could apply that to unsteady, unsaturated flow in porous media. Talk about unsteady and unsaturated, I'd start with another beer but the jug's empty".'

Dr Philip found the whole thing rather amusing, as you can see from the photo above right with Professor Ralph Slatyer, in which he is revealing what he actually said to Dr Boardman. The pictured conversation took place during a visit by Prof Slatyer, who was recently appointed Science Advisor to the Prime Minister, to the Centre for Environmental Mechanics. While there he gained an overview of the Centre's research and discussed national science policy issues.



Letter
Cont. from p.2

Along the way, however, there are costs, such as the collapse of morale and the loss of status and relevance (especially among many older staff members), which apparently are not being taken into account.

Further, there are CSIRO divisions which, because of amalgamation, restructuring and changes in demand from the community, are now considerably overstaffed with marginally relevant experts.

When all of this is combined with a desperate requirement to save expenditure throughout CSIRO, I cannot understand why we are not having another round of Voluntary Early Separation (or non-disputed redundancy).

This is an established practice throughout the Commonwealth employment sector and clearly there are a number of older staff who would readily accept such a basis for early retirement.

Apart from the budgetary savings that would result, many other advantages would flow to the Organisation: young/new staff would be employed to develop fresh areas of work. The generally ineffective alternative of retraining older staff would not be required.

While it is sometimes thought that redundancy offers would place great financial strain on divisions, this is not true. The majority of the funding for the payout comes from the superannuation entitlement and is not a charge on the division. Other portions come from leave entitlements which divisions must find in any case and from a salary in advance payment which can be funded by holding the position vacant for a period following the redundancy.

At present we seem to be blocked from any chance of obtaining redundancy settlements by the attitude of CSIRO administration and the CSIRO Officers Association, both of which seek to limit all redundancies, whether forced or mutually agreed.

For many older CSIRO staff, the time has come to part with the Organisation in a dignified way and one that does not demean their social or professional status. For people who have given their working lives to the Organisation, early separation with a settlement sufficient to allow them to begin a new life is a reasonable expectation. The CSIRO administration and unions should appreciate that this is also to the advantage of CSIRO.

I would be pleased to hear from anyone interested in this matter.

Tom Stevens
Division of Building,
Construction and Engineering

Unions take advantage of training course to tackle major issues

Delegates from across Australia attended a CSIRO union training course at Wodonga in August. It was the first of its kind for the Organisation and provided a useful forum for debate on some important issues.

The five day course, held at the Clyde Cameron College of the Trade Union Training Authority (TUTA), attracted delegates from the CSIRO Laboratory Craftsmen Association (CSIRO LCA), the CSIRO Technical Association (CSIROTA) and the Australian Public Sector and Broadcasting Union (APS&BU).

TUTA is a statutory authority established by the Commonwealth Government to train trade union and staff association representatives. All state capitals have TUTA training centres, with the Clyde Cameron College being the centre of the Authority's activities.

The joint union training course was held to give delegates an opportunity to discuss changes occurring in CSIRO and the variety of external and internal issues facing the Organisation. The aims included increasing awareness among members and enhancing bottom-up and top-down communication within the unions.

Apart from the more general issue of the state of unionism in Australia, association delegates also considered the approaching ACTU Congress and the Science and Technology policy to be put before it.

The delegates reconfirmed the need for constructive industrial relations in CSIRO and for the democratic processes already in place in the staff associations. To this end, current CSIRO industrial issues were discussed and valuable direction given to association representatives.

A range of issues, including award restructuring, human resources strategy, personnel management and amalgamation also came in for consideration.

Amalgamation

The three staff associations are negotiating for a future amalgamation, forming the largest union within CSIRO. It was noted that the highly effective CSIROTA infrastructure would initially benefit all CSIRO members of this proposed large public sector union.

On the amalgamation issue, we were fortunate to have Peter Robson, Joint Federal Secretary of the APS&BU present to answer questions and offer his views. Generally, delegates were in favour of amalgamation, with final administrative structures yet to be determined.

There was much discussion on personnel management (i.e. those events between appointment and separation) with detailed comments generated on issues such as the Performance Review and Development program, sexual harassment policy, unsatisfactory performance and the tenure award. It was agreed that negotiated policy for personnel management was only as effective as the willingness of supervisors and administrators to implement it.

It was apparent to all that many supervisors in CSIRO were either ignorant of policy or chose to disregard it. A point acknowledged by all was that mismanagement of staff by supervisory scientists was the cause of many of our personnel problems and that despite considerable management training being provided to supervisors, there was little evidence of any effect. Although documentation on dealing with unsatisfactory performance was readily available, personnel mismanagement appeared to continue largely unchecked.

During the discussions on personnel management, delegates were joined by Mr Arthur Blewett and Ms Carmel MacPherson, both from the Human Resources Branch. This was a rare opportunity for such a large meeting of CSIRO union delegates to discuss formally and informally, issues of importance with senior management advisors.

Delegates made clear their dissatisfaction with the management style of many supervisors and their disappointment that negotiated agreements with CSIRO, represented by Corporate Services, were regularly disregarded by line managers.

Finally, delegates questioned the role of Corporate Services in agreement negotiations and asked why they should continue to negotiate at this level. Delegates asked Mr Blewett and Ms MacPherson to advise the Chief Executive:

1. we conclude that, in effect, there is no accountability for directors, chiefs and line managers; and
2. we believe a regular and systematic application of the guidelines for managing unsatisfactory performance to chiefs would be a start to resolving this problem.

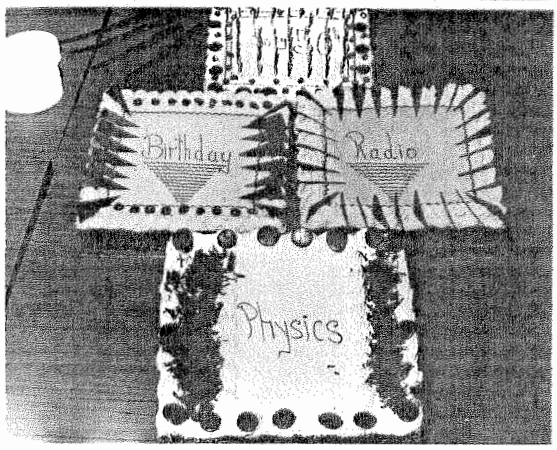
The joint union course was considered a success by all who attended, coming as it did at an appropriate time in the development of the Organisation. Its worth was proved, not only in the valued discussions and material presented, but also as an opportunity for representatives of unions negotiating amalgamation to acknowledge and confirm their common interests.

Vaughn Cox
Chairperson, WA CSIROTA
Division of Animal Production
Floreat Park

'...delegates made clear their dissatisfaction with the management style of many supervisors...'

Above, the delegates. From left to right, Glen Cameron, Doug Braybrook, Mark Tunningly, Michael Lang, Dallas Richmond, Leanne Abberton, Don Wigham, Gail Russell, Ralph Gilbert, Terry Byrne, Geoff Lane, Ron Johnson, Bob Johnston, Carole Popham, Phil Harrip, Les Fallick, Ross Rebgetz, Michele Narracott, Vaughn Cox, Tony McCaffrey, Nicki Gordon-Smith, Garry Hannan, Malcolm Hodgen, Neal McQueen and Daryl Mummery.

Division of Radiophysics turns 50



On 23 August the Division of Radiophysics celebrated its 50th birthday. The festivities, although lacking fireworks, had a much higher profile than the Division's secretive beginnings.

In February 1939, the Australian Government received a 'most secret' cable from the British Government, informing it of an important new development in defence science – later to be known as radar (radio detection and ranging). Australia was invited to send its best qualified available physicist to learn about the technique.

The Cabinet ministers of the day almost certainly knew nothing about radar, but they had no hesitation in sending Dr David Martyn of the Radio Research Board. He came back full of enthusiasm for the new science.

On 23 August 1939 there was a meeting to consider the establishment of a radar research group. It was attended by the Prime Minister, the Minister for Defence, the Minister for CSIR (as it was then), the Postmaster-General, Sir John Madsen (Chairman of the Radio Research Board and Professor of Electrical Engineering at the University of Sydney), Sir David Rivett (Chief Executive Officer of CSIR) and Dr Martyn.

They agreed to establish a secret radar research group and to call it 'radiophysics' for camouflage. They also agreed to house the new laboratory in an extension of the National Standards Laboratory in the grounds of the University of Sydney – because an extension would attract less interest than a new building.

At the end of August, Dr Martyn was appointed Officer in Charge of the Radiophysics Laboratory and in May 1940 Radiophysics was given the status of a Division. Its existence was not officially announced until the end of the war.

During the war, Radiophysics mainly worked on aircraft warning systems. Later it branched out into navigation aids, cloud physics and radio astronomy. Along the way, it built one of the world's first computers (CSIRAC, 1948), worked on semiconductors and transistors and devised the Interscan aircraft landing system.

Today, 50 years down the track and with a proud history of science for Australia, the Division works on gallium arsenide solid state devices, antennas for both earth stations and satellites, image formation and processing, telecommunications and hardware processing techniques.

Above, two of Radiophysics' longest service staff members, John Murray and Beth Nanlohy, prepare to feed the multitude on 23 August, the Division's birthday.

Murray Nanlohy

Sirocredit

Topics of Interest

SIROCREDIT members get more than just the financial services provided by the credit union. Through co-operative agreements, a range of other benefits also is available.

1. Legal advice

In each state, SIROCREDIT has arranged for a legal firm to provide a free consultation and will preparation service for members. These firms can also provide competitive quotes for other legal requirements, such as conveyancing or family law matters. To get in touch with the SIROCREDIT preferred solicitor in your State, contact any of SIROCREDIT's offices listed below.

2. Financial planning

To provide for the ever increasing demand within CSIRO, SIROCREDIT recently established its own financial planning service. SIROVEST is staffed by its own paid employees so that they can provide advice which is not influenced by high yielding commissions. Information and investments are placed through SIROCREDIT via its licence with the SECURITOR group of companies.

SIROVEST is fully versed in all aspects of CSIRO superannuation and bonus plans and is able to tailor a plan for individual investment, retirement or budgetary needs. Advice is available from the SIROCREDIT offices in Melbourne, Canberra and Sydney, and can be arranged for members in all other states.

3. Tax return preparation referral

SIROCREDIT has arranged with the accountancy firm Haines Norton for advice to members on tax and the preparation of members' tax returns. The fees charged by Haines Norton will be competitive, but obviously will depend on the nature of the work involved in each individual return. The fee will be estimated beforehand and agreed to by the member before any work starts. Tax return preparation is available in all states of Australia and the contract particulars may be obtained from SIROCREDIT.

4. Insurances

All members' domestic and commercial needs can be arranged by SIROCREDIT. The credit union promises:

- the best policy for the best possible price
- complete flexibility, with choice of replacement or indemnity cover on home or contents and agreed market value on vehicles
- convenience, with monthly payments for no additional cost

SIROCREDIT's insurance also provides for the amalgamation of all a member's insurance covers under one policy, eliminating the time wasted in varying renewal dates, etc.

5. Travellers cheques and foreign currency bank drafts

SIROCREDIT provides at no charge American Express Travellers Cheques to any CSIRO location around the country. It also can produce foreign currency bank drafts for members at a moment's notice. Many other banks and financial institutes charge heavily for these services.

To find out more about how SIROCREDIT can assist you, ring or write to any of these offices:

Melbourne Head Office,
89 Hoddle Street,
Richmond Vic 3121
PO Box 9,
East Melbourne Vic 3002
PH: 03-483 1500 *or* 008-33 8698
FAX: 03-483 1566

ACT office,
CSIRO Black Mountain Laboratories,
Black Mountain ACT
PO Box 710,
Canberra ACT 2601
PH: 062-46 5400 *or* 062-46 5785
FAX: 062-46 5440

NSW Office,
CSIRO North Ryde Laboratories,
105 Delhi Road,
North Ryde NSW
PO Box 387,
North Ryde NSW 2113
PH: 02-887 8248
FAX: 02-887 8249

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'...if God tried to enter the CNRS [French National Scientific Research Council], He'd flunk. He has performed an interesting experiment, but nobody has ever succeeded in replicating it. He has explained his work in a voluminous publication, but it wasn't even in English, and he has published nothing since...'

Hubert Curien
Minister of Research and Technology
France

Merino steals the show, as French PM drops in on CSIRO

A desire to expand science and technology activity in Australia led the French Prime Minister to include CSIRO in his brief trip to Australia last month.

Monsieur Michel Rocard and Madame Rocard visited CSIRO on 18 August, accompanied by the Minister Delegate for Foreign Affairs and the Minister for Overseas Departments and Territories, their spouses, three Members of Parliament and a contingent of diplomatic officials and French press.

They were in Australia for only a day and a half at the start of a tour of the South Pacific.

CIRC was responsible for organising the CSIRO visit, with the Public Affairs Unit assisting with displays and speeches. The French party was officially welcomed to CSIRO by Senator Button, Mr Barry Jones, Dr Keith Boardman and Dr Roy Green, and taken to see some displays of our work.

The projects chosen all had a French connection, and the divisions concerned put a lot of co-operative effort into providing display material and advice. They also provided scientists to explain the displays to the VIPs – some even managed some French!

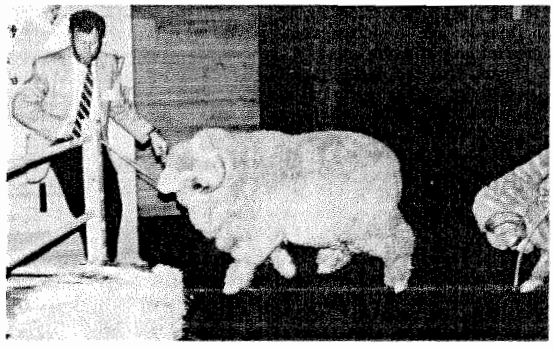
On display were:

- Animal Production's controlled release capsules for dosing animals. One of the Division's many licensees (Captec) launched an anthelmintic for sheep in France in June. Keith Ellis and Terry Leche did the honours for the Division, but their thunder was stolen by George Merriman who brought two magnificent Merinos from the Merryville Stud to catch the eye of the visitors and press *(see photo)*.
- Water Research's joint venture with the Cassegrain Group, Cassiro Pty Ltd. This company has been formed to develop and market the Division's gypsum slotting technology for improving poor soils. Cassegrain is owned by a French family which migrated here in the 1950s and several French companies and individuals are now providing technical help in the development phase. David Mitchell was partnered by Claude Cassegrain to explain the venture.
- Plant Industry's gene shears technology, fresh from its display at Parliament House in July when our joint venture was launched officially. Gene Shears Pty Ltd has its French link through our partner Limagrain, which is putting $22.5M into developing the technology further. Jim Peacock was assisted by Karen McGhee in coping with the many questions raised by this display.
- Entomology's biological control research, particularly the proposed new research lab at Montpelier in southern France. The Division's presence in Montpelier has encouraged other countries, as well as France, to build up the area as an international centre for biological control research. Jim Cullen and Liz Armstrong showed some live samples of insect pests and the damage they inflict on plants.
- Applied Physics' diamond film technology. This is creating great interest in industry, which can see many possibilities for using very thin diamond films as wear-resistant coatings, in optical components, in semiconductors etc. The Division and French company Thomson-CSF are to carry out joint research to develop the laboratory work into an economic industrial process. (Unfortunately, a sudden escalation in the air pilot's dispute meant nobody from the Division could attend).

To finish off there was a collage of photographs showing a variety of other CSIRO work. This worked well as it enabled the French visitors to ask about items that caught their interest. Subjects on display were the $10 plastic banknote, magnetite sewage treatment, the Australia Telescope, satellite geological imaging, QEM*SEM, clean coal, Scrimber, Sirospun, climate and greenhouse research and wildlife studies of penguins.

All the displays, except gene shears, were designed by Vlad Mosmondor of Forestry and Forest Products, who did a marvellous job for Public Affairs in a short time with a minuscule budget.

The visit lasted 45 minutes and about half of that time was taken up with speeches by M. Rocard, Senator Button and Mr Barry Jones. M. Rocard announced proposals for CSIRO-CNRS joint research on climate and for talks between Sirotech and a similar technology broking organisation in France, ANVAR. Senator Button announced funding for some projects under the bilateral Australia-France science agreement; this included a coral reef project in which CSIRO has an interest. Barry Jones led off valiantly in French before reverting with relief to English.



Above, Dr Keith Ellis of the Division of Animal Production persuading one of the star attractions to enter the display. Below, Dr Jim Peacock, Chief of the Division of Plant Industry, explains gene shears to M. Michel Rocard. Behind Jim's arm is Vlad Mosmondor from the Division of Forestry and Forest Products, designer of the displays.

Above, the plastic $10 note created a lot of interest. Inspecting it are Dr Keith Boardman, Professor Michel Ronis (First Secretary, Scientific, French Embassy), M. Rocard and Senator John Button.

The pain and pleasure of CSIRO'S premier social event

Will Steffen from the Centre for Environmental Mechanics offers this account of a yearly event which gets some CSIRO staff huffing and puffing. Those of us who have trouble finding the stamina required for lifting a coffee mug may find reading this article quite exhausting!

Hundreds of CSIRO scientists have done it. Technical and clerical staff have done it, and so have administrators. Visiting scientists from the UK, the USA, New Zealand, Japan and Finland have done it, and even a few chiefs have done it.

But the Chief Executive Officer and the Chairman have never done it, nor has any institute director or member of the Executive Committee.

Before the more cynical readers take another potshot at CSIRO's top management, the activity in question has nothing to do with sex, power or money. It is the Black Mountain Cup, CSIRO's annual Canberra fun run.

The BM Cup has become a midwinter institution in the CSIRO calendar, having been run for the 13th consecutive year in July.

Originated by Colin Hazelton, former workshop manager at the Centre for Environmental Mechanics, the race is now organised by EM's Greg Heath. 'There is no other CSIRO event of any kind, social or scientific, that brings together a more diverse group of people within the Organisation,' Greg said, commenting on the value of the BM Cup to the morale and social cohesiveness of CSIRO staff.

'Normally we have about 100 runners, and with an additional 100 or so spectators, we have a very good cross section of CSIRO staff. And often we get a team or two of runners from CSIRO divisions in Sydney or Melbourne.'

The first official race was held in 1977, when Hazelton – who made the coveted trophy, the Black Mountain Cup, that goes to the winning team of four runners – organised a group of regular lunchtime joggers from Entomology, Plant Industry and Environmental Mechanics for a more formal race around the familiar tracks on the slopes of Canberra's Black Mountain.

Dominated

Early BM Cups were dominated by the teams from Entomology, which won the first four races before Plant Industry broke their hold on the cup in 1981.

Individually, the early races saw the emergence of the remarkable Rosemary Longstaff as Canberra's top female distance runner. Rosemary, then with Entomology, still ranks as the ACT's best ever woman marathoner.

On Black Mountain she was devastating, winning outright first in the inaugural Cup and again in 1980. In all, Rosemary ran the BM Cup six times, with three second placings and a third to go with her two wins. Her best time was just under 21 minutes for the 5.6km course.

It is extremely unusual for a woman to win outright a mixed race of any distance. But what makes Rosemary's achievement all the more amazing is the nature of the BM Cup course.

Although it is euphemistically dubbed the 'Little Hill' run, there is nothing little about the hills over the rugged, undulating circuit. The course is psychologically tough as well, as just when runners are recovering from the initial 1.5km burst uphill, they find they have lost much of that altitude and face three steep, sharp hills before beginning the sprint home. Such a course would normally favour stronger male runners.

Others that have thrived on the challenging course are CSIRO's older runners. In 1986 Environmental Mechanics' 60 year old Keith Perroux covered the course in a quick 25.25, while 51 year old Brian Austin of Paxus/Comnet (formerly CSIRONET) recorded a sizzling 22.37 in the race this year.

Who is CSIRO's fastest chief? Only three present or past chiefs have run the BM Cup, with Terry Speed, formerly Chief of Mathematics and Statistics, living up to his name with a 22.23 in 1985 and 22.40 in 1986. Peter Diggle, a later Maths and Stats Chief, ran 23.20 in 1985, while David Smiles, then Chief of Environmental Mechanics and now of Soils, posted a 24.15 in 1980.

For consistency, it's hard to beat Ray Leuning of Forestry and Forest Products, who, from 1983 to 1986 recorded four consecutive times within six seconds of each other. For persistence, the award goes to Ross Gilby (now retired) and Tom van Gerwin of Entomology, who have each run in 12 of the 13 Cups, and to Keith Perroux, who has run in 11.

Although the BM Cup has never been won by a division from outside Canberra, it's not from lack of tryers. Teams from Animal Production, Applied Physics, Food Research, Fossil Fuels, the Lucas Heights Research Labs, Mineral Physics and Process Technology from Sydney; Textile Industry from Melbourne; and Irrigation Research from Griffith have all had a go, but without success. With two Sydney teams performing well in this year's BM Cup, perhaps the Canberra divisions' grip on the trophy will be broken in 1990.

Non-CSIRO runners have dominated the individual titles in recent years, but the course record is still held by Plant Industry's Peter Berney, who raced around the circuit in 18.09 in 1985. Berney led Plant Industry to a team time of 1.25.27, a record which also still stands.

Considering the very rocky tracks that comprise the BM Cup course, it is a remarkable record that no-one has been seriously injured. 'We've had only one minor injury over the years,' Greg reports, 'and that was in 1977 when a runner from the RAO, who shall remain nameless, got lost and ended up stumbling through the bush on the west side of Black Mountain. Bleeding and somewhat embarrassed, he finally appeared at the finish line over an hour after the start. We've never lost anyone on a permanent basis.'

One runner who was determined not to get lost was Plant Industry's Emile Brunoro. Now well known in the ACT as leader of the Sun Ripened Warm Tomato Party in the recent local election, Brunoro reportedly hitched a ride on an ACT Park ranger's landrover in the 1978 race. It didn't help him much, though, as his time was only 30.15.

Instantaneous reporting

A novel feature of the race is the nearly instantaneous reporting of the results. Within 15 or 20 minutes of the run's finish, the complete results, including all of the aggregate team times, are available.

The clever system, devised in 1978 by Environmental Mechanics' John Bryan, is based on a record of timed electronic pulses sent to a computer as the runners cross the finish line. The runner's numbers also are recorded in sequence and the two lists are matched by computer.

The race's mid-July timing has proved a wise decision as far as the weather is concerned.

'In 13 years we've never had rain for the race,' said Greg. 'The worst day we had was one of those bleak, foggy winter days – it was only 1°C at midday. Generally it's 8-10°C and sunny – ideal conditions for running.'

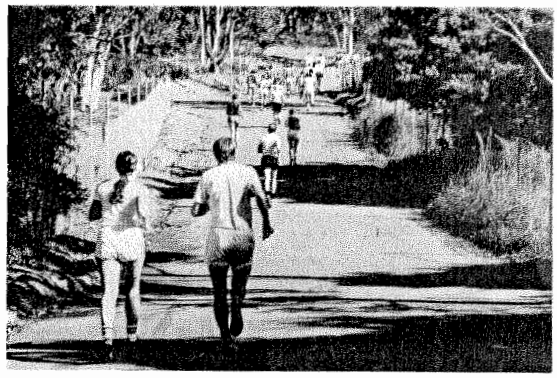
An interesting trend is the drop off in the number of participants in the BM Cup during the late 1980s. Until the 1989 race, which had 100 runners, the number of entries had decreased from a peak of 111 in 1981 and 110 in 1982 to 52 in 1988.

The trend, to some extent, reflects the general drop off in interest in running since the early '80s. But Greg thinks other factors may be operating.

'The trend also could reflect the sharp decrease in the number of younger staff joining CSIRO since the early '80s. Many of the people still running the race were participants from the BM Cup's inception in the late '70s.'

And what of the future? With the upsurge of interest in 1989 and solid backing from SIROCREDIT, which began sponsorship in 1985, the BM Cup is set to continue as CSIRO's premier mid-winter athletic and social event.

But, although there has usually been a large number of runners from the corporate centre, there is still an embarrassing lack of participation by top management. So, Neville Wran and Keith Boardman, institute directors and Executive Committee members: how about having a go in 1990. It's never too early to start training!



The agony is just beginning, as runners struggle up the hill at the start of the BM Cup.

The 1978 winning team from Entomology. From left, Kim Pullen, Rosemary Longstaff, John Feehan and Roger Farrow.

Well in front of the field, Rosemary Longstaff charges down the hill towards the finish of an early BM Cup.

Is this really a fun run? Bill Domingues of the corporate centre (No. 67) and Environmental Mechanics' Will Steffen (43), stagger across the line in the 1989 race.

Domingues

The engineer they call 'Your Worship'

When Councillor Larry Stephens was sworn in as Mayor for the City of Heidelberg on 9 August this year, it was hardly surprising to his colleagues at the Division of Manufacturing Technology.

Nevertheless, it was rather unusual for an Independent Councillor with three years' Council experience to have received strong support from both major political parties which also were making their own bids for the mayoralty.

In addition to his propensity for community involvement, which is quite indefatigable, and his dedication to his family – wife of 27 years, Beverley, daughter Cheryl, 21, and son Dale, 18 – Lawrence William Stephens always has been prepared to do that little bit extra for people, whether from CSIRO or the general community.

This is demonstrated in a number of ways, such as in filling the role of Santa at the Division's Christmas parties, or updating his first aid qualifications to continue in his job as Divisional Safety Officer (he holds the St John Ambulance Medallion), or performing his tasks as Chairman of the recently formed Regional Employee Development Committee Victoria/Tasmania (the reconstituted VICTAT Committee).

After an apprenticeship in fitting and machining at the Maribyrnong Ordnance Factory, and invaluable industrial experience during subsequent employment as both a metrologist in the Footscray Ammunition Factory Metrology Laboratory and as a technical officer in the RMIT Production Engineering Department, Larry Stephens joined CSIRO in 1972.

Originally employed as a technical officer with the Division of Tribophysics (later to become the Division of Materials Science), Larry soon demonstrated his interest in the well being of his fellow CSIRO officers through his early membership, and later presidency, of the CSIROTA (CSIRO Technical Association).

His ease and excellence of communication within and outside the Organisation did not go unrecognised, and by 1978 his professional engineering status was confirmed when he graduated from Swinburne College of Technology with a Diploma of Engineering (Production), was accepted as Graduate of the Institution of Engineers, Australia, and was reclassified to the scientific staff as an experimental officer.

By this time, Larry was making a significant contribution to CSIRO's metal machining research, and he continued to work with the metal machining group when it transferred its allegiance to the then newly-formed Division of Manufacturing Technology at Fitzroy. His participation in the area of staff politics also underwent a slight change of direction when he took over as the Division's representative on the CSIROOA (CSIRO Officers Association).

In 1985, the Division made plans to move from its temporary Melbourne premises (on three sites at Fitzroy) to a new headquarters site at Preston. Throughout the period leading up to, and during, the move in May 1986, Larry found himself in the position of relocation organiser/manager, with the Divisional responsibility for the conversion, equipping and provisioning of a former plastics/resin factory into a fully functioning CSIRO laboratory.

Above, Mayor Stephens in his other public role, as Santa Claus at the Division's Christmas party.

For Larry, 1986 was a big year. The smooth and successful transfer of the Division's staff and resources to its new industrial premises contributed to his reclassification to the newly created position of Melbourne Laboratory Site Engineer. Also, in August of that year after standing as an independent at the age of 46, he was elected to represent the Banyule Ward in the Heidelberg City Council. All this in addition to his increased corporate membership involvement with the IEAust, in particular as an active member of the Victorian Manufacturing Branch for which he has now served terms as both secretary and chairman.

Already prominent in the Banyule area, through his 10 year association both as secretary and then president (a position he relinquished on election to Council) of the Banyule (Australian Rules) Football Club, the newly elected Councillor Stephens immediately took on the important position of Chairman of the Heidelberg Bicentennial Committee and soon became involved in a wide range of new community activities. Now, after serving only a three year term as Councillor, his community endeavours have been recognised by the vast majority of his fellow councillors with his elevation to Mayor.

Well done, Larry!

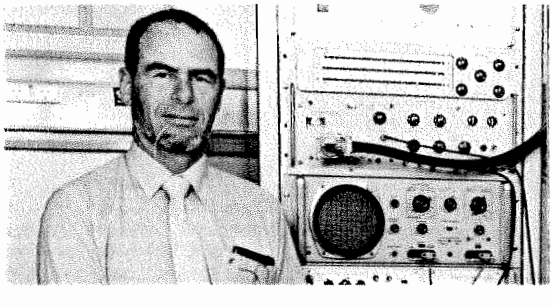
NML thesis earns degree for Dr Somlo

A thesis on his professional output at the CSIRO National Measurement Laboratory has earned Dr Peter Somlo the degree of Doctor of Applied Science.

Dr Somlo's thesis, granted by the Faculty of Engineering at the University of Melbourne, took a global look at more than 30 years of his research at the Laboratory, which is now located in Lindfield.

The thesis refers to over 50 publications including the book: Somlo and Hunter, *Microwave Impedance Measurement* (P. Peregrinus, 1985), and four patents.

Dr Somlo is leader of the Division's Microwave Measurements project.



David Sangster retires

David Sangster retires

Mr David Sangster, leader of the Radiation Chemistry and Technology Section of the Division of Chemicals and Polymers, has retired.

Like most committed scientists, though, he intends continuing his work – perhaps not with CSIRO but at least at Lucas Heights, where he has been based for the past 32 years.

David joined (the then) CSIR as a research officer in the Division of Soils in 1948, soon after completing his degree at the University of Adelaide. Within a few months he was seconded to the Atomic Energy Research Establishment at Harwell in England.

At that time, Australia was using Harwell as a training ground for Australian scientists interested in this country's nuclear energy industry. Therefore, when David came back to Australia in 1956 he returned, not as part of CSIRO, but as a Senior Research Officer at Lucas Heights in the Australian Atomic Energy Commission (AAEC), which had been established in 1953.

Between then and 1981, David advanced through the scientific ranks of the AAEC, establishing his international reputation as a leader in the field of radiation chemistry.

As a result of the CSIRO-AAEC reorganisation at Lucas Heights, 1982 saw David back with CSIRO as section leader of Radiation Chemistry and Technology for the Division of Chemical Physics, and officer in charge of its Lucas Heights unit. Two CSIRO name changes later and seemingly unperturbed, David continued his work on the industrial applications of radiation, specialising in the use of radiation in chemistry and biology.

Throughout his career, David has been a prominent member of the Royal Australian Chemical Institute (RACI), including a year as NSW Branch President and Member of the Executive Council, and another year as Chairman of the Polymer Division and member of the Full Council. He also is an affiliate of the American Chemical Society.

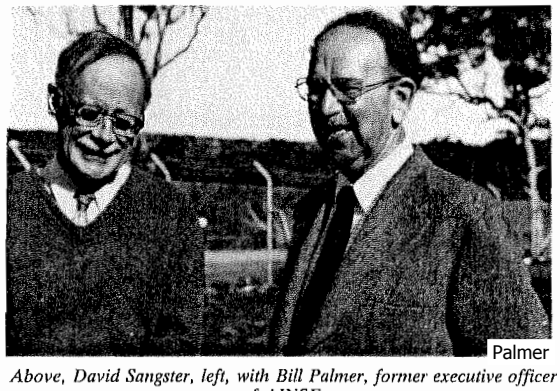
In recognition of his contribution to polymer science, in 1987 he received a Citation from the RACI Polymer Division and a year later the 14th Australian Institute of Nuclear Science and Engineering Chemistry Conference was convened in his honour. The Conference was attended by many distinguished radiation chemists from overseas.

In the preface to the Journal of Radiation Physics and Chemistry which commemorates the occasion, the Conference President Professor Donald Napper, Professor of Physical Chemistry at the University of Sydney, referred to David as the 'father' of radiation chemistry in Australia, noting his wide contribution to the promotion of both fundamental science and the industrial applications of radiation.

David also has had a continuing involvement with the training of future scientists. Through his work with AINSE he has had an impact on research at various Australian universities and through the Australian School of Nuclear Technology (ASNT), and has taught research throughout Australia and South East Asia. With Professor James O'Donnell, he has co-authored the text *Principles of Radiation Chemistry*, which also has appeared as a Japanese edition.

During his time at Lucas Heights, David has made innumerable friends. Many have been made through his work; he has the ability to communicate his enthusiasm for complex radiation chemistry and its uses to any listener. But an equal number have been made through his interest in and concern for fellow staff. We held an 'official' farewell for David at the end of August, but we hope he will be around the site for many more years. He is truly a scholar and a gentleman.

Chris Thompson



Palmer

Above, David Sangster, left, with Bill Palmer, former executive officer of AINSE.

Photo: Geoff Baxter

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CoResearch

No. 328 October 1989 CSIRO's staff newspaper

CSIRO AUSTRALIA

ASTEC report

Less is more?

For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath.
Matthew 25:29

According to the latest report of the Australian Science and Technology Council (ASTEC) Australia's position in world science is in danger, and if we want to prevent a serious decline in research standards we had better be prepared to decrease our number of researchers.

That's right. Decrease, not increase.

The report, titled *Profile of Australian Science* and officially released on 27 September, calls for increased funding for research, mainly from the private sector, as well as incentives to lure gifted graduates on to doctorates and careers in science. The new PhD graduates will be needed, it appears, to fill the gaps left when the present aging researchers start retiring, with a vengeance, in the 1990s.

But the report also suggests that in the long run the only way to maintain the quality of research may be to reduce the number of people actually engaged in it.

'Inevitably' it says, 'priorities have to be established to distribute the limited quantity of resources for basic research.'

ASTEC proposes that funds be redistributed to favour those areas of research that can deliver the kind of results the world wants. Areas that have been 'worked out' – that no longer 'justify the expenditure of significant resources to extract what is left' in terms of 'demand for the product' – should be shut down.

Similarly, the limited funds available for individual scientists should be concentrated on a relatively few 'outstanding researchers' rather than rationed out, as now, in tiny morsels to a clamoring horde.

These generalisations are aimed mainly at the universities, not at organisations like CSIRO. 'Higher education ... is the sector' according to the report 'where the current number of researchers is, on average, receiving a low level of funding' (– and thus presumably the sector that most badly needs to have a few of its scientists 'redistributed' out of basic research).

'The Commonwealth Government appears' says the report, rather coyly, 'to favour a reduction in the number of active researchers in higher education as a means to concentrate research effort.

'This policy would also have the effect of providing the lesser number of researchers with additional funds, allowing them to work closer to the leading edge in their disciplines. This is the strategy which has been followed by Government laboratories.'

According to Jim McLeod, chairman of the working party that produced the report, and Professor of Medicine at the University of Sydney, 'Resources are simply spread too thin. We must give our best researchers the equipment and support they need to get results.'

These 'best researchers' are apparently – and perhaps luckily, from the point of view of the proposed solution to our problem – also spread pretty thin. The report's scouts found them 'small in number and ... spread across the country ... amongst various institutions. On a number of occasions, Australia's international reputation in particular sub-fields was traced to the activities of talented individuals ... working on their own. If these people were to retire or leave Australia, their expertise would be lost.'

This has something of a romantic, even mythic, ring to it, with its lonely, faintly heroic intellectual frontiersmen saving the just-plain-folks from scientific extinction.

And the ring becomes a little louder, perhaps, when the report goes on to propose the establishment of Special Research Centres for the purpose of bringing together these 'truly creative people'. In the future, the report says, the number of these centres will need to be increased, 'probably at the expense of block funding to institutions.' Universities, it remarks with neat insight, often 'tackle modest problems, with modest results.'

The report also calls for a lessening of the 'direct link' between teaching and research, so that the new teams of researchers will not be subject to the restrictions imposed by student needs.

Neither should they be hampered by artificial divisions between academic disciplines – 'Advances in basic research often take place at the boundaries of traditional disciplines ... [but] ... institutional rigidities ... restrict this activity and should be changed to make this research co-operation easier.' The high-powered researchers, drawn as they will be from among our 'best international performers', will deserve, and repay, more freedom as well as more funding, the report argues.

'Those who generate the most creative ideas, or breakthroughs, ... could be given the opportunity to assemble research teams to pursue whatever they choose for a fixed period of time. In effect, this is the notion behind the Special Research Centres in higher education.'

If the ASTEC proposal sounds a bit high-flown, even perhaps elitist, it certainly doesn't suffer from that excess of modesty of which it accuses the universities. And if desperate diseases do call for desperate remedies, the question is, perhaps, just how bad is Australia's scientific health?

According to ASTEC, parts of it are excellent.

The working party that produced *Profile of Australian Science* found that government funding for basic research is in line with world standards, as is the overall quality of that research.

But from there on it's less reassuring:

- In comparison with similar countries, Australia's private sector is spending very little on science; it should spend more.
- Scientific equipment in our universities is outmoded and in poor repair; most of it needs to be replaced.
- Researchers are getting far less funding than they need, on an individual basis, to work effectively.
- Too few science students are proceeding to postgraduate work.

It appears that science has become so unattractive as a career to young people that unless something is done soon we will not have enough PhD graduates to man existing 'keep-the-boat-afloat' positions, let alone enough to allow us the luxury of choosing from among them an elite corps of scientific commandos.

According to John Madden, head of ASTEC's Studies Branch, 'By the turn of the century, up to half of all research positions in the public sector will fall vacant. It is unlikely that the current rate of production of PhDs in Australia will meet the demand.'

In other words, if we don't move smartly we may well find ourselves with a reduced community of researchers whether we like it or not, but it is likely to be a community whose standard has been not proudly raised, but embarrassingly lowered, in the sight of all the world.

Dr Norm Thomson, this year's Sir Ian McLennan Achievement for Industry Award winner, with the three models who presented a range of Australian-made cotton garments at the Award ceremony. The event was held at Sydney's glamorous Darling Harbour Convention Centre on Wednesday 27 September. CSIRO Chairman, Mr Wran, was among the many public figures who attended.

New cotton breeds earn McLennan Award for Dr Thomson

Dr Norm Thomson of the Division of Plant Industry has taken out this year's Sir Ian McLennan Achievement for Industry Award for the breeding of two new and successful varieties of cotton.

Dr Thomson, Officer in Charge of the Division's Cotton Research Unit at Narrabri, said that in the few years since the new varieties were released commercially – Siokra in 1985 and Sicala in 1987 – they had gained more than 70 per cent of the Australian cotton planting market.

He credited their success to high yield, pest resistance and strength of fibre. (For more scientific detail see *CoResearch* No. 310, March 1988, and No. 315, August 1988.)

Appropriately, the Achievement for Industry Award carries more than mere kudos – Dr Thomson will be given a grant of up to $10 000 for overseas study related to the prize-winning innovation.

Dr Thomson's research team members were awarded a Sir Ian McLennan Achievement for Industry Award plaque in recognition of their contribution to his success.

This year for the first time the Award Trustees decided to honour the three runners-up with Certificates of Commendation. These were, in alphabetical order (– the three certificates denoting equal merit): Mr Donald Beech of the Division of Tropical Crops and Pastures, for his development of the commercial viability of the chickpea industry in Australia; Dr Graham Price of the Division of Geomechanics, for his resolution of foundation problems of gas platforms on the North-West Shelf of Australia; and Dr Bruce MacA Thomas of the Division of Radiophysics, for his design work for earth-station antenna development in Australia.

A special plaque was also awarded to Mr R A Williams, chairman of Cotton Seed Distributors Ltd, in recognition of the importance of the company's effort in the commercial development of the two varieties of cotton.

For another photo from the ceremony, turn to p.3.

S-C ORI

From the Chief Executive

A column by Dr Keith Boardman

I am writing this column at the end of a week which saw some biased and inaccurate reporting in the Australian media, particularly on ABC TV and radio news, on the position of CSIRO's involvement in the 'gene shears' technology.

The technology relates to the ability of special RNA molecules, called ribozymes, to act as enzymes to specifically cleave other RNA molecules.

This has enormous potential application in biology, including agriculture and human medicine, by switching off unwanted genes. The novel work on ribozymes carried out at the Division of Plant Industry by Jim Haseloff and Wayne Gerlach led to worldwide patent applications by CSIRO and the formation of a joint venture with the French company, Limagrain – the fourth largest seed company in the world – to exploit the technology commercially.

The agreement with Limagrain provides for the entry of Australian companies to the partnership and I am now confident that this will be achieved.

The claim on the ABC that our technology was worthless was particularly damaging to CSIRO. The reports in the Australian media occurred on the eve of the publication in *Nature* of a 'news and views' report on gene shears by *Nature*'s Australian correspondent, Tania Ewing, and two days before the announcement that Thomas Cech of the University of Colorado had shared the 1989 Nobel Prize for chemistry for his discovery in the early 1980s of the ability of special RNA molecules to cut RNA at specific sequences.

The content of the *Nature* article was passed to the ABC and the *Sydney Morning Herald*, but CSIRO was refused access to the material, even though we were expected to comment on the view expressed on ABC TV that, from a commercial point of view, the CSIRO technology was worthless.

Following publication of the issue of *Nature*, Graeme O'Neill, the leading science and technology reporter in the print media, did a summary of the Ewing article for Melbourne *Age* readers and noted that CSIRO was confident of the strength of its patent applications.

By week's end, CSIRO became aware of an article by Thomas Cech, published recently by the US Biochemical Corporation, reviewing the literature on ribozymes and giving due credit to Haseloff and Gerlach for their novel contributions, which demonstrate that ribozymes can be designed to target any nucleotide sequence.

The treatment given CSIRO in this incident reflects an unfortunate tendency by the Australian media to accept views from overseas without adequate investigation, and to rubbish Australian efforts. It also is very disappointing that *Nature*, a respected and influential science journal of very high standing, published the report from its Australian correspondent without adequate checking and under the headings 'Australian innovation covered by US patent' and 'Commercial deal with French may be empty'.

The award of a Nobel prize for the original ribozyme discovery made only in the early 1980s, and the worldwide recognition already of the great potential of the technology derived from the ribozyme concept, is a good illustration of the close relationship between basic research and its application for economic benefit. Also, it demonstrates that the time frame for exploitation of discoveries in basic research can be quite short and the concept of science push and market pull as alternate driving forces for research is simplistic.

###

The first meeting of the Prime Minister's Science Council was held on 6 October. In his introductory remarks, the Prime Minister outlined his views on the role of the Council. Its prime role is as a forum for exchanging views, but the Prime Minister indicated that proposals before the Council must be action oriented. Papers prepared for a Council meeting will be published as soon as possible after the meeting.

There were two topics on the agenda for the first meeting: 'Global Climatic Change – Issues for Australia' was discussed in the morning session, and 'Resources for Science and Technology and their Utilisation' in the afternoon.

The four papers in the morning session provided an excellent coverage of the topic, with sensible recommendations for action. The CSIRO speakers – Dr Pearman of the Division of Atmospheric Research and Dr Walker, Chief of the Division of Wildlife and Ecology – are to be congratulated on the excellence of their papers and presentations.

The afternoon session ranged widely over the topic; from the relative funding of academically related research in Australia to a consideration of the factors for successful commercialisation of research results.

It is indeed a milestone for science and technology in Australia, with the Prime Minister showing so such interest in the papers presented at the first meeting and being prepared to devote his personal attention to the Council.

M Keith Boardman

Letters to the Editor

Dear Editor,

Once again the divisions have been let down by the corporate centre. After staffing an Employee Development Unit and releasing the glossy *Directory of Employee Developoment Programs*, funds to actually conduct courses have run out only a quarter of the way through the financial year and we are told that the remaining courses have been cancelled.

Other organisations realise the importance of continuing in-service training. And actually manage to conduct courses. CSIRO's Performance Review and Development program, with its promise of training to eliminate bottlenecks, is based on the assumption that appropriate training is available. What now? How do we retain our enthusiasm for PRD? How do we develop faith in corporate centre? Please, no more promises that cannot be fulfilled.

Alister K Sharp
Division of Food Processing

Dear Editor,

What future for science graduates?

Since leaving university I have come to appreciate the dwindling value of a science degree. Many biological and physical science graduates are now simply tools for cheap research, to be found annually at those government and industry enforced university student clearance sales.

How many graduates now fill non-professional positions to avoid unemployment or job insecurity, or have pursued a PhD because there seemed nowhere to go after honours? How many have left science altogether? Will these people ever be included in those trendy surveys on career prospects in Australian science?

For those of you who are degree graduates and feel you've been led up the garden path by science faculties, employing organisations and scientists from another time capsule, be grateful for what you've got! If it wasn't for credentialism you wouldn't have a job. Don't question the predicament you're in. This is the opportunity of a lifetime to relinquish your all for Australia's Research and Development. Don't underestimate the job satisfaction that will surely come from giving up your dreams of a career in order to subsidise your Division's financial problems and kudos.

Vaughn Cox
Animal Production Floreat Park

Dear Editor,

There is no other way of putting it: we're in shock. We, who'd long imagined your correspondents were not only quite incapable of elementary errors of scientific method, but also were at least aware of the work of Alexander G Bell and its contemporary fruits, find our beliefs at grave risk.

Confronted with the stark evidence of a letter allegedly penned by one Alister K Sharp (represented as an office bearer of the OA) in which assertions are made that CSIRO has suffered surreptitious budget cuts, there is little we can do but follow our scientific ideal, dear editor.

Accordingly, would you please investigate that letter and hopefully assure us that it is in fact a hoax? In that case, would you arrange for the perpetrator to apologise to Alister K Sharp for the mischief done to CSIRO's reputation for vigorous, informed and objective scientific enquiry?

If, however, the letter is genuine, we will revisit our hypothesis that your scientific correspondents are both unfailingly scientific and belong to a multi-disciplinary team in which there are non-scientist professionals. We fear that the observable and verifiable facts will have dealt our hypothesis a mortal blow.

You see, those facts establish that CSIRO has been supplemented for each of the 'cuts' identified by your correspondent. The supplementation was made following representations by that part of the multi-disciplinary team that holds a currently wonky hypothesis about the other part.

I Lowth
R Lockwood

Dear Editor,

Helmut Panhuber has got to be joking! In a time when the Organisation is fighting for its survival he wants childcare centres [*Co-Research* August 1989]. I don't know whether he realises it, but there is a real war going on between us and the Treasury (and others) who want to commercialise CSIRO. The last thing CSIRO needs at this time is an increase in unproductive costs, no matter how desirable it might be to alleviate the financial burden on any particular individual or perhaps two income family.

Granted, there is a need to attract and keep valuable employees, but this is already being done with the provision of private cars to some (not yet all) senior staff. Where is the budget provision for these cars and the substantial costs of redundancies that are no doubt in the pipeline? I suppose Helmut reckons 'if I doesn't ask I'll never get', so I shouldn't blame him for trying.

Perhaps, given the new tenure agreement which is on the books, he should wait and see whether the CSIRO and, equally importantly, his job, survive the next few years first.

M H Jones
Mineral Products Port Melbourne

Dear Editor,

On the back page of the Budget Statement document issued by the corporate centre, pie charts are used to illustrate the percentage of funds allocated to institutes, corporate centre, specific purposes and repairs and maintenance.

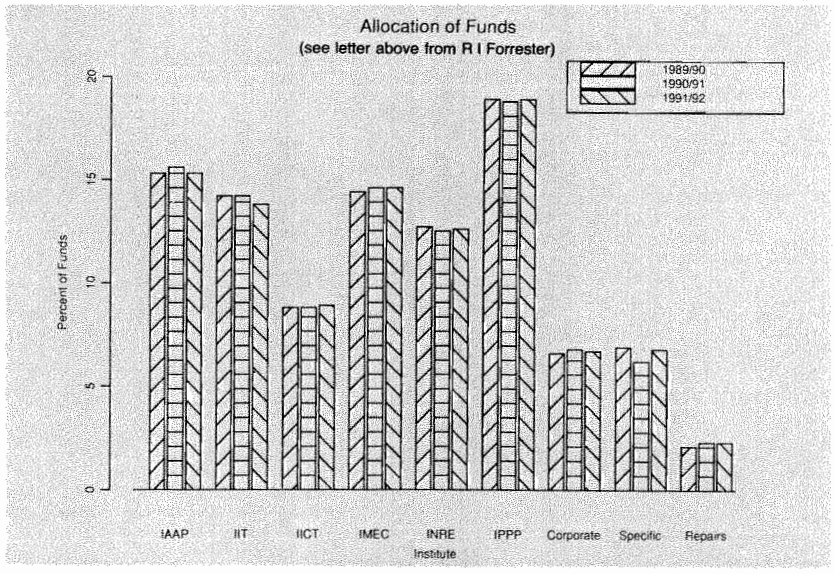
Pie charts are inappropriate for showing minor year to year differences such as those present in these data. A grouped histogram (see below) would have done the job a lot better. It is much easier for the eye to detect the small year to year differences in the grouped histogram than in the pie chart presentation.

In any case, the differences are so small that it is rather pointless to point them out at all, rather a mean over three years (presented perhaps as a pie chart) could be given while saying that minor variations will occur each year.

This inappropriate presentation of data could have been prevented by assistance being sought within CSIRO. Expertise in data analysis and presentation is available within three Biometrics Units and the Division of Mathematics and Statistics.

R I Forrester
INRE, Biometrics Unit

More letters on p.5.



A Matter of Opinion

This month's point of view column comes from CSIRO's Corporate Planner, Dr Don MacRae, who is replying to a column by Dr Art Raiche.

ART'S MYTHS RE-VISITED

I think that Art Raiche's opinion in the August *CoResearch* makes a strong case for an improved team effort between CSIRO's scientists and the managers who support them. As Art says, it is an issue which deserves 'real debate'. Since he 'does not see any role for corporate planning in CSIRO', my response focuses on the planning perspective. There are many other facets of management to which Art alludes and to which others might respond.

MYTH 1: CSIRO was not sufficiently responsive to changing times.

In my view, most of us in CSIRO recognise that if the Board and staff fail to set CSIRO's directions and priorities, then we face a period of externally inflicted rather than internally managed change. I agree with Art that there have been a great number of divisional re-arrangements in the past. In the 'golden age' this was largely due to growth in available resources, but more recently it has resulted from external reviews such as Birch and ASTEC inquiries and Minister Jones' high tech push.

The environment for scientific research has changed radically since the late 1970s. The Board, Directors and a great many scientists are acutely aware of this and the introduction of corporate planning is just one way of dealing with this reality.

MYTH 2: CSIRO research is top down driven.

The Board of CSIRO is responsible for setting the Organisation's broad strategic directions after consultation with all key stakeholders, principal among whom are the Organisation's scientists. Thus, of all information channels, the bottom up flow of judgements and insights emanating from scientists is pre-eminent.

However, to quote Dr Tony Gregson, a scientist/farmer member of the Board, 'the bottom up part is relatively easy...The top down part is harder. It is less clear. It involves a much broader picture and it involves looking further ahead. The Board must be in a position to decide on the allocation and redirection of resources to broad areas of priority'.

Part of the task of setting research priorities at any level is making a persuasive assessment of the benefits of research. This alone can be influential. Let me give some examples.

First, at the strategic level, the Chief Executive Dr Boardman has been at pains to point out the benefits of R&D in general and CSIRO's research effort in particular to the captains of Australian industry in recent years. Consideration also is being given to communicating this message to future captains through MBA courses and the like.

Second, the Board Sub-Committee on National Research Priorities is developing an approach to setting CSIRO's broad directions and priorities which focuses on the economic, social and environmental benefits of research to the Australian community. The design and application of the approach will be a CSIRO team effort involving a cross-section of CSIRO's internal and advisory stakeholders. Obvious benefits will flow from the nation's premier research body producing the best available assessment of its own influence on and contribution to the nation's research.

Third, the Board and the Consultative Council also have been at pains to inform chiefs and research leaders of the need to determine the benefits of individual research programs as the key to putting together the wider picture of research benefits. This wider picture will foster a cultural change in Australian industry and a more persuasive case to government and the community that investment in CSIRO should match that of the past, so the Organisation can continue to deliver.

Fourth, there are direct benefits for the individual scientist from being involved in this assessment activity. Among other things, stronger cases for external and internal funding generally will result.

The corporate planning office actively supports these four areas. In the third and fourth, its contributions have been through close interaction with scientists and research managers who have sought our assistance. Only one institute has not done so.

The approaches being developed are largely from first principles and tailored to CSIRO's needs, with 'management books' of only marginal value. So far many scientists over a dozen divisions have taken part in this 'tailoring' process. That is, what applies to one division does not necessarily apply to another. On the other hand, the process has offered many opportunities to cross-fertilise effective planning practices from one part of the Organisation to another.

Incidentally, the benefits assessment work by divisions through support from the corporate planning office is costing a great deal less than past efforts in this area by external consultants.

Cont. on p.4

New mill confirms CSIRO as best wool research body in the world

Construction is underway on an industry-funded $6 million addition to the Division of Wool Technology's facilities in Geelong.

The Australian Wool Corporation's decision to build a new wool processing mill and laboratory enhances CSIRO's position as the world's premier wool textile research body.

The 4800 square metre mill will encompass all production stages from scouring to finishing for both worsted and woollen processing systems.

It also will include state of the art design features for streamlined materials handling and production monitoring now common in the wool processing industry.

Just under one quarter of the new building will comprise laboratory space, replacing a section of existing plant which includes World War II huts.

AWC Chairman Mr Hugh Beggs said 'If wool is to continue to compete successfully against new generation synthetic fibres, our research will need to be second to none. The new mill will ensure just that'.

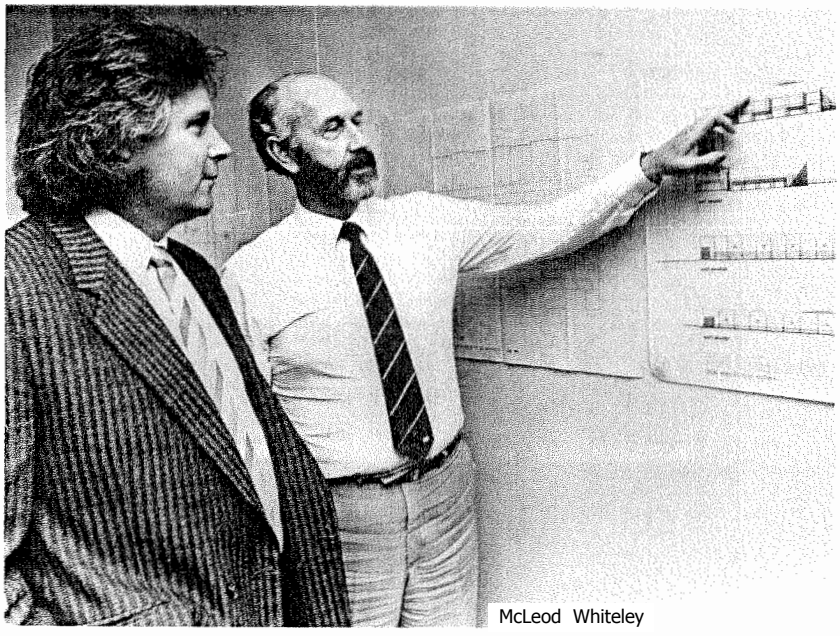
Wool Technology Chief Dr Ken Whitely said the new mill would allow for an expansion in research programs, especially in the mechanical processing of wool.

'[It] will give added impetus to our processing research and continue the thrust of our work that has included the commercial success of Geelong developments such as SIROSPUN, SIROSCOUR and SIROCLEAR,' he said.

Adelaide based building contractors CSC, together with the Geelong group Sabcon Pty Ltd, will oversee all stages of construction.

CSC already has worked with the AWC on building projects in Western Australia, South Australia and New South Wales.

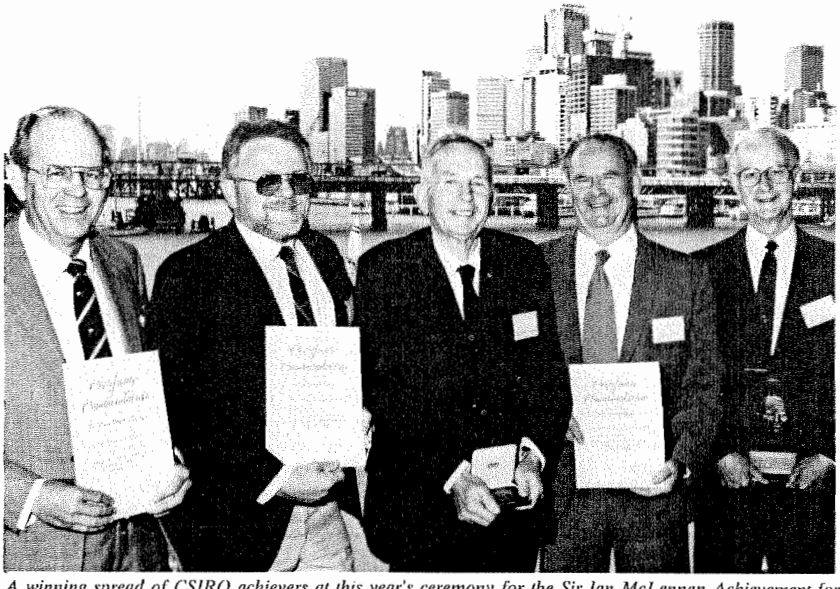
The mill should be operational by July next year.



McLeod Whiteley

Above, the Australian Wool Corporation's National Property Manager Mr Jeff McLeod and Chief of the Division of Wool Technology Dr Ken Whiteley examine plans for the new mill.

The McLennan Awards...*from p.1.*



Thomas Price Thomson Beech Spencer

A winning spread of CSIRO achievers at this year's ceremony for the Sir Ian McLennan Achievement for Industry Award- left to right, Dr Bruce MacA Thomas, Division of Radiophysics; Dr Graham Price, Division of Geomechanics; Dr Norm Thomson, Division of Plant Industry; Mr Donald Beech, Division of Tropical Crops and Pastures; and Dr Don Spencer who, as Acting Chief of the Division of Plant Industry, accepted the Award plaque on behalf of his division's winning research team.

R&D tax incentive

Legislation is updated

The following has been contributed by the Industry Research and Development Board

CSIRO staff would be well aware of the Government's efforts to lift the competitiveness of Australian companies by improving their innovative skills through R&D. The Government's major program is the 150 per cent tax concession, which also encourages more effective collaboration between companies and public sector academic and research institutions.

This seems a good time to update CSIRO staff on R&D tax concession developments, the most important being the recent extension of the incentive past its planned 1991 closing date.

The incentive will now operate a further two years until 30 June 1993, after which a reduced concession of up to 125 per cent will apply until 30 June 1995.

Obstacles have remained to effective co-operation between public sector research organisations and industry, including:

- companies' lack of recognition of expertise within such organisations;
- companies' aversion to risk taking; and
- lack of established links between the two sectors.

However, there is clear evidence that the tax concession has helped increase collaboration. A recent study on the effectiveness of the tax concession by the Australian Industrial Research Group, comprising some 50 of Australia's biggest companies, showed that contracted research in the businesses surveyed almost doubled in the three years to 1989.

Public sector research institutions should place a high priority on increasing co-operative activities with companies.

The tax concession also has been effective in stimulating a significant rise in the amount of R&D performed by business enterprises. Since its introduction in 1985, business expenditure on R&D has increased:

- from 0.34 per cent of GDP in 1984-85 to 0.45 per cent of GDP in 1987-88; and
- the annual rate of real increase in private business enterprise R&D was 19 per cent between 1984-85 and 1985- 86, and six per cent between 1986-87 and 1987-88.

The increases in private sector expenditure on R&D has generated an increase in private sector R&D employment. ABS figures reveal that for private sector businesses, the main target of the tax concession:

- the level of research effort in person years increased from 5389 in 1984-85, before the introduction of the tax concession, to 7835 in 1987-88, a rise of about 45 per cent;
- over the same period the equivalent increase for technicians was about 34 per cent and for other staff 42 per cent;
- the level of R&D employment growth during this period is similar to the increase in private sector R&D which was around 50 per cent in real terms.

In addition to ABS surveys, a recent study on the impact of the concession on business, undertaken by the Centre for Technology and Social Change, found that it has helped to establish the right climate for the development of innovative export industries.

Significantly, the study found that the concession had led to business R&D strategies being re-evaluated and redirected with a greater and longer term commercial focus.

CSIRO can obtain direct benefits from the tax concession:

- the special provisions for syndicated R&D mean this element of the concession is providing a substantial new source of funds for CSIRO researchers to develop their innovative ideas;
- the Registered Research Agency (RRA) status under the concession encourages small to medium sized firms to contract R&D work to CSIRO;
- partnerships formed to undertake R&D activities now are eligible for the concession and all RRAs are able to participate in such partnerships.

SYNDICATION

The syndication arrangements are attracting commercial investments to CSIRO projects. Syndicated R&D allows groups of eligible organisations (which may include a research organisation) to form syndicates to undertake significant R&D projects beyond the resources of a single entity, or too risky to undertake alone.

Special features of the syndicated arrangement offering advantages for participants include:

- the Industry Research and Development (IR&D) Board will provide a letter of comfort to syndicate promoters that the proposed project appears to comply with the definition of R&D. Such letters have proven useful in attracting investors to syndicates;
- advance payments may be claimed up to 12 months before start of the R&D; and
- the syndicate group may register jointly for the tax concession.

Syndicated R&D is proving a lucrative source of badly needed funds to fully develop promising CSIRO research projects. To date, Sirotech and Technology Investment Management Limited have agreed to raise over $90 million for CSIRO projects.

The funds will be used over three years for further development of a range of CSIRO projects, including:

- antiviral chemicals
- laser isotopic analysis
- medical ultrasound
- wireless communication system based on magnetic induction fields
- prostheses incorporating biomaterial coatings
- conveyor belt monitoring systems

CSIRO will be contracted to do the R&D, with some specialised research and testing being contracted to outside organisations.

The IR&D Board has advised the CSIRO syndicate that its projects meet the definition of R&D for the purpose of the tax concession. The syndicate is now examining some proposed amendments to the R&D concession legislation which will affect syndicated R&D. CSIRO Board approval also is required before the syndicate can proceed.

The Government announced these changes on 7 September 1989, to overcome concerns that a number of proposals for syndicated R&D had attempted to remove all or most of the commercial risk to investors. The Government was concerned that under these arrangements the focus of any investment decision would move away from the commercial viability of the proposed R&D, to the amount of the guaranteed return.

To remove these unintended benefits, the legislation will be amended to:

- restrict deductibility for the purchase of pre-existing technology to 100 per cent; and
- include a risk provision which adjusts the 150 per cent premium deduction proportionally to 100 per cent as the element of risk is reduced.

These new arrangements will ensure that investors take their fair share of the costs and risks involved in R&D projects, and will ensure that high quality research projects are undertaken.

RRA STATUS

Any organisation eligible for the tax concession (companies incorporated in Australia, public trading trusts and partnerships of eligible companies) can contract its R&D work to a separate organisation and still be eligible for the concession.

A company which contracts an RRA to do R&D on its behalf can claim the full 150 per cent deduction for any amount spent on the R&D, reducing the after tax cost of its R&D to only 41.5 cents in the dollar. Eligible companies doing the work themselves, or contracting R&D work to a separate organisation without RRA status, are subject to an expenditure threshold.

Companies must spend $50 000 or more in a year of income to claim the premium deduction. Expenditure between $20 000 and $50 000 is deductible on a sliding scale between 100 per cent and 150 per cent, and annual expenditure less than $20 000 is not eligible.

An added bonus for companies contracting their R&D work to RRAs is that payments made before the start of work may be claimed up to 12 months in advance. This arrangement is equally advantageous for research organisations which are unable to commit resources to R&D projects without the security of prepayments.

CSIRO has had RRA status since 1 July 1988.

PARTNERSHIPS

RRAs may form a partnership with an eligible company to do R&D projects. R&D expenditure incurred by eligible companies within a partnership after 20 November 1987 are eligible for the tax concession.

The IR&D Board encourages all CSIRO staff to be aware of the R&D incentive, particularly those aspects encouraging collaboration with the business sector, and to actively promote the incentive to companies. The potential benefits for all involved, and importantly, the potential for improving Australia's economic performance, could be enormous.

For further information on any aspect of the tax concession, or on how CSIRO can become more involved, call Ashley Cross at the IR&D Board on 062-76 1038, or the toll free hotline on 008-026121.

In March this year, *CoResearch* ran a story on p.1, which outlined the concerns held by some CSIRO chiefs about possible rorting of the R&D tax incentive scheme by certain companies. *CoResearch* would be interested in hearing from chiefs, or others with an interest in this area, who would like to respond to this article about the tightening up of the legislation. Also, any general comments about the R&D incentive would be most welcome. Please send your letters to the address on the back page.

A Matter of Opinion

Cont. from p.3

The corporate planning office is active in other areas as well. An overview of its activities will be distributed widely in CSIRO soon, together with the CSIRO PLAN, comprising the existing strategic plan, a corporate management plan and an operational plan.

I agree with Art that the right types of contacts with industry are crucial for all levels of management in CSIRO. Since joining CSIRO, staff in my office have made a range of appropriate contacts with their peers in industry.

Regarding external funding, the corporate planning office is endeavouring to mobilise external funds for extension of existing multi-sectoral models of the Australian economy. This will provide an improved capacity for appraising the impact of science and technology on the long term performance of the Australian economy.

The projected R&D funds for this are greater than the budget of the corporate planning office. Also, it is expected that subsequent commercial services will generate returns several times this budget. To put this in perspective, the corporate planning office comprises four professional staff, an office assistant and consultancy funds of a little over $100 000.

Granted, these are not external funds for specific research by CSIRO, but someone has to demonstrate the effects on the economy of technological change options in a language which Australia's economic rationalists understand. The potential benefits for the nation's research effort and economic performance are profound. It also will have value in appraising strategic options and different scenarios externally – i.e. there will be value to CSIRO too.

MYTH 3: The McKinsey Report will bring success to CSIRO.

Art claims that as a result of McKinsey, CSIRO is now less well aligned with the needs of industry. The first thing to note about the McKinsey advice is that, after careful consideration, CSIRO management drew on those aspects perceived (after wide consultation) to be most relevant to CSIRO's needs. In addition, it would be appropriate for CSIRO to judge the effectiveness of its industry alignment strategy after a settling period.

Obviously, such an evaluation would need extensive consultation with industry. This type of evaluation was done by the National Research Council of Canada recently. Among other things, the NRC commissioned a survey of the 500 companies with which it was most actively involved. Perhaps Art would care to read the report on this survey and comment on the appropriateness of CSIRO adopting a similar approach.

MYTH 4: Professional management will ruin CSIRO.

I agree with Art that this myth probably is held by many scientists. I also agree with his secondment suggestions. Given Art's obvious communication skills, I would relish his involvement in the design and delivery of a program to accelerate the benefits that scientists might derive from CSIRO's planning effort.

We need an Organisation-wide team approach built on mutual respect for the professionalism of scientist and administrator alike. We need to build up an acceptance among scientists of the obverse of a corporate centre truism: 'CSIRO's success is dependent on its brilliant and highly competent scientists'. Namely: 'CSIRO's success is dependent on a highly competent performance by its Board, top management team (Chief Executive, directors and chiefs) and its corporate centre administrators and advisers'. Anything less than a top quality team effort from both will ensure that our vast potential will remain largely untapped.

Working Together

Special Supplement compiled by Industrial Participation Officer Human Resources Branch

Co-operation between employees and management

FROM THE CHIEF EXECUTIVE

An introduction by Dr Keith Boardman

CSIRO's adoption of an Industrial Participation plan marks the formal expression of the Organisation's commitment to participation of staff in decisions affecting them and their work environment.

The primary focus of IP is staff working together to achieve mutual goals. It is about discussing matters with others before taking action, better communication and increased opportunities to contribute to decision making. The policy is not intended to operate in isolation from other CSIRO policies. Rather, it should become an integral part of the general management style.

I believe CSIRO is a very appropriate environment for participative practices. The very nature of the research environment, based on project teams dedicated to common goals lends itself well to consultation and co-operation. The work usually is interesting and challenging. It encourages staff to be resourceful and motivated. They have an interest in the work and in seeing that it succeeds.

The release of the IP plan comes at a time when productivity, efficiency and survival are particularly important and necessary. It is a time when CSIRO needs to create a more secure and satisfying future for its staff. Employee participation should assist this by fostering a spirit of co-operation and understanding.

CSIRO has a strong tradition of consultation at all levels. While many other government and private bodies are now establishing consultative committees, it is noteworthy that CSIRO has had such a forum operating at the most senior levels since the late 1970s.

The establishment of the Consultative Council has been one way of stimulating greater participation. The Council discusses and debates general employment and industrial issues facing CSIRO staff. CSIRO has a history of good relations with unions. The Council has assisted with the development of many staffing policies and initiatives.

But Industrial Participation encompasses more than the operation of formal committees. The Consultative Council and the divisional consultative committees play a significant part in the direct involvement of staff in discussions on key matters and their potential to encourage greater participation in decision making. I believe, however, that the greatest benefits will be realised at the workface itself, i.e. better communication between staff in projects and programs, greater job satisfaction, improved morale and commitment.

Achieving better levels of participation must be based on trust and a willingness to communicate. Management needs to work with staff members and their unions to promote desirable practices and to develop skills and attitudes necessary for the successful promotion and implementation of greater worker participation.

Accordingly, I commend this policy to all staff in CSIRO.

N K Boardman

Official launch of Industrial Participation Plan

The Chairman, Mr Neville Wran, will officially launch the CSIRO Industrial Participation Plan at the Corporate Centre on 1 November 1989.

This culminates three years' work by the Industrial Participation sub-committee. The sub-committee, chaired by Dr Ken Whiteley (Chief of the Division of Wool Technology), consists of both management and union representatives who reflect a wide cross section of the Organisation.

The plan seeks to promote within CSIRO, practices aimed at greater employee influence at both the workplace and organisation levels. It aims to provide for significant involvement of staff and their unions in decision making through structures and processes for sharing responsibility and information.

CSIRO strongly supports industrial participation and recognises the benefits which can accrue from more staff involvement in decision making, particularly better informed outcomes, greater commitment from staff and a more satisfying and productive work environment.

While the implementation of Industrial Participation will be the responsibility of all line managers, an Industrial Participation Officer will be available from the Human Resources Branch to undertake activities directed at:

- ***educating staff in the principles and practices of participative management;***
- ***encouraging and assisting with implementation of the plan; and***
- ***fostering the establishment of effective communication and information sharing throughout CSIRO.***

Industrial Participation: good human resources practice

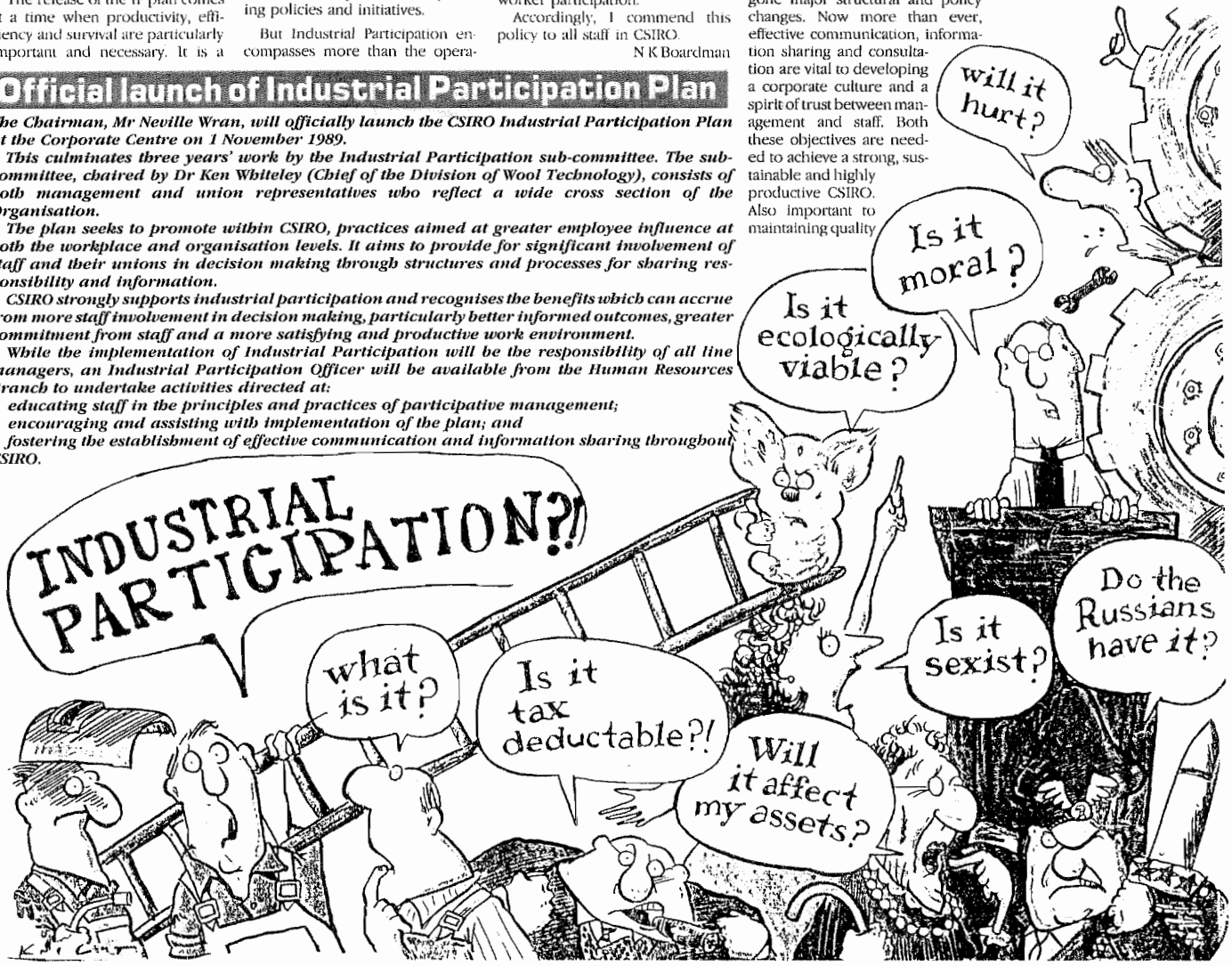
Arthur Blewitt

The industrial participation plan reflects the Organisation's commitment to the broad involvement of staff in decision making. The Organisation's – and indeed Australia's – future capacity to compete depends upon gaining the full co-operation and participation of a highly motivated workforce.

Employee participation means providing opportunities for individuals to influence decisions concerning their work. Normally this is achieved through consultative groups at various levels within the structure. By promoting this practice, CSIRO is seeking to optimise the nature and degree of employee influence at the workplace and organisation levels. This of course does not lessen the responsibility of the delegated officer for making the final decision, but it does ensure that he/she has the benefit of the best advice available. This will enhance the effectiveness of management decisions and their implementation.

In recent years CSIRO has undergone major structural and policy changes. Now more than ever, effective communication, information sharing and consultation are vital to developing a corporate culture and a spirit of trust between management and staff. Both these objectives are needed to achieve a strong, sustainable and highly productive CSIRO. Also important to maintaining quality output is the adoption through consultation and co-operation of the best technology and work practices available. This requires a commitment to development of staff skills and devolved decision making.

The concept of industrial participation is consistent with, and complementary to, CSIRO's current human resources direction. The development of a comprehensive human resources strategy, the proposed strengthening of the PRD process, the refinement of the employee development program and award restructuring moves all will require involvement by staff and management.



The secret is out!

Work need no longer be performed in conditions of anger, frustration and alienation. Jobs need no longer be fragmented into meaningless, boring and repetitive tasks. Employees need no longer be treated as mere appendages of high tech machines. Work need no longer be paced, measured, supervised and planned to the point where people feel they have lost any sense of independence or control – and hence dignity.

Conventional wisdom had it that alienating work was the price we paid for our material prosperity. Our levels of productivity, we were told, depended on mechanisation and division of labour, and increasingly on labour-displacing automation. We may not have recognised it but even in an enlightened work environment like CSIRO there are many examples where a strong division of labour exists, where mechanised processes are introduced in the name of productivity.

Hierarchies of authority were built into the very process of production because, we were led to believe, hierarchies are the most efficient mechanisms for achieving social co-ordination and control.

But a new world of work is emerging. Competitive pressures and technological innovation are triggering changes that could have far reaching implications. Behind closed gates and doors an unprecedented level of restructuring is underway. Fundamental changes to work organisation and industrial relations and being contemplated. The old virtues are being questioned.

The reason for the change is simple but complex. We are told that mass production is reaching the limits of its technical – and therefore economic – efficiency. Markets for mass consumer goods have become saturated; competitive pressures induced by newly industrialised nations in South East Asia and South America are becoming acute; and demand is being expressed in specialised market niches. Quality rather than quantity is increasingly the road to success. These are all issues that are well known to many people in CSIRO.

This shift is having impressive consequences. It is creating a new requirement for 'value added' management techniques and for a flexible, skilled and responsible workforce able to exploit the productive gains available with computer integrated production systems. This in turn is inducing industry to abandon its obsessions with fragmented jobs and lowered skill levels.

The drive for greater management control through centralisation and automation is giving way to a drive for competitive survival – if possible, on the basis of a co-operative relationship between management and the workforce. A new industrial culture is emerging.

This revolution in the mode of work is not yet established. It is not even widely known, if you judge by the standard press reports which still see work as an object of boredom or amusement. But the truth is that work is about to undergo its greatest change since the Industrial Revolution.

Industrial Democracy – Industrial Participation – Employee Participation

What happens in making decisions and organising work is more important than labels attached to the process. Industrial Participation means different things to different people, but debate over terminology should not shift the focus from discussion about the benefits flowing from change in participative workplace practices.

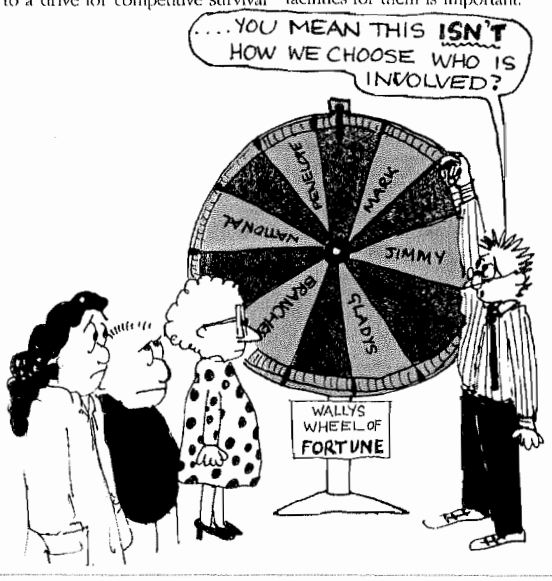
Industrial Democracy is the idea, the goal to work towards, in much the same way as we are working towards a more democratic society generally. The same principles apply: maximum participation by all people (in our case, employees), equal rights and equal opportunities.

Industrial or Employee Participation describes the process that leads to greater employee influence as an essential part of the process for achieving industrial democracy.

Industrial Participation means employees having the opportunity to have a genuine say and influence in decision making.

There is no set formula for the introduction of participative processes, but there are some key principles which should be observed:

- Information sharing in a form capable of being understood and used by employees is a basic pre-condition.
- Employees and their representatives must be able to exercise their rights without fear of victimisation.
- A foundation of reasonable job security, education and training must be provided.
- Recognition of employee representatives and provision of facilities for them is important.



The Basic Elements

- **A spirit of trust among all involved is essential for developing participative practices.** It is important that at the outset, management commitment to the development of a consultative approach is clear and well known. Employees and their representatives also should put aside past approaches and give consultation a fair go.
- **Traditional confrontationist stances need to be put aside in order to build a spirit of trust.** This will involve actually listening to what the other side is saying, as opposed to merely going through the motions.
- **Consultation and co-operation need to become a way of life within the Organisation.** Consultative decision making processes cannot succeed on their own but must be part of an overall approach of encouraging better ways of working together.
- **Change is made more difficult if people feel their jobs may be threatened by the outcome.** Attention therefore should be paid to issues involving job security.
- **Training usually is required if people are to successfully take part in consultative processes.** Everybody must be trained in the new way of doing things so those ways can be implemented effectively.
- **Participative processes are not meant to replace employee representatives structures such as unions.** In fact, union representatives often will play a leading role.
- **It is important not to overlook the needs of groups such as non-English speaking workers and others who often have found it hard to be heard.**
- While participative practices involve all people in enterprises and can lead to better decisions, in the final analysis **management must take responsibility for overall decisions** affecting the Organisation.

Employee influence and extent of participation

The extent of employee participation should be considered in the light of shared commitment. Where employees are involved in the process of making a decision, they generate a greater sense of involvement in that decision and an increased commitment to its effective implementation.

The participation and influence of employees in decisions affecting them varies from no influence, where management makes the decisions unilaterally, to complete domination, as represented by the notion of 'worker control'. The joint commitment of managers and employees is impossible at either extremity, where at least one party is disenfranchised.

The following table identifies a number of participative practices flanked by these extremes and outlines the processes involved and their likely outcomes.

The table shows that a rising level of influence should be accompanied by a corresponding increase in responsibility taken by employees.

It is up to the parties involved to ensure that this coupling takes place.

As shown in the table, the processes of employee participation are both diverse and complex:

- the higher the degree of employee participation and involvement, the greater the need for mutual trust. Entrenched relationships are difficult and slow to change.
- the precise nature of the practices at which an employee participation program is aimed within a division will depend in part on the existing culture and practices of the organisation. Each approach has advantages and disadvantages that must be fully considered by all those directly involved.
- there are of course some areas of responsibility for which managers cannot delegate its decision making authority, irrespective of the degree of employee involvement in the division's decision making process. Management retains the ultimate responsibility for ensuring that effective decisions are both made and implemented. The involvement of employees can actively assist managers to achieve these ends.
- it is not possible, however, to shift instantaneously from very low to very high employee involvement in and influence over decisions at work. Employees cannot be expected to play an effective role in decision making and to assume the accompanying responsibility without the confidence and capacity to do so. On the other hand, managers cannot be expected to embrace the practices of sharing decision making authority and responsibility without the development of necessary skills. It therefore is essential that the employee participation process is introduced incrementally and accompanied by relevant training and skill development. This training and development can be provided by the Human Resources Branch.

EMPLOYEE INFLUENCE

Degree of Influence	Participative Practice	Process	Outcomes
LOW	Communication	Management takes all decisions and informs employees of reasons	–Informed employees
	Information Sharing	Management takes decisions based on exchanged information. Informs employees of reasons and implications	–Involved employees –Opportunity for employee responsibility for implementation
	Prior Consultation	Employees involved throughout decision making process. Employee views considered in management decision	–Greater employee understanding of issues –Increased opportunity for shared responsibility
HIGH	Joint Decision Making	Employee and management involved in taking agreed decisions on specific issues	–Both parties responsible for and committed to effective implementation

Industrial Participation and the CSIRO Officers Association

Joe Flood

Perhaps the most important single issue for the OA over the past few years of rapid change has been the question of management style in CSIRO: communication between the corporate centre, divisions and professional staff; consultation with staff and associations before major decisions; and the increasing responsibility and accountability required of scientists.

In a time of change, better communication and greater consultation and trust between management, staff and unions become a necessity rather than a luxury.

The OA strongly supports the introduction of participative practices, at the corporate level through Consultative Council and through direct meetings with management.

At the divisional level it has played a primary role in establishing divisional consultative committees in Soils, Building, Construction and Engineering, Port Melbourne and Exploration Geoscience, and has been strongly involved in all other committees established on the Consultative Council model.

The OA is unusual in that its membership includes the majority of the scientific managers of the Organisation and also the majority of those who suffer through bad management practice. The Association has advocated better management practice and training at all levels and has encouraged members to be more participative and democratic in their approach to management, in the interests of a more harmonious and effective workplace.

It seeks to make all managers aware that communication is a major part of their jobs and that the all-too-common 'mushroom' approach isn't good enough.

What industrial participation is and is not

Although most people would agree that IP is a desirable aim, the actual meaning of the term is unclear to many people and there are many misconceptions.

Industrial participation *does not* mean:

- **Conservative or inept 'decisions by committee'. It is true that large groups mostly will choose the** *status quo* and when change has to be made it usually must be done through the prerogative of 'command'. But the best way to introduce change is to allow it to be implemented, where possible, by those whose work it will affect. Generally they are the best informed about what will and won't work. If acceptance of change is expected, then it must be done *with* people, rather than *to* them.
- **Complicated apparatus and large numbers of committees.** The greater part of IP is carried out through a change of attitude and a common sense approach to other people's rights and responsibilities. A good attitude to direct participation already exists in much of CSIRO. However, some formal mechanisms for IP are necessary to oversee the process and to ensure that the best solutions are found. Communication between people who are not in direct contact only can be achieved through formal procedures. However, efforts must be maintained to ensure that ineffective committees are discontinued or revitalised.
- **Information sharing.** The passing of information between management and employees in both directions is a prerequisite for IP but is not itself sufficient to allow participation in decision making.
- **Slice groups.** These groups of employees selected by management were once a popular means for managers to get feedback from different parts of their establishment. However, they have repeatedly been shown to be less valuable and durable than joint management /staff/union consultative committees. Slice groups tend not to be taken seriously by either staff or management and usually have a short life once interest wanes. Consultative committees, on the other hand, usually have a strong commitment from staff representatives, particularly if they have been involved in the establishment process. They are able to discuss local industrial issues and to make use of the information networks of both management and unions.
- **Research projects designed and run by all staff.** Results from a project conducted in a division show that non-professional staff believe the major responsibility of scientists is to determine the research program and set priorities. In fact, a major complaint about scientists is that they are equivocal and fussy decision makers. Other staff would prefer scientists to make firm decisions about research and stick with them, so they can get on with their jobs.
- **Sharing power.** The retention of power for its own sake is often counter productive. Decision makers should consider delegating wherever possible and should pass on sufficient information and an overview of requirements so others may execute their duties effectively.

Employee participation should be for all employees.

Industrial participation *does* mean:

- **Prior consultation.** Wherever practical, people should be consulted before decisions affecting their working lives are made. At organisational level, staff representatives need to be consulted at all stages on the formulation of policies affecting staff.
- **Joint decision making.** Where possible, staff should be encouraged to make those decisions about which they are the best informed and the best arbiters of the correct procedures. Groups of equals may be encouraged to discuss problems openly and come up with possible solutions by consensus.
- **Working together.** IP procedures and committees are designed to cope with 'win-win' situations where all parties can come together for mutual benefit. 'Win-lose' situations where there must be a loser are best handled through conventional industrial negotiation.

Conclusions

CSIRO is fertile for IP activity. Most of its work environments already are close to the IP ideal of a 'community at work' and most officers work in semi-autonomous groups. Work usually is varied and interesting and employees generally are encouraged to be resourceful and self motivated. Relations between unions and management are good and there have been almost no industrial disputes in the Organisation.

Nevertheless, CSIRO has a number of very obvious problems. Horizontal and vertical information flows have been notoriously poor. Management style has been paternalistic and relatively authoritarian and has not encouraged employee participation. Staff generally are not familiar with group decision making except within small research teams and the formation of teams of equals has been discouraged by both the promotional structure and by fairly rigid management structures. The personnel function is poorly developed and there is very little inhouse training. Management skills are not a prerequisite or, until recently, even a criterion, for promotion to management positions.

Recent reorganisations have left a great deal to be desired in terms of consultation. However, more consultation has taken place than during many of the smaller scale reorganisations in the past. A great opportunity exists for management, staff and staff representatives to be involved in organisational change. Divisional consultative committees may help bring together staff in new divisions who have never worked together, and may provide a way of carrying information through larger, more cumbersome divisions. IP techniques of small group consensus decision making, such as 'quality circles' and IP activities within divisions, may help identify and solve problems of integration.

Too often in the past, management in CSIRO has consisted of placing obstacles in people's paths rather than providing responsibility and opportunity. In many divisions, a move to project budgeting has been accompanied by a move from management by control to management by accountability. Devolving responsibility to the lowest reasonable level may help fully develop CSIRO's enormous human resource. Consultative committees help management, staff and associations to work together to achieve this aim.

Industrial Participation in the Workshop

Bob Johnson, LCA

The Laboratory Craftsmens Association believes in industrial participation. We believe that craftspeople seek initial employment in the Organisation because the work offers a chance to increase knowledge and skills through involvement in a wide and varied area.

The LCA is the craftsperson and therefore sees industrial participation as the link to achieving his or her aims in choosing to work in the Organisation.

IP is about responsibility – or the involvement of all staff in the success of the Organisation of which they are a vital part.

Being a successful partner involves communication, consultation and direct participation. For the workshop based person, this leads to the satisfaction of being able to say 'I was involved in the success of that project'.

Participation in decisions affecting the workshop will increase people's preparedness for change and create a basis for accepting any required changes. This increased involvement will lead to a more flexible and efficient workshop.

IP covers sharing as well as involvement: the exchange of ideas, identification of individual strengths and the overcoming of weaknesses. This enables involvement by offering and accepting information. This sharing and consultation in the workshop enables joint decision making and self management. Communication is an important part of IP. Communication means the disclosure of facts and attitudes in a way that the significance of the facts and the reasons behind the attitudes are made clear to all concerned. This will mean better relations with all other staff.

Finally, by having a clear understanding of what is happening and why, and by contributing to the work environment, workshop staff will gain an increased sense of belonging and this will mean an improved working life, greater job satisfaction, a better relationship with management at all levels and an increase in self improvement.

A message for administrative staff

Shirley Pipitone, Public Sector Union

'Scientific excellence ... requires the very best administrative support' (the Chairman, the Hon Neville Wran, CSIRO Annual Report 1987-88).

This is the task ahead for administrative staff in CSIRO. In recent years, more and more administrative functions have been devolved to divisions. The thrust now is for administrative staff to take on an expanded role as professional advisers to management.

To do this, administrative staff need a full understanding of and commitment to the objectives of CSIRO and the objectives of their divisions. Industrial Participation provides the opportunity to gain this understanding through improved information-sharing and consultation. By becoming involved in decisions affecting them at work, staff will be more committed to implementing those decisions.

Participation will help everyone make full use of his or her skills and abilities. This has benefits for both staff and management – staff gain improved morale and job satisfaction, management gains increased productivity and efficiency.

Participation also will help administrative staff to be actively involved in future changes in CSIRO, rather than feeling that change has been thrust upon them. This is very important because we live in a time when change is the only thing that is predictable.

The CSIRO Industrial Participation Plan encourages the formation of divisional consultative committees where staff may discuss matters affecting them. As the plan emphasises that staff representatives will be union-based, all administrative staff are encouraged to join the Public Sector Union. Divisional personnel officers can indicate who your local workplace delegate is.

By joining the PSU you can have your say in the new non-confrontationist management/union framework that Industrial Participation provides – a framework that has management and unions working together for common goals.

GETTING STARTED

Common questions and answers

This section is a companion to the *Guidelines for Operating Arrangements for CSIRO Divisional Consultative Committees*. It explains the rationale for the Guidelines and provides guidance based on the operation of previous divisional consultative committees. It answers a number of questions that those setting up divisional or site committees will have to face.

■ What is a divisional consultative committee?

It is a forum where management, staff and unions may meet to discuss and help resolve divisional problems.

■ Why do we need one?

A consultative committee can act as a sounding board for all kinds of ideas, problems and general information. It can be the division's suggestion box and complaints department. It can solve industrial relations problems in a constructive atmosphere, and enable the different staff groups to work together to help achieve the division's aims.

■ What sort of things does the committee handle?

Just about any matter coming under the delegation of the chief, except matters involving only one individual (which must still be handled through normal industrial relations procedures). Committees work best when their members keep well-informed and interested, when staff bring forward issues regularly, and especially when divisional management is prepared to raise matters of real significance.

Some matters that always should be brought before the committees are:

* divisional management committee minutes, if these exist;
* matters affecting more than one association or staff group;
* matters relating to industrial participation, consultation or information sharing;
* technological change.

■ Why can't line management handle suggestions and complaints?

Often they will, and this may be the best way of doing things. But anyone who has been a line manager knows that with the best will in the world you will filter a lot of information. And you won't take a lot of the complaints and suggestions that come to you any higher, it's just not your job. Management and staff do not have mutually exclusive goals. Allowing staff input into issues of concern can assist management to make better, more informed decisions to which staff members themselves will be committed. The committee will provide a forum for staff to raise their concerns and the easiest way to do this is by involving the staff associations, who clearly are distanced from management. Anyone who has had to act through a superior or intermediary knows the frustration of dealing with people whose priorities are different.

And even if your supervisor is a good communicator, plenty of others aren't.

■ My Chief has an 'open door' policy. Why can't I just go and see him/her?

Of course you can. But often you won't. Maybe you don't want to bother your chief, or you don't want to seem like a troublemaker, or you know he/she is going to be too busy to have much time for you. And even if you always do, you probably know plenty of people who are much more timid.

Also, if it's just one person, maybe it's going to only seem like his or her problem, whereas if a whole committee also sees the problem, the chief is going to take a lot more notice.

■ What will the Chief get out of it?

The committee is where the chief can take time out to listen to the 'little people' of the division. It can help him/her head off potential problems before they occur, and nip unfounded rumours in the bud. It is the place for floating ideas that may affect a lot of staff later on. And it's a way for him/her to explain exactly what he/she is trying to achieve and to get help from all the staff in the division to do it.

■ Why are the staff representatives nominated by the associations?

It is now almost universally recognised by commentators on industrial participation across the political spectrum that IP must proceed through the associations. Earlier attempts to introduce participation through management-initiated slice groups have almost all failed once management interest lapsed. The problem with industrial participation introduced from above is that it tends to be regarded by employees as a management ploy or a fad. Staff must feel that the committee belongs to them before they will bring their concerns to it and the easiest way to do this is by involving the staff associations who are the legitimate structures representing employees. The staff association model permits a greater range of topics to be discussed. General industrial relations matters often are talked about by the committees, and possible confrontation may be avoided in the positive atmosphere of a committee.

Staff associations also provide continuity. Slice groups often end with a change of management, but associations tend to keep committees alive during an interregnum and press for their continuation with a new management.

■ How are representatives chosen?

Management representatives are nominated by the chief (apart from the divisional secretary or DAO, who appears *ex officio*).

Each association has different rules regarding elections. The OA will provide nominees on request (and usually nominates local group representatives). The Technical Association conducts a formal election. Members of other associations usually nominate a representative through an informal election.

A typical structure in larger divisions comprises two-five management nominees (e.g. chief, divisional secretary, program leader or other 'middle manager', EEO or safety officer); two OA nominees; two TA nominees and one nominee from each of the Laboratory Craftsmen Association, ADSTE and the Public Sector Union. Members of the committee are appointed for a year, and it is usual for members to nominate a proxy when taking office.

■ What about non-unionists? Aren't they represented?

Members of all existing committees take the attitude that they are staff representatives, and will bring forward matters from any member of staff (but not individual industrial relations matters). Staff who wish to help select a representative may join the appropriate association (and this is one of the benefits of membership). If the chief feels that a group of staff is not properly represented by this arrangement, then he/she may nominate a representative and even hold an election if desired). The representation issue should not be dwelt upon for too long. What is most important is to have a functioning, productive committee that brings forward staff concerns and provides an effective forum.

■ How are decisions to be made?

Decisions are to be by consensus (no voting). Consensus can be taken to mean no dissent. While a decision may not be the preferred one for all parties, it is one they are prepared to tolerate.

The powers of the committee stem from the delegated powers of the chief, and as the chief is a member of the committee, this gives the committee 'teeth' if the chief sees fit to exercise those powers. Consensus decisions may be to take some action, or refer the decision to another committee (e.g. divisional management committee, OHS committee), or develop the proposal further in a subcommittee or consult other members of staff.

■ What administrative arrangements should the committee follow?

This is up to the committee. How the Chair, secretarial services, publicity and frequency of meetings are handled should be a consensus decision of committee members. Some practices that have been found to work are:

1. Chair

A chair that rotates slowly between the different groups (e.g. OA, TA, other associations, management) provides some continuity but gives different members of staff the chance to take responsibility for the committee and to learn the skills of chairing a meeting. Changing the Chair every three meetings or six months is one possibility. It probably is better if the chief does not take the chair as others may need the practice more.

2. Minutes

Having the incoming Chair take the minutes is good training, but if members of the committee are unable to prepare minutes then the division should provide this facility. Minutes or statements of matters discussed should be displayed prominently and/or published in staff bulletins. A statement of committee activities, paying particular attention to the development of IP initiatives in the division, should be provided to Consultative Council annually.

The agenda normally should be kept at a central point so staff may easily refer matters. For example, the divisional secretary can keep the agenda in consultation with the Chair.

3. Attendance of other staff

Sometimes the committee may wish to invite others to attend, to provide expert advice or to present a case. Some committees routinely allow any interested member of staff to attend while others permit this only by invitation.

■ Confidentiality

Membership of a committee is a responsible position and should be treated as such. If confidential matters are raised, the committee may decide to remove such matters from the minutes, to exclude observers, or to place a confidentiality requirement on members, which should be respected. In normal circumstances however, the operations of the committee should be open for scrutiny to everyone.

■ How formal should the meeting be?

Generally the meetings should be friendly occasions where information is freely shared and difficult matters freely discussed in an encouraging environment. However, the purpose of the meetings is serious, and time usually is a factor, so the Chair may have to introduce some elements of formality.

■ Resources

A staff officer of the Human Resources Branch is responsible for liaison and implementation of divisional committees, and will provide necessary information or contacts. The Organisation has several part-time resource people who will talk to those interested in setting up a committee.

Steps in setting up an IP consultative committee

Step 1: Read the CSIRO Industrial Participation Plan.

Step 2: Do you need to change? Take stock of what is happening around you at work. Does everyone know where the division is heading? Have changes been easy to bring about? Is there a wide gulf between managers and employees? Is morale low? Are some people kept in the dark about changes? If there are some difficulties, would a more consultative approach help solve the problems?

Step 3: Discuss the principles of Industrial Participation with other employees in your division. If you require more information, call the Industrial Participation Officer or a member of the IP sub-committee.

Step 4: INVOLVE EVERYONE. If you have decided that a more participative approach would be of benefit, request a meeting of all staff in the division to consider the establishment of an IP committee. Set up a pilot group to consider the committee representation formula and report to the staff meeting.

Step 5: Agree on the committee representation formula and elect representatives.

Step 6: Invite the IP Officer to meet the committee and decide:

* the scope of the agenda;
* ways of improving information flow to all employees in the division;
* goals for training and educating everyone in the division about the consultative practices in all facets of workplace operation; and
* the regularity of meetings.

Step 7: Advise all employees in the division of the information flow proposals and training goals to ensure everyone has an opportunity to contribute.

Step 8: Develop a plan for implementation.

Step 9: Check your progress by involving all groups in the division.

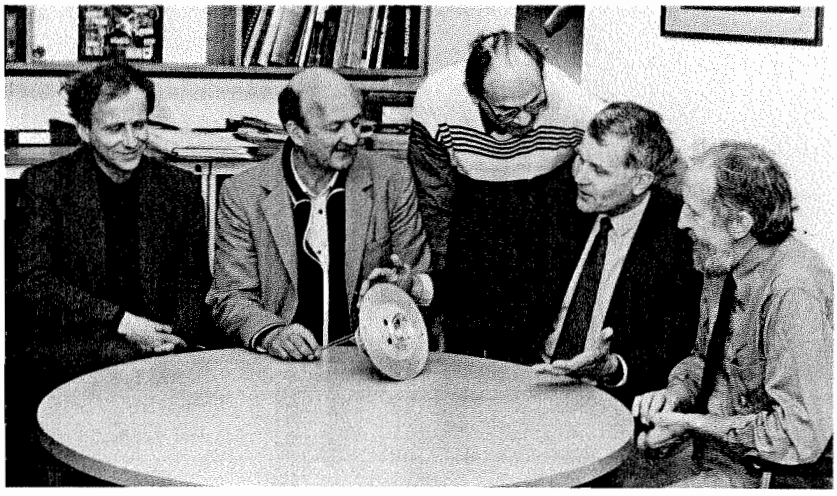
Step 10: Prepare an annual report for inclusion in the CSIRO annual report to the Prime Minister's Department.

IF YOU NEED ANY HELP

Contact one of the following trained facilitators:

■ *NOEL TARBOTTON, Industrial Participation Officer*	***062-48 4660***
■ *JOE FLOOD, CSIRO Officers Association*	***03-556 2333***
■ *PHIL HARRIP, CSIRO Technical Association*	***08-224 1841***
■ *SHIRLEY PIPITONE, Public Sector Union*	***062-48 4327***

Australia's Radioastron work moves ahead



Above, the USSR delegation delivering the antenna feed unit to CSIRO. Left to right, Dr Vladimir Lukash of the USSR Space Research Institute, Dr Yurij Parijskij of the USSR Special Astrophysical Observatory, Professor Jan Einasto of the Estonian Academy of Science and Drs Kelvin Wellington and Brian Robinson of the Division of Radiophysics. Wellington Robinson

The item on the table is not a combination lawn edger and sprinkler, a high speed diamond grinder or even CSIRO's secret weapon, but a small part of a large international project.

The project, Radioastron, is an international radio astronomy mission initiated by the USSR (see* Co-Research *No. 309, February 1988). In the mid 1990s the Soviet Space Agency will launch a radio telescope into orbit around the Earth. This will be used with ground based telescopes in many parts of the world to form fantastically detailed images of astronomical objects, equivalent to being able to see a tennis ball on the moon.

The Australia Telescope, operated by CSIRO, will play an important role in the ground based network, being the most significant radio telescope in the southern hemisphere. At the same time, Australian-made hardware will be flying on the Radioastron spacecraft.

The orbiting radio telescope has an antenna, 10 metres in diameter, for collecting data. Once collected, the data are focused to pass through the antenna feed structure – the component sitting on the table – and then into the telescope's receivers. Australia is building the dual channel 1.6 GHz receiver, one of three being supplied by Western countries.

The Australian contribution was intended as an industry 'seeding' project, funded by COSSA ($400 000) and the Australian Space Office ($900 000).

The Division of Radiophysics, working with the Australia Telescope National Facility, is responsible for the overall design. British Aerospace Australia (BAeA) is the prime contractor for the Australian package, while Mitec Ltd, one of Australia's leading manufacturers of microwave components, has the subcontract to produce state of the art cryogenic amplifiers.

The USSR's prototype feed was recently delivered to Australia so that Mitec could check its compatibility with its prototype amplifiers. Earlier this year, another milestone was passed when BAeA handed over structural and thermal models of the receiver to the Space Research Institute of the Soviet Academy of Sciences in Moscow for testing.

The whole project, which includes space-qualifying of the receivers in this country, will boost Australia's credentials in the production of space hardware.

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Letters
Cont. from p.2

Dear Editor,

In the last issue of *CoResearch*, Vlad Mosmondor asks what kind of service the Print Advisory Service is and goes on to assert that we 'only want the good quality design'. He also suggests that we should provide 'a real service to divisions by providing artwork of graphs and charts'.

One of the principle objectives of the Print Advisory Service is to purchase print and related services for institutes and divisions at competitive rates. There is a constant and increasing demand for this service and as a small team we are occupied providing it. With the limited staff resources remaining, and in response to institute and divisional requests, we save the Organisation substantial amounts of money by providing a design service when practicable. It has to be focused where there is a need and where we are told it is wanted, usually front covers, promotional items and saleable publications.

My experience suggests then that the Organisation's publishing needs would not be served by the Print Advisory Service providing artwork for graphs and charts. The mundane services that we do provide, however, are too extensive to describe here, and are mainly concerned with managing an awe-inspiring amount of detail required to get a variety of publications out on time, on budget and at an appropriate quality level.

Why do we promote ourselves within the Organisation? We have a valuable service to offer and it is our responsibility to bring it to the attention of as many people as possible within CSIRO.

John Best
Manager
Print Advisory Service

Dear Editor,

How to get corporate visionaries to see divisions

Liz Tynan suggested in the September issue of *CoResearch* that all corporate centre staff should spend some time each year in CSIRO divisions. Her suggestion was made in response to an earlier article by Art Raiche which, as Liz put it, 'had some strong words to say about the corporate visionaries of Limestone Avenue'.

At a recent OA meeting in Canberra (mostly scientific luminaries in attendance), one of us put the motion that corporate centre staff should spend two weeks per year in a CSIRO laboratory. Several people spoke in support of the motion, no-one spoke against it, but the motion was defeated. This was the only motion of the evening which attempted to do something positive to address the problems which filled the rest of the meeting; most of these related to the relationship between divisions and the corporate centre.

If scientists want corporate centre staff to learn more about how science actually works, scientists have to be prepared to show them.

A small group of us is preparing a proposal detailing how such a scheme would work and we would welcome suggestions about such a plan.

Greg Tanner,
Division of Plant Industry
Sarah Ryan,
CIRC, Corporate Centre

W(h)ither translation?

or

Übersetzerdammerung

Despite its continuous existence since the days of the Second World War, many members of CSIRO knew little or nothing of the Translation Service.

Accounts of its activities appeared, on several occasions severely censored, in august publications such as the CILES Report, hidden in the later pages and generally unnoticed by readers whose mental stamina had by this time been disastrously sapped by all that had gone before.

Authority, generally speaking, ignored the operation of the service on the sound principle that since It did not understand the work that this small group was doing, that work and that small group were obviously of no importance.

Nevertheless, many scientists made use of the service and translations were provided from some 20 European languages. There was, unfortunately, never a permanently employed translator of Japanese or Chinese, a deficiency which was eagerly pounced on and roundly condemned, in some cases by people who had refused to consider the permanent employment of such a person. (Each of the permanent translators, by the way, translated from at least 15 European languages).

From 1976, when there were seven translators, numbers were allowed to decline. The vacancies that occurred through retirements were seized for other purposes, with the result that within four years the service was reduced to three translators: two in Sydney, serving Queensland and New South Wales, and one in Melbourne, struggling to cope with the requirements of the rest of the continent and never having a backlog of fewer than 10 articles. 'Life was not meant ...'

And so life went on. Each year some two million words were translated from 20 European languages: the cost to the Organisation was far less than the charges of external translators, despite arguments to the contrary by people who knew nothing about these matters.

Then came the heroic age of Pappas *et al* and the unfolding of a drama unequalled in savagery except, perhaps, by the sagas: well known and well loved faces disappeared and few knew where the next blow might fall.

For some months the Translation Service, ignored or simply forgotten, survived amid the chaos and destruction all round it. This state of affairs could not be expected to last long, and indeed it did not. In a single swift act, the two translators in Sydney were disposed of and the triumphant cry 'user pays!' rang out over the mess of 'Request for Translation' forms and dog-eared photocopies of dreary, obfuscating articles by Russian authors aspiring to political preferment.

The survivor of this slaughter now sits uneasily in Melbourne faced with the daunting prospect of translating for the entire Organisation (at the rate of $17.50 per 100 words of English) and uncomfortably aware that it is clearly intended that the income from his efforts should cover his salary.

Daunting prospect

On the more cheerful (?) side, the Sole Survivor recently has been engaged in assessing some 150 responses to an advertisement for contract translators which appeared at the beginning of June. Eighty-five translators whose prices seemed the least outrageous[1] were selected and a directory is in preparation, copies of which eventually will be sent to divisions, who will then be able to save time by approaching translators direct, instead of operating through the Sole Survivor. It is hoped (feared?) that this directory will be revised at regular intervals. And that all will live happily ever after.

VAE VICTIS! USER PAYS!
Pangloss Aukland
Sole Survivor

[1] A note for multiculturalists. In telephone conversations relating to answers to the advertisement, it was consistently noted that the heavier the foreign accent, the higher the prices requested, or, in some cases, demanded. A particularly fierce lady required $30 per 100 words for translating from a European language.*
** For the Equal Employment Opportunity aficionados or aficionadas: there also were some fierce men.*

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Hologram forms part of new IICT calendar

The Institute of Information and Communications Technologies soon will release an attractive 13 page, large format, full colour calendar for 1990. It will illustrate the Institute's work and will feature a hologram prepared by the Division of Applied Physics as an integral part of the design.

It follows the successful 1988 Division of Radiophysics calendar, which won a prize in this year's National Print Awards (see *CoResearch* No. 322, April 1989).

The new calendar has been sponsored by AUSSAT Pty Ltd, Convex, Apollo Domain Computer, Corporate Enterprise Developments Pty Ltd, Austek Microsystems Pty Ltd and Ericsson Defence Systems.

CSIRO staff may buy copies of the calendar by contacting Ms Jan George at IICT's office in Canberra on 062-48 4130. The cost to CSIRO staff is $12 per calendar. Those outside CSIRO, please add $5.00 postage and packing to your order.

Cattle nutrition work set to assist developing nations

Research by Dr Bill Winter of the Division of Tropical Crops and Pastures has found that cattle production can be improved dramatically by supplying nutritional supplements direct to the animals, rather than just spreading out a variety of fertilisers.

This could have important ramifications for cattle production in developing countries, as well as in parts of Australia.

According to Dr Winter, cattle don't always get all their nutritional requirements from grazing.

'It is like assuming that if you put all the breakfast cereals in the world down for kids to eat, they will select the right nutritional balance,' he said.

Dr Winter's research has shown that improving cattle production in very poor grazing areas may be done relatively cheaply by supplying those nutrients which are in short supply.

'In north west Australia, annual liveweight gains may be increased three to four times from either native pastures or low cost improved pastures with strategic supplementation,' he said.

Dr Winter, who presented his work to an international conference in France this month, sees the research as particularly relevant to African and South American countries.

'Australia is the only place in the world that is a developed country within the tropics,' he said.

'Because of this, we have been able to tackle research which cannot be done in those countries.'

Dr Winter has spent 15 years researching cattle production at Katherine in the Northern Territory.

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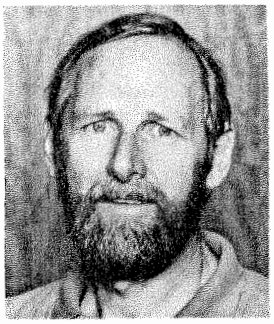
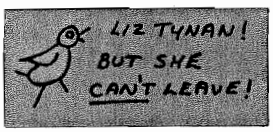


Above, Dr Bill Winter



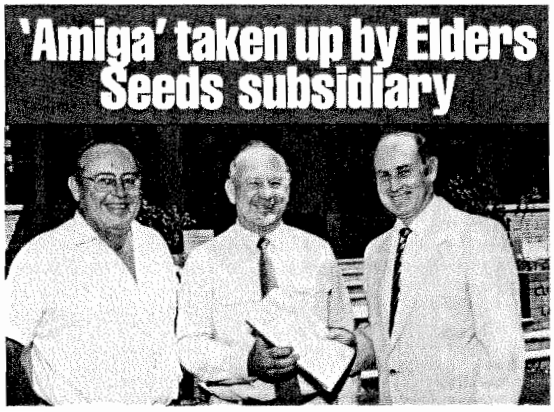
Dr Bedding wins Urrbrae Award

CSIRO's nematode expert, Dr Robin Bedding of the Division of Entomology, has won the 1989 Urrbrae Award for his contribution to Australian agriculture.

Dr Bedding is perhaps best known for developing nematodes to control Sirex wood wasp in pine forests, a technique which stopped a major outbreak of the wasps in South Australia in 1987/88.

The Urrbrae Award, made annually since 1975, is a public memorial to those students of Urrbrae Agricultural High School who served in World War II.

'Amiga' taken up by Elders Seeds subsidiary



Eyles *Above, Mr Les Eydes, Mr John Fuller and Dr Frank Smith*

An agreement between CSIRO and Hodder and Tolley, a subsidiary of Elders Seeds, has been signed, allowing for the commercial buildup of seed from a high yielding *Stylosanthes* pasture legume called Amiga.

Mr Les Edye of the Division of Tropical Crops and Pastures has been involved in developing the new legume.

He said 'Amiga is a remarkably persistent pasture legume, particularly suited to cooler or more arid regions of northern Australia.'

Queensland Manager of Hodder and Tolley, Mr John Fuller, said the company had grown Amiga near Mareeba on the Atherton Tableland.

'We're very pleased with the initial growth, which has been vigorous,' he said.

'We expect commercial seed to be available around September next year.

'Amiga is easy to establish and is an extremely high seed producer, so it builds up much quicker in the pasture,' he said.

Acting Division Chief, Dr Frank Smith, said he was pleased the Division had entered into a commercial agreement with Hodder and Tolley.

'It will ensure that Amiga seed is available to graziers as rapidly as possible,' he said.

'The Division is confident that Amiga will make an important contribution to the beef cattle industry in Queensland and the Northern Territory.'

Mr Edye has released two other cultivars for semi-arid or dry tropics areas in Australia since 1973. Verano and Seca have become the dominant pasture crops in these areas.

'However, since Verano was released it has become evident that it was not highly productive in areas with an altitude above 300 metres, with cool temperatures or in marginal rainfall areas below 760mm', he said.

Mr Edye expects Amiga stylo to replace Verano as the pasture legume of choice in less favourable areas.

The Australian Meat and Livestock Research and Development Corporation provided funds for the Amiga research and also is financing a new venture by Mr Edye into subtropical cultivars.

Dr Batley releases new book

A scientist with the Division of Fuel Technology has just released a new book through CRC Press.

The book, by Dr Graeme Batley, an SPRS with the Division's Centre for Advanced Analytical Chemistry, is titled *Trace Element Speciation: Analytical Methods and Problems.*

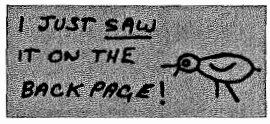
Dr Batley is well known for his work on chemcial speciation measurement and its application to the bioavailablity, toxicity and transport of trace metals in the environment.

The book was produced primarily to help analytical chemists. It provides information on speciation studies and the problems associated with each method, and will aid in the selection of appropriate techniques.

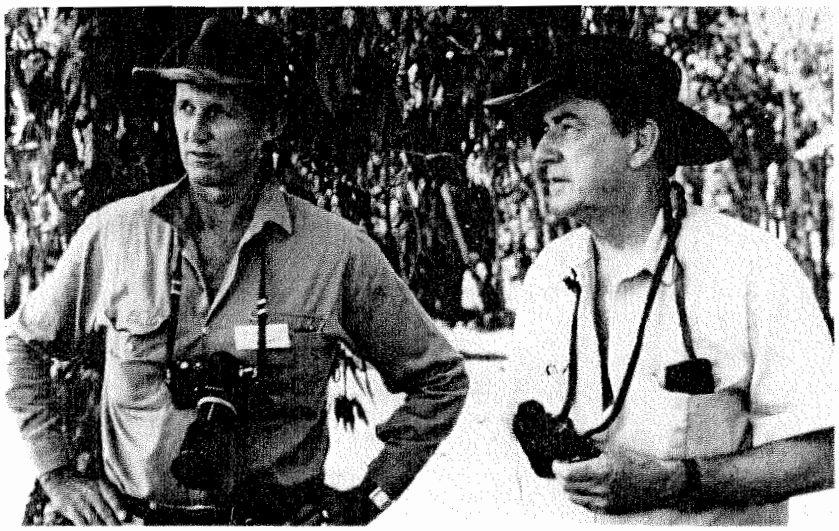
Contributions have been made by Dr Mark Florence and Dr Gary Low, also of Fuel Technology, Dr David Waite (ANSTO), Dr Y K Chau and Dr P Wong of the Canada Centre for Inland Waters, Dr Ulrich Forstner and Dr Michael Kersten of the Technische Universitat in Hamburg and Dr Greg Morrison of Chalmers University in Sweden.

The book is available from D A Books and Journals Australia Pty Ltd, 11 Station Street, Mitcham Victoria 3132.

Research by Dr Batley's group on heavy metal speciation in Lake Macquarie featured in *Ecos* 55, and work on tributyltin and copper in oysters will appear in a future issue.



Chairman visits the Top End



Above left, Dr Laurie Corbett, Officer in Charge of the Tropical Ecosystems Research Centre, discussing research programs with CSIRO Chairman Mr Neville Wran, at Kapalga Research Station, Kakadu National Park.

Corbett

In early August CSIRO staff in Darwin were visited by the Chairman of CSIRO, Mr Neville Wran. During his week-long stay in the Top End, Mr Wran, who was accompanied by Mrs Wran, combined a tour of some of the Northern Territory's most popular tourist destinations in Kakadu National Park with visits to a number of CSIRO research sites in the region. Mr and Mrs Wran's day tour of the Division of Wildlife and Ecology's research station at Kapalga in Kakadu National Park culminated in an informal barbeque with CSIRO staff. Mr Wran also inspected one of the Division of Horticulture's tropical fruit research projects and toured the Tropical Ecosystems Research Centre at Darwin, including the new Science Education Centre.

Extech

The following has been contributed by Extech Equipment Pty Ltd, in response to an invitation to outside companies to make use of* CoResearch *to place information which may interest CSIRO staff. It is not a paid advertisement.

Analytical pyrolysis of complex multicomponent samples

Pyrolysis gas chromatography (GC) frequently is applied to the analysis of pure materials such as synthetic polymers and natural materials like cellulose and rubber. There are, though, many applications for the analysis of complex composite materials that may be only partly organic or may be mixtures or blends of a variety of organic materials, have different melting points, boiling points, etc.

If polymers are involved, it may be impossible to extract or remove them from the final product for quantitation, quality control or other evaluation.

Pyrolysis permits the analysis of these systems without extensive sample preparation by liberating organic material from the matrix for analysis by GC, GC/mass spectrometry (GC/MS), GC/Fourier transform infrared (GC/FTIR), etc.

Multiple step pyrolysis permits the selective volatilisation of individual components from the sample or division of the pyrolysate into temperature-dependent fractions. Dynamic headspace sampling before pyrolysis removes volatile organic components from the matrix before separate GC analysis of the higher molecular weight components.

A system has been developed which includes a dynamic headspace and pyrolysis chamber with temperature settings from ambient to 300°C and a pyrolyzer that is continuously variable from ambient to 1400°C.

An on-line trapping system allows collection of the volatiles and reinjection into the GC. Cryogenic refocusing of the analytes at the GC inlet permits spitless operation for trace analysis. Analyses are performed using capillary column separations and flame ionisation detection.

For further information contact Extech Equipment Pty Ltd, 6/675 Boronia Road, Wantirna, 3152, Victoria, Ph: 03-887 0055 or 008-33 8132.

Planning your publications

by Jeff Prentice, Print Advisory Service, Sydney

The New Perspective

No longer can divisions and institutes view their publications as afterthoughts or ad hoc productions. A new ethos is entering CSIRO and slowly overhauling outmoded practices. Part of that ethos is being expressed through a variety of publications.

Central to the new thinking is the push to collaborate with business, rural and industry sectors in joint ventures; to respond to the needs of the private sector; to translate science for the public benefit; to find the right market niche for CSIRO technology; and to demonstrate CSIRO's worth to the community. Marketing strategies and business plans are on the drawing board. CSIRO needs to communicate quickly and more frequently through print and electronic means, to issue more succinct reports, to produce cost-effective but impressive public relations material, to write industry oriented reports, to market commercial brochures and to allocate sufficient funds from tight budgets to meet all these demands.

Besley Hews-Taylor Collins Prentice Sanders Grey Inglis

Planning meeting for the Division of Applied Physics' Biennial Report 1987/89, left to right, acting program leader Laurie Besley, program manager Ken Hews-Taylor, assistant Chief John Collins, Jeff Prentice, Paul Saunders from IMEC Site Services, business manager Roger Grey and program manager Barry Inglis.

A thought provoking book, *Cultural Literacy*, written by the American author E D Hirsch Jr, has been released in Australia. It was first published in 1987 and the Minister for Science Barry Jones contributed a pungent foreword to the Australian edition.

The book is compulsive reading, persuasive in tone, insightful and urgent in its message. The author bemoans the lack of cultural literacy among American youth and attacks the peddlers of education theory who ignore the natural processes of developing culture in society.

Science also comes under Hirsch's microscope. He says 'Although the true language of much science is mathematical, important elements of science can be expressed without the mathematical complexities that effectively move science beyond the understanding of all except specialists. Indeed, the goals of scientific literacy are no different from those of other kinds of cultural literacy, to provide each citizen with the basic framework of knowledge into which public debate can be placed. It is part of the basic responsibility of scientists to translate the essential elements of science into general, non-technical terms...'.

Closer to home, David Hoare, a CSIRO Board member, made some pertinent remarks on science communication in his recent article 'Science has to play the ball' (*Directions in Government*, August 1989). He said 'Science has to go out and sell itself in the market place. It is an absurdly narrow and short sighted view to see that effort as demeaning and detracting from science itself'. He added 'Science has to demonstrate it is willing and able to manage the R&D function in a way that is contemporary, relevant and properly focused'.

The message is clear: science communication must be meaningful and understandable for digestion by industry and business and it must be marketable and up to date to assist R&D in today's competitive business environment. Therefore more attention must be given to the type of publications issued by divisions and institutes – publications which carry messages to national and international scientific and business audiences.

Communicating through print

The main principle in producing effective divisional and institute publications is advance planning. A team approach ensures that a variety of views is aired before material is written.

Defining the intended audience is vital. When it comes to communicating with business, divisions and institutes should address a series of questions. How do companies communicate? What do they communicate? When do they communicate? On the basis of answers to these questions, more aggressive, commercial publications appealing to companies may be produced.

The Communication-Institute Support Group in Canberra has prepared a quality document using the latest printing and technology. Called *Commercial Relationships with CSIRO*, it is an aggressive move, aimed at improving CSIRO's commercial relationship with the private sector.

Publications containing a balance of scientific information specifically addressed to industry and its expectations will be more effective in attracting outside funding. The days of producing traditional, lengthy divisional reports are fast disappearing. The challenges of the 1990s demand a new approach.

Planning communication packages

Before offering some assessments of CSIRO publications now in circulation, I would like to outline what a communication package should be and how print still takes a leading role.

A communication package may be defined as a series of statements, objectives, strategies, intentions, projections and achievements, succinctly expressed through an appropriate medium and designed to influence decision makers and/or attract the interest of potential clients. If this definition was applied to the current wave of CSIRO publications, some would not stand up to scrutiny.

Unfortunately some brochures, reports, presentation folders and leaflets lack innovation and fail to take an entrepreneurial approach. They are inward looking, verbose and don't appear to have a clearly defined purpose. One of the major faults is a lack of structure.

Incidentally, when it comes to issuing divisional and institute reports, it is essential that ISSN numbers are included for accession purposes. Not all CSIRO reports adopt this practice.

As a guide to formulating a communication package aimed at industry, the following steps should apply:

1. Identify and scrutinise your target audience. Who are you trying to reach and what do they want from you?

2. Translate or interpret scientific research. Will the text be understood by its intended audience? Does it convey the right message? Has the content the right structure?

3. Select the best medium for your message, e.g. presentation folder, brochure, information sheet, report, video or a combination of several.

4. Get your timing right. When are potential clients most receptive?

5. Examine the results, and use a winning formula again.

A communication package with the right market image may help divisions and institutes secure more funding from the private sector. To help scientists and science communicators produce worthwhile publications, Print Advisory Service (PAS) staff are available for free consultation in Melbourne and Sydney. They have access to graphic designers, photographers, editors and printers. There also are outside consultants equal to the task – but they cost. IMEC Site Services in Sydney has graphic design and photography available for divisions and institutes as required. Some divisions have graphic artists and photographers who concentrate on inhouse productions, while using PAS to organise cost effective printing.

A communication package may be single or multi-faceted, depending on its message. Also, the package should be part of a communication plan and in turn, of a wider communication strategy adopted by the division or institute.

Problem issues

Divisions and institutes need to address several difficult issues facing the publications process in today's economic climate. Firstly, how confidential can reports be if they publicise joint ventures with companies? And, can scientists advance their careers if their work involving confidential contracts is not made public? Secondly, what is the most cost effective way of marketing publications? Database marketing should be an essential part of any plan. If the publication does not reach the right audience, then time and resources are wasted. Thirdly, not all divisional and institute publications should be directed at industry. Some should be aimed at the corporate sector and others at the wider scientific community. Again, forward planning will determine the right mix.

The integrated effort

There are encouraging signs that some divisions and institutes are lifting their games when it comes to creating publications with a competitive flair. For example, the **Division of Tropical Animal Production** used outside consultants for the writing, editing and production of its Divisional Report 1989. The final result is commendable, the content succinct, the design good and the message for industry emphasised throughout.

Close collaboration between divisional and PAS staff has produced a competent and industry-targeted annual report for the **Division of Materials Science and Technology**. Major research areas described are highlighted by excellent colour and multi-column techniques. The high quality work of the divisional photographers has contributed to the overall appeal of the publication.

Recently, the **Institute of Animal Production and Processing**, at a meeting of Chiefs of Divisions, began to assess the type of publications being issued by its divisions – especially the format and style of reports. Already, the Institute has issued an impressive and well focused brochure prepared by the PAS in Melbourne.

The **Division of Wool Technology** formed a team to produce a full colour brochure on FAST (Fabric Assurance by Simple Testing). The team included a scientist, a science communicator, a member of Sirotech, a freelance designer and a production editor. The expertise of all members ensured the brochure met industry needs and had the right image. It helped the division to attract national and international sales for the product.

Another example of good planning is the CSIRO Rural Sector Report 1989, which had to be produced very quickly. Communicators from three institutes, IAPP, INRE and IPPP, and the Manager Rural Industry Relations for IAPP/IPPP, in association with a leading design group and PAS in Sydney, ensured the publication met several criteria essential for success with the target audience. The report was issued on time.

The **Division of Geomechanics'** Biennial Report 1986-87 and an industry oriented brochure called *Science and Engineering in Australia* both incorporate good generic design, judicious use of diagrams and appealing and striking colour photos. The text focuses on research projects aimed at increasing the competitiveness and safety of Australian industries, and both publications would appeal to the corporate sector.

In publicising commercial ventures between CSIRO and business partners, high profile, full colour brochures are in vogue. For example, PAS in Melbourne was involved in the planning and preparation of the NAMAC (National Advanced Materials Analytical Centre) brochure. By working with the Division of Materials Science and Technology, the NAMAC brochure has a balance of text, diagrams and photographs, the layout is uncluttered and the location maps clearly indicate contact points.

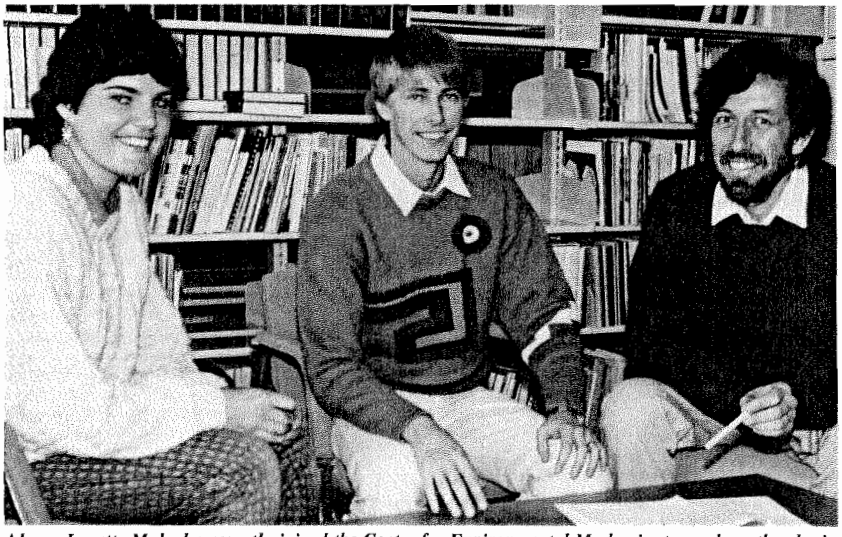
The **Division of Mathematics & Statistics** soon will issue a high profile, informative, full colour presentation folder which includes 15 'Close-Up' information sheets. Again, proper planning and a team approach were essential to the exercise. High on the agenda was a brief from the Division Chief to produce a capability document which would sell the expertise of DMS staff to industry. Also important was the decision to use a professional design group, to include original photography and to adopt a colour scheme with the use of good generic design. It was planned by the Chief, the Divisional Secretary, four program leaders and PAS.

Early in 1988, the **Institute of Information and Communications Technologies** was formed and a meeting of its communicators was held within the first three months to plan publications and activities. A communication package was agreed on, including a leading presentation folder, an Institute brochure clearly showing major research activities, and a message from the Director. An award winning calendar on the Australia Telescope was issued by the Division of Radiophysics, with the help of outside sponsorship. The newsletter *ICON* was created, as well as a video with the CSIRO Film and Video Unit, aimed at decision makers in industry. All components of the communication package were the result of team work, and the contributions of each division were vital in this process.

Other divisions and institutes have produced worthwhile publications and those mentioned here are only a few examples.

Most divisions and institutes are producing capability documents of the calibre needed for capturing the interest of Australian industry and the scientific community. Face to face contact is the best approach in negotiating contracts, but having a 'calling card' shows the professional attitude needed for CSIRO to enhance its prospects as Australia's premier research organisation.

Lynette joins soil erosion project at CEM



Above, Lynette Malcolm recently joined the Centre for Environmental Mechanics to work on the physics of the erosion of soil by wind. A graduate in physical geography from the University of New South Wales, she previously had worked with environmental consultants Sinclair, Knight & Partners. At the Centre she will work with Mike Raupach, right, of the Micrometeorology program. Also collaborating in the project is John Leys, centre, of the NSW Soil Conservation Service, Buronga. The research is funded by a grant from the National Soil Conservation Program.

Book a tribute to the NML – and to Jack Wright

A book outlining the first 50 years of the National Standards Laboratory was launched at an informal ceremony on 31 August at the Division of Applied Physics.

The guest of honour was Mrs Katie Wright, widow of Jack Wright, a former Scientific Assistant to the Chief of the Division. Jack was commissioned by the Division to write the history, and it was a great shock to all when he died suddenly in May 1988, just after finishing the manuscript.

Publication of *Measurement in Australia 1938-1988* completed the celebration of the Division's golden jubilee, the centrepiece of which was a week of seminars and open days held last November.

Jack Wright was particularly well qualified to write the history of the Division. He graduated BSc in Chemistry from the University of Melbourne in 1935, and after working in the chemical industry, he joined the Information Service at CSIR Head Office in Melbourne in 1948.

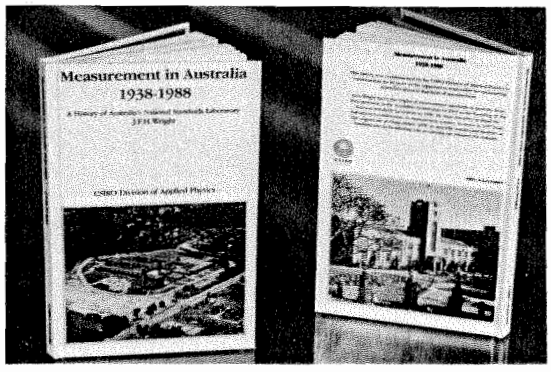
As the audience was reminded by Mrs Wright at the launch, Jack produced *Industrial Research News* from its first issue in 1957 until 1966. He also was involved in liaison between CSIRO and secondary industry.

In 1969 Jack joined the (old) Division of Applied Physics as Laboratory Secretary. Following Divisional amalgamations to form the present National Measurement Laboratory in 1974, Jack became Assistant to the Director, Mr Fred Lehany, until he retired in 1979. He thus combined journalistic skills with a very good knowledge of the Division in its various manifestations over the years.

Jack is remembered as a quiet, unassuming, perennially good natured colleague, a very competent brass musician and a tireless proponent of voting reform in Australia.

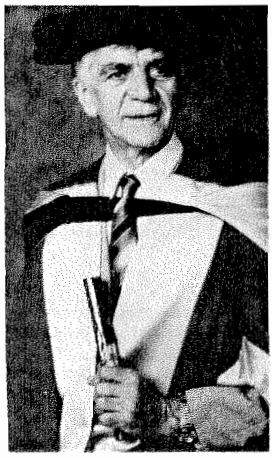
The history is very much a personal assessment of the Division by one who knew it and served it well.

At the ceremony the present Chief, Dr Bill Blevin, presented copies of the book to the Wright family. Also among the guests were Mr and Mrs Ian Wright, former Chief Mr Fred Lehany and Messrs John Gilmour (National Association of Testing Authorities, Australia) and John Birch (National Standards Commission).



Above, Measurement in Australia 1938-1988 *by the late J F H Wright. The book is available direct from the Division of Radiophysics, or from the CSIRO Bookshop in East Melbourne.*

Above, the Chief of the Division of Applied Physics, Dr Bill Blevin, presents copies of the history to Mrs Katie Wright in the presence of her son, Mr Ian Wright and his wife Merryll. Blevin Wright



Above, Dr Albert Rovira

Honour for Dr Rovira

Chief Research Scientist with the Division of Soils, Dr Albert Rovira, has been made Doctor of Agricultural Science by the University of Melbourne, for his work on the complex interactions between plant roots and soil micro organisms.

Dr Rovira's work provides farmers with sound management practices to overcome problems of cereal root diseases such as cereal cyst nematode – problems which cost Australian agriculture up to $500 million each year in lost yield. For this work, he received the Sir Ian McLennan Achievement for Industry Award in 1987.

Vale Jack Cummins

Vale Jack Cummins

Long-time CSIRO officer and former Governor of the Ian Clunies Ross Memorial Foundation, Mr Jack Cummins, died earlier this month.

Mr Cummins, who retired from the Foundation late last year, died peacefully at his home in Melbourne, aged 86.

He resigned from CSIRO in 1962 and until his appointment as Governor of the Foundation in 1971 he was successively Treasurer, Secretary and Chief Executive Officer.

Mr Cummins joined CSIR in 1927 on a senior studentship and in 1929 became an assistant research officer with the Division of Forest Products. Later, he established a scientific liaison bureau, which forged closer contacts between the Organisation and Australian and international business.

He was a tireless advocate of CSIRO and remained loyal to the Organisation long after he had ceased his work there. His quote in an article in the August 1986 issue of *CoResearch* was memorable: '[Sir David] Rivett used to say if you worked for CSIR, you had to be worthy of it. I still firmly believe that'.

DTC&P has new communicator

In response to increasing awareness of the importance of promoting public interest in research, the Division of Tropical Crops and Pastures has appointed a Communication Manager, Ms Jenni Metcalfe.

Ms Metcalfe, who holds an MSc from Griffith University, has an extensive background in both science and communication.

Communication project leader Ms Anne Tuppack said the appointment presented an ideal opportunity to reach new markets.

'We want to improve communication with the Division's client groups and use modern communication technology to make the work of the Division known to the community in general,' she said.

The recent cuts in government research funding made the communication role even more vital, said Ms Metcalfe.

Above, Ms Jenni Metcalfe

A note from Liz Tynan:

This is to be my last issue of CoResearch *as editor. I would sincerely like to thank everyone in the Organisation who has assisted me during my four and a half years in the job. I have been frustrated, downhearted, enthused and elated in about equal measure during that time, but ultimately I have enjoyed my task greatly. I am sure the new editor, Liz Mackay, will do a splendid job, and will continue the battle for freedom of speech in CSIRO – a battle by no means won. Again, thanks for all your help.*

Liz

***CoResearch* is produced by the Public Affairs Unit for CSIRO staff and interested outsiders. Readers are encouraged to contribute or offer suggestions for articles. Stories may be reproduced, provided acknowledgement is given to both *CoResearch* and CSIRO. The deadline for contributions is the last Monday before the issue month. Prepared jointly by the incoming editor Liz Mackay and the outgoing editor Liz Tynan, PO Box 225 Dickson ACT 2602. Ph: 062-48 4567. FAX: 062-48 4641.**

CoResearch

No. 329 December 1989 — January 1990 CSIRO's staff newspaper

CSIRO AUSTRALIA

OA campaigns for science

The CSIRO Officers Association has virtually completed a letter-box drop of 350,000 leaflets in nine marginal electorates around Australia as part of a campaign to make politicians pay attention to science.

Recent opinion polls have shown that Australians on the whole are enthusiastic about the benefits offered by science, but federal science policies are still allowing our research and development effort to lag behind that of similar countries.

The leaflet urges voters to use their power over vote-hungry politicians to force a higher profile for science into agendas before election time.

John Stephens, President of the Officers Association, calls our present R&D lag 'an alarming situation', and believes that the most efficient way to make government, and business, respond is through the electoral process.

The hard-hitting leaflet begins with a bleak prospect — Australia in crisis — outlining that crisis as follows:

- Interest rates are exorbitant, especially on home loans.
- Our international debt is growing beyond all reason, our credit rating is in question and our dollar shaky.
- Unemployment and inflation both remain far too high.
- Our environment is being polluted and degraded at an ever increasing rate.
- There is far too little 'value added' by Australian industry to our agricultural and mineral exports.
- Australian manufactured goods are generally uncompetitive both here and overseas.
- There is too little productive investment with too much money going into company takeovers.

If this situation is to improve, argues the leaflet, we must spend more on scientific research and development. This will bring us internationally competitive industries and better employment opportunities as well as helping to preserve our environment.

Such an increase in expenditure, it claims, is not a cost, but an investment in our future.

- Australia must at least double its R&D effort just to stay in touch with international competition.
- Australian business must become more enterprising in its willingness to take up the results of Australian R&D in new or improved processes and products instead of leaving overseas interests to reap the benefits.
- The government must take absolute responsibility for finding the necessary funds. Industries that fail to volunteer their fair share should be levied.
- The R&D needs of all industry sectors and all matters of public interest, such as the environment, must be met. Both environmental research and basic research must continue to be funded by the government.
- Our young people must be attracted once again to careers in science, technology and engineering. In addition, better education for these careers must be a national priority.
- R&D must be a national enterprise to spread the risks and the rewards while focussing the effort productively. This is much the case already in agriculture and the minerals industry and it should be extended in an improved form to manufacturing. Industry, employees and research workers should all be active partners with government in its management.

After stressing the urgency of the problem, and telling the voters what steps need to be taken to overcome it, the leaflet reinforces its message with a reminder that polls show public opinion to be well and truly on the side of science:

- more than 80 per cent of Australians support a massive increase in our R&D effort; and
- 85 per cent would like to see scientists and engineers directing that effort.

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The 350,000 letter-drop is only part of a continuous campaign by the Officers Association to raise science awareness in the community. Early this year they distributed a leaflet on the importance of CSIRO itself in solving Australia's problems, and they also conducted their own opinion poll to gauge public feeling about science issues.

The Association also lobbies politicians with what John Stephens calls 'considerable intensity' and speaks up strongly on behalf of working scientists at the National Science and Technology Group meetings.

All of this, says John Stephens, is a response 'not just to our situation but also to Barry Jones describing us as wimps some years ago.

'We have been challenged. We have picked up that challenge and by God we're going to run with it from now on.'

STOP PRESS

CSIRO Medal winners announced

The names of this year's CSIRO Medal winners were released on 27 November:

- the raw wool measurement team from the Division of Wool Technology and the wool industry (the late Dr M W Andrews, Mr D Charlton, Mr H G David, Mr S A S Douglas, Mr J F P James, the late Mr B H Mackay, Mr R A Rottenbury, Mr R B Whan and Dr K J Whitely) — for the introduction of objective measurement into the marketing of Australian raw wool;
- Dr W J Peacock, Chief, Division of Plant Industry — for leadership of the Division;
- the SIROFLOC team, Division of Chemicals and Polymers (Mr N J Anderson, Dr B A Bolto, Dr D R Dixon, Dr L O Kolarik, Dr A J Priestley, Mr W G C Raper and Dr D E Weiss) — for development of the SIROFLOC process for preparation of potable water;
- the High Frequency Radar Division, Surveillance Research Laboratory, Defence Science and Technology Organisation (special mention for Dr G F Earl, Dr M G Golley and Mr J A Strath) — for development of the Jindalee Over the Horizon Radar.

Next month's *CoResearch* will carry the full story and pictures.

New seeder released commercially

A revolutionary band seeder designed to improve legume establishment in native pastures is about to be manufactured commercially.

The new seeder was launched at the Annual General Meeting of the Australian Meat and Live-stock Research and Development Corporation at Rockhampton on 29 November. It was developed by Dr Sid Cook of the Division of Tropical Crops and Pastures and Mr Peter Walsh, an engineer with the Queensland Department of Primary Industries.

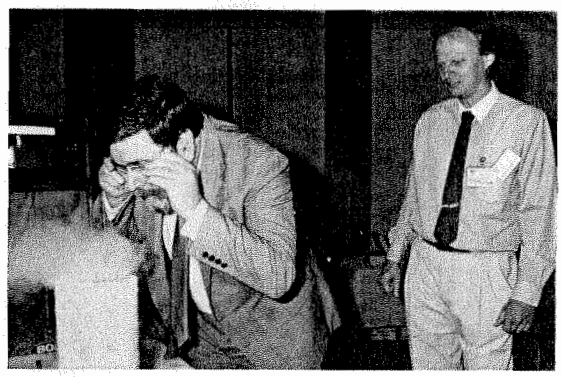
The Division has chosen Connor Shea Napier, a large farm machinery firm, to manufacture the machines, and some should be on sale this summer.

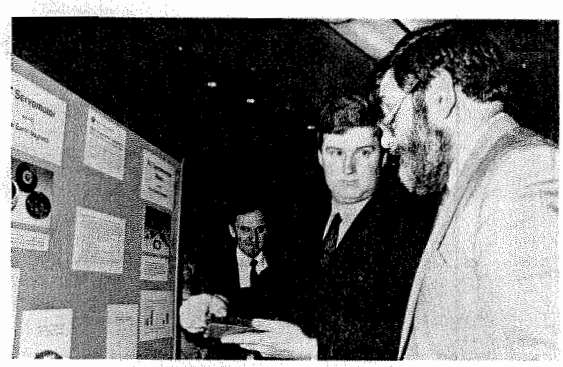
The device sows a band of seeds to an optimum depth of 10 millimetres, at the same time placing a small amount of fertiliser below the seed to boost legume growth, and applying a 50 centimetre herbicide strip on the soil surface to reduce root and shoot competition. The bands are sown 1·5 metres apart.

Band sowing also offers environmental advantages. 'It retains litter and trash on the surface and causes very little soil disturbance' Dr Cook said. 'People from all over Australia have been asking me about it.'

Soil conservation experts are hailing the technique as a major step in soil management and land care.

Industrial Technologies Display





The Institute of Industrial Technologies mounted a striking display of the latest in CSIRO technology at Parliament House in Canberra on 24 October.

Each of the Institute's Divisions set up a stall to display its wares to the public and media.

Scientists and their business partners were on hand explaining CSIRO's ventures in the private sector from both a scientific and a commercial point of view.

The exhibition was well received, especially the more spectacular displays.

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Above, top, Science Minister Barry Jones tries to glimpse a piece of metal being levitated by superconductivity equipment set up by Dr Stephen Collocott of the Division of Applied Physics.

The middle picture seems to show Shadow Minister for Science, Peter McGauran, looking to Barry Jones for scientific insight while Dr Colin Adam, Director of the Institute, stands well back. Perhaps Dr Adam knows that Mr McGauran is about to put the new high-tech magnet to a very low-tech use against his political rival? (Bottom picture.)

What they are really doing is pitting their strength against that of the powerful rare earth magnets being developed by the Division of Applied Physics.

From the Chief Executive

A column by Dr Keith Boardman

I am writing this column on my return flight from Seoul after leading the Australian delegation on a Science and Technology mission to the Republic of Korea. The visit follows on the signing of a Memorandum of Understanding for Science and Technology co-operation between the two governments.

The nine-person delegation was broadly based, with representatives from DITAC, CSIRO, ANSTO, universities and industry, and it received excellent support from the Ambassador and his staff at the Australian Embassy in Seoul.

We were received by the Minister of Science and Technology and visited the major research institutes in the public sector in Seoul and Taedok Science Town, located 170 km from Seoul, and a private sector institute.

Taedok Science Town is a major development and many of the public sector research institutes are being transferred there, together with a number of private sector institutes.

Korea has a strong central bureaucracy and a number of very large companies that dominate the Korean economy. R&D is very much market-driven and there is strong interaction between the public sector research institutes and private companies.

Korea has been very successful over the past two decades in developing a strongly competitive export-oriented manufacturing industry based on the acquisition of foreign technology and a low wage structure. Korea's relative cost competitiveness is now declining because of increasing labour costs, industrial disputation and rising inflation. Greater emphasis is now being placed by government on the promotion of basic sciences and the development of a capability to develop new technologies, with less dependence on the technologies of Japan and the USA.

The delegation gained the strong impression that basic science is generally weak in most of the research institutes and the universities, with a shortage of well trained researchers. But a determined effort is being made to attract back experienced expatriate scientists from abroad, mainly from the USA, and there are plans to greatly expand the funding of post-doctoral fellowships for Korean scientists to gain experience in foreign laboratories. There will be increasing opportunity for Korean post-doctorals to join Australian laboratories, particularly in priority areas for Korea and where Australia has a strong international reputation.

A survey of Koreans on the subject of Australia, carried out by the Australian Embassy, showed a great lack of knowledge about Australia, but the scientists we met were generally aware of our scientific capabilities.

CSIRO is very highly regarded for its achievements in strategic basic research and several of the research institutes we visited would like to model their future directions on CSIRO. It is ironic that CSIRO, which is so highly regarded as a public sector research organisation in so many countries, has suffered substantial funding cuts over the past five years and poor government support. It came as no surprise that the priority R&D areas in Korea are similar to those of other advanced nations, namely, new materials, biotechnology, fine chemicals and information technology.

I believe there are opportunities to develop a better relationship with and knowledge of Korea by the exchange of scientists, initially in areas of basic science, and the acceptance of Korean post-doctoral fellows. But in the longer term, if Australia is to obtain greater benefit from co-operation with Korea, we must learn to collaborate in strategic areas which may be commercially sensitive, and share the development of the intellectual property for mutual benefit.

With the help of Directors, I have set down my vision for CSIRO and it will be considered by the Board at its November meeting. I propose to distribute a statement to all staff before the end of the year.

M Keith Boardman

Apologies

In the October issue of CoResearch *the third letter in the Letters to the Editor section was attributed simply to I Lowth and R Lockwood. Two lines were omitted, reading 'B Mithen' and 'Finance and Services Unit, Corporate Centre', respectively.*

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The feature on development of poultry vaccines in the August issue of CoResearch did not mention the contribution of the team from the Division of Biotechnology at Clayton. Scientists involved earlier in the Infectious Bursal Disease Virus (IBDV) project were: Mr G. M. Black, Dr M. L. Britz, Dr J. I. Skicko, Dr H. Y. Cheung, Ms N. Ivancic, Dr R. A. Irving and Dr J. L. Atwell. At present, Dr John Skicko and Mr Andrew Wolfe are continuing fermentation scale-up work for the project, and are playing a crucial part in the successful development of the project.

Letters to the Editor

Dear Editor,
Video recordings are being used increasingly in the laboratory and in the field to investigate various topics in biology such as: predation, scavenging, habitat use, responses to stimuli, and behavioural interactions. Video is used particularly in difficult situations, e.g. deep water, night time under artificial light and where disturbance is to be kept to a minimum.

I intend forming a register of video users, mainly to establish a forum for communication of ideas and methods and to let users know about other users. To this end I would like a short summary from each user, giving on a single A4 page:

Name and affiliation
Project – objectives
Brief outline of work
List of equipment
Comments on problems

Once I have a reasonable response from Australia's universities and research institutions, I will compile the information and send copies to those people who have responded.

Ted Wassenberg
CSIRO Marine Laboratories

Dear Editor,
I am sure many of your readers will be intrigued by the illustration on this year's CSIRO Christmas card. The caption says 'Nature's delicate balance can be supported by the scientific knowledge born of Mankind's insatiable curiosity'.

I thought the best ecologists were telling us the 'balance of nature' is a greenie myth.

William Wordsworth can provide a more appropriate caption:

Sweet is the lore which Nature brings;
Our meddling intellect
Mis-shapes the beauteous form of things:
We murder to dissect.

Nick Alexander
CSIRO Information Services Unit

... about the Editor

Dear Editor,
I agree with Liz Tynan that we need much more face to face communication between central and divisional staff.

As someone who has spent a number of years in divisions and at Limestone Avenue, I know that both areas have people who give excellent service to the real business of CSIRO – research.

I have begun a small program to bring the two places together by taking members of the Human Resources Branch out into the field whenever possible. The response of these people has been marvellous – and the divisional people are only too ready to show them around and discuss issues.

I am now talking to other people here at Limestone to see what we can do to take this a bit further, to involve people from all central groups and get them out and about.

We are, after all, one Organisation ... at least, that's what I'm told!

Wendy Parsons
Institute of Natural Resources and Energy

Dear Editor,
Dissatisfaction of staff in divisions in relation to the corporate centre continues – fuelled by the view that there are two classes of staff in CSIRO: the 'haves' in the corporate centre and the 'have nots' in divisions.

While centre staff get more pay for the same work and shelter themselves from budgetary constraints, they can expect little sympathy from divisional staff. For example, who in the corporate centre goes without a computer if he or she really wants one? Computing consultants – reputedly not very good ones at that – are hired for exorbitant fees compared with an ES doing the same job in the division, and are then provided with PCs (what division can afford that luxury?). Meanwhile, some of the most senior scientists in the Organisation cannot afford to buy even a modest PC or other basic piece of equipment. To add insult to injury, the budgetary software developed within the centre is so poor that some divisions have been forced to develop their own.

A second problem is the 'faceless' image of corporate centre staff, referred to by Liz Tynan. What do they do and for whom? Presumably they are helping divisions to be more relevant and operate more efficiently in the service of the country? If this is the case, their value would be best tested by applying the 'consumer pays' principle to their services – as the centre did so eagerly with the Division of Maths and Stats. Divisions could receive the whole budget allocation and contract the centre to provide the service they need. In this way, projects in the centre would compete on the same basis as individual research projects for goods and services. The centre would operate in the same financial environment and have the same standards of accountability as divisions. This would help them to better understand the conditions under which most of CSIRO functions.

The pity about the continuing antipathy of divisional staff to the corporate centre is that individuals in the centre feel personally slighted. As in any other organisation, most of the staff are no doubt capable and hard working. Unfortunately, as long as the centre maintains the present inequities, it will be seen to be inhabited by self-interested pariahs who travel business class while the rest of us go economy, if at all.

R W Sutherst
Chief Research Scientist
Division of Entomology

Dear Editor,
I write in support of Liz Tynan's innovative approach to making the corporate centre more relevant and in tune with the operational wing of the Organisation, a wing that has been severely clipped in the past few years.

Unfortunately Liz, one week per year is not long enough to provide CC staff with the quantity and quality of insight needed. I think it requires at least 6-12 months in a division to achieve a result. Better still, they could be more mobile and after, say, three years in CC would have to spend a compulsory year in a division, i.e. a mini cultural revolution. (The same may be said for institute staff).

At the time of the allegedly large restructuring of head office (now CC), I took time out to make this point and actually photocopied pages from Drucker that said one of the golden rules of management was not to appoint people to corporate centres who had not cut their teeth in operations. I know it got there because someone rang me and said they would 'get back to me'. I wonder what happened.

A Liz Tynan type plan, or variation on it, has a much greater utility than merely solving the 'us and them' outlook. It would rapidly lead to the realisation that more functions should be devolved to divisions or done away with altogether and that CC staffing levels could be reduced and savings generated put towards the research effort. Has anyone seen any additional research funds as a consequence of the last one?

Good on you Liz – pity you're going.

J E Vercoe
Assistant Chief
Division of Tropical Animal Production

Dear Editor,
I would like to express my admiration and thanks for the tremendous job that Liz Tynan has done for the staff of CSIRO through her editorship of *CoResearch*. In addition to transforming a routine company journal into something considerably more lively and informative, she has actually helped to maintain a 'CSIRO culture'.

The introduction of the two class society (big M management vs staff) to CSIRO as part of the McKinsey problem has caused considerable alienation amongst scientists towards Corporate and Institute entities. The forum that Liz provided for disparate points helped to maintain some hope that there still existed an organisation worth saving as well as to reassure staff that the bulk of their colleagues were alive and sane, albeit somewhat discouraged. The fact that this was done despite strong pressure for *CoResearch* to present a Management point of view is all the more cause for admiring the job that she did. It was not without cost.

Good luck Liz and also good luck to the new editor!

Art Raiche
Division of Exploration Geoscience

More letters on p.6

A Matter of Opinion

This month's point of view column comes from Dr Alister K Sharp from the Division of Food Processing.

Like many other staff, I am dissatisfied with the recently introduced CSIRO bonus scheme (Policy Circular 89/6, PB12/1/4, 25 May 1989). I do not believe this scheme will succeed in achieving its stated aim of encouraging staff to commercialise their inventions and I fear that it will inhibit our future research.

Under the bonus scheme, at least 20 per cent of all income derived from royalties and licence fees is now paid as cash to staff who 'made a significant contribution to the achievement' that earned the income. A further 30 per cent is now 'used to recognise significant achievements of national benefit'. The scheme recognises not only scientific contributions, but also those that 'may have been to the management of a research project'.

I agree with the principle that part of income generated by royalties, etc, should be returned to the people who created it. I believe, though, that this income should be used to supplement research funds and not become payments into individual pockets. I object to the scheme for the following reasons:

1. As scientists, we know that we are easily motivated, requiring only a fair salary and good working conditions. CSIRO researchers are not 'in it for the money'. Our best motivation is to have access to adequate equipment, adequate technical support and adequate travel funds. Our working conditions have been devastated in recent years and general destruction to morale is obvious. The present bonus scheme not only fails to correct this situation, but further exacerbates it.

2. The present reclassification scheme already can be used to reward staff for outstanding performance such as successful commercialisation.

3. The scheme will lower the standard of CSIRO's research by inhibiting collaboration. Creativity is enhanced by discussion and good science requires peer review. If it were true that CSIRO staff could be motivated by cash rewards, then it follows that, being intelligent, we would attempt to maximise those rewards by sharing them with as few others as possible. The bonus scheme, therefore, will reduce discussion and so hinder scientific development.

4. Most CSIRO scientists have no training in commercialisation (Sirotech was established in recognition of this). Should the Board wish to improve this aspect of CSIRO's performance, I suggest that it start by providing adequate training in the skills required for commercialisation.

5. Successful commercialisation of inventions is largely out of the control of CSIRO staff. Those of us with experience in commercialisation have found that success depends more on financial and commercial factors than on the technical merit of an invention. There are many instances where the commercial partner has shelved an invention to protect an existing product from competition.

6. Even if a cash bonus did act as a motivation, the time between developing an invention and the return of royalty payments is too great for the promise of payment to be effective. Between the time of invention and the receipt of royalties or fees there can be a delay of 10 or even 15 years, to refine the invention, to seek commercial partners, to make commercial and financial arrangements and to build plant; CSIRO staff rarely are in a position to reduce this delay. Is it reasonable to believe that even CSIRO staff can be motivated by an offer of a possible reward in 10 to 15 years?

7. There is a danger that the CSIRO bonus scheme will lead to a reduction in the real value of general salaries. The CSIRO scheme rewards only selected staff, and so operates quite differently to the bonus scheme adopted by Qantas, and proposed for other Government businesses, which pays all staff a bonus based on before-tax profit.

8. Conflicts of interest are inevitable when those designated to administer the scheme also are potential beneficiaries. The Policy Circular explained that 'the size of bonus paid to each nominee shall be recommended by the Chief' (paragraph 11), yet 'Institute Directors will take into account any contribution by the Chief' (para 13), and again 'an Institute Director may be eligible for a bonus' (para 14).

9. By the time a piece of research reaches commercial fulfilment, many people have contributed in many different ways – scientific, technical support and commercial, yet the Policy Circular gives no guidelines for the allocation of payments between different groups contributing, or among the various individuals of each group.

10. Rather than proceeding by a licence or royalty agreement, commercialisation may be effected by means of a one-off cash payment to CSIRO. In such cases, no bonus would be paid under the terms of the CSIRO bonus scheme.

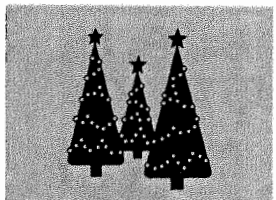
11. Allocation of cash payments will be contentious when the achievement that generates income is not a simple, one-off invention, but rather the result of many years of effort by various staff members, some working throughout the project and others for only part.

12. Allocation of payments will be even more contentious when there has been collaboration between divisions (chiefs will have to argue their division's relative contributions) and when the divisions are in different institutes (institute directors are designated to mediate the scheme).

13. The policy circular gives no guidelines about how 'achievements of national benefit' are to be identified from among the many non-royalty-earning achievements of CSIRO. Presumably national benefits include both achievements that have a cash value but don't earn royalties (such as improved agricultural practices that increase Australia's exports) and those with no cash value (such as preservation of the environment). How are rewards to be allocated between such diverse 'achievements of national benefit'? Are achievements of national benefit to be recognised retrospectively, as are commercial achievements, and if so how far back in time?

14. Finally, and unequivocally, I absolutely reject *any* scheme in which 'there is no right of appeal in relation to the award or size of a bonus' (para 15).

Editor's note: As always, comments from readers are most welcome. Send your letters to the address on the back page.



Season's greetings to all staff from the new editor!

New products for rock stress measurement

The Division of Geomechanics has come up with two new developments in rock stress measurement that are looking good as export earners. Chief of the Division, Dr Bruce Hobbs, released details of the new techniques on 27 October.

'CSIRO' he said 'has been among the world leaders in rock stress measurement for more than 10 years. Now the Organisation is building on that reservoir of expertise to bring the new techniques to the market-place.'

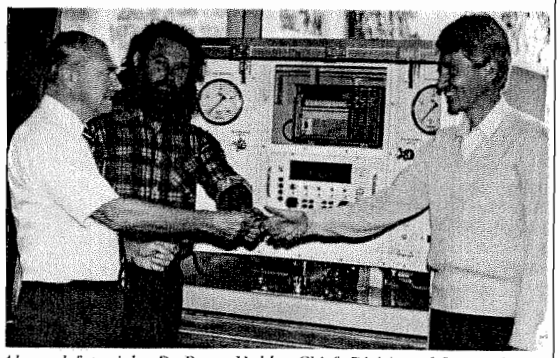
The first initiative was the manufacture and marketing of hydraulic rock stress measurement systems as a joint venture between CSIRO and Strata Tek Pty Ltd.

Mr Jim Enever, Program Manager of the Sub-Surface Reservoir Engineering Program at the Division, has been working closely with Strata Tek in the commercial exploitation of CSIRO's hydraulic fracture expertise.

'These activities are now bearing fruit', said Mr Enever. 'We have just sold one of the systems to ISMES, Spa, an Italian geotechnical organisation responsible for major civil engineering investigations.'

The second foray into the market-place is a recent agreement with Mindata Pty Ltd, an Australian-owned group manufacturing and marketing geotechnical instrumentation developed by CSIRO and others.

Mindata have representatives in Canada, the USA, the UK, and Sweden, and will now market CSIRO's 'Minifrac' system, a low-cost, miniaturised hydraulic fracture system for routine process control applications in the mining industry.



Above, left to right, Dr Bruce Hobbs, Chief, Division of Geomechanics and Mr Jeff Edgoose, Principal of Strata Tek, hand over the keys of one of their new rock stress measurement systems to Dr P Devin of ISMES Spa.

Water Resources wins MIS prize

The Division of Water Resources in Perth is the proud owner of a new NEC microcomputer, thanks to an idea from two members of the Floreat Park laboratory.

John Bright and Lloyd Townley were the joint winners of the Great Systems Ideas Competition run recently by the Management Information Systems Branch in Canberra.

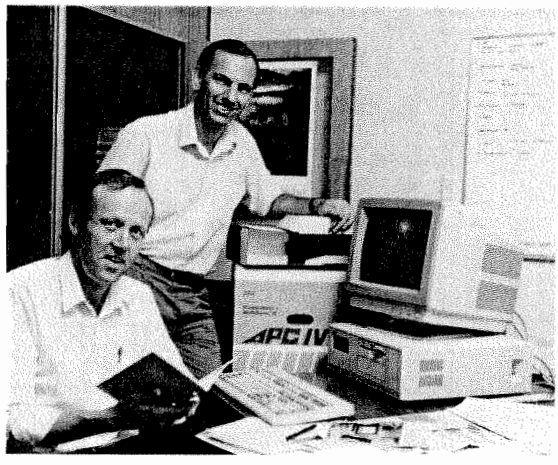
The competition asked for ideas for new systems, or for improvements to existing systems, that would help users do their jobs more effectively and efficiently. A number of high quality ideas were entered in the competition, which was judged by a panel of senior officers with divisional, institute and MIS Branch backgrounds.

The winning idea was for a system that helped simplify the preparation of submissions for external research funds. The system proposed would also ensure that a division's external funding proposals would be consistent.

Apart from the winning entry, four others were highly commended by the judges. These were from:

- **Jill Colefax, Tropical Ecosystems Research Centre, Darwin.** Jill proposed a local system for simplifying and speeding up payment to casual employees.
- **Martin Gilby, Division of Animal Health, Parkville.** Martin's idea was for a salary projection system for use in preparing grant applications.
- **Olivia Lee, Division of Radiophysics, Epping.** Olivia suggested a facility that would automatically start computerised tasks at a set time.
- **Patricia McGee, National Building Technology Centre, North Ryde.** Patricia proposed the inclusion of a 'date for payment' field in the invoice module of TIMS, the divisional accounts-payable system.

Judging by the quality of the entries, the competition was a resounding success and the MIS Branch will be having another look at some of the best ideas with a view to new and better systems in the future.



Above, John Bright (left) and Lloyd Townley, Division of Water Resources, Perth, unpack the computer they won in the Great Systems Ideas competition thought up by MIS branch in Canberra.

Industrial Participation Plan is launched — but will it float?

Readers will remember last month's four-page insert in CoResearch *on the upcoming Industrial Participation Plan. Well, now it's here, but what sort of difference, if any, is it going to make to our working lives?*

The following article was contributed by the Secretariat of the CSIRO Consultative Council. The editor would like to hear from readers what they think of the Plan. Is it a solemn farce, a real breakthrough, a well-intentioned but naive product of wishful thinking, a sop to the workers, the best thing since Glasnost, the same thing as Glasnost, what we ourselves make it, or what? Letters please!

Consultative Council report

The 24th meeting of CSIRO's 10-year-old Consultative Council was held at the Corporate Centre on 31 October and 1 November.

In conjunction with the meeting a function was held on 1 November to launch both the CSIRO Industrial Participation Plan and the Occupational Health and Safety Agreement. The documents have been produced, under the guidance of Council members, to promote greater participation, consultation and communication at all levels of the Organisation.

The strategy of the OHS agreement is to involve all line managers and individual staff members in the identification and prevention of health and safety problems.

The IP Plan and the OHS Agreement were formally launched by Science Minister Barry Jones. Reading a speech written for Neville Wran (who was sick on the day) Mr Jones emphasised management's commitment to the provision and maintenance of the highest standards of workplace democracy, harmony, and health and safety.

Carole Popham, General Secretary of the CSIRO Technical Association, also spoke, affirming the commitment of the staff associations to a joint approach to promoting improved consultation and communication in the Organisation.

Above, Carole Popham shows Barry Jones the new Industrial Participation Plan booklet.

The IP Plan promotes the establishment of divisional consultative committees aimed at providing opportunities for staff to be consulted on, and contribute to, decisions that affect them and their work environment.

The Council members believe these committees should go some of the way towards improving communication and consultation practices, but they also hope CSIRO people in general will adopt a more participative, co-operative approach. If such initiatives are to have any chance of success both staff and management must be willing to work together in pursuit of common goals. And that willingness will depend on mutual trust and openness.

We hope that improved levels of participation will make for better-informed decisions, a greater commitment and sense of ownership of new policies and practices, raised morale and an altogether more satisfying and productive workplace. The Plan is aimed at giving people the chance to contribute their full range of expertise and skills.

The Council will continue to operate as the main forum for consultation between staff associations and management in CSIRO. Among the most important issues we discussed at this last meeting were

- developing a human resources strategy
- improving appeals and grievances processes
- considering employee development and career planning initiatives
- releasing staff for union activities
- reporting on EEO, OHS, and the Personal Counselling Service activities.

Information on all these will be sent out soon, and next month's *CoResearch* will carry an article from us on the new human resources strategy.

Wool Tech Workshop

Above, left to right, Dr Alan Donald, Director of Animal Production and Processing, Dr Peter Saul, Strategic Planning Group Ltd, and Dr Vince Williams, Manager, Planning and Communication, Division of Wool Technology.

Williams

Director of the Institute of Animal Production and Processing, Dr Alan Donald, was among those attending a Strategic Planning Workshop for the Division of Wool Technology.

The 22 division members met at the Bellinzona Country House, Hepburn Springs, Victoria, for the three day workshop in September.

Because of the pilots' dispute, seven memberrs of the Sydney Laboratory and the workshop facilitator, Dr Peter Saul (of Strategic Consulting Group Pty Ltd) drove from Sydney. They were welcomed in Albury on the Sunday evening by a torrential storm which blacked out the city.

The Division Chief, Dr Whiteley, assistant Chiefs, program leaders and some project leaders, with senior divisional and laboratory administrative staff from Geelong, Melbourne and Sydney laboratories, spent three very fruitful days clarifying divisional objectives in research, technology transfer, funding, communication, people management and corporate development.

Calling all hoarders of back copies of* Coresearch. *Jeff Prentice, the new communication manager for the Division of Mathematics and Statistics, is missing some issues from his collection.

Those issues Jeff would like to get hold of are: No. 185 (October 1975), 234 (October 1980), 235 (November 1980) and 295 (September 1986). Anyone who has these copies should forward them to Jeff at Maths and Stats, PO Box 218, Lindfield NSW 2070.

Industry award for COALSCAN

Dr Brian Sowerby, Chief Research Scientist with the Division of Mineral and Process Engineering at Lucas Heights, is the winner of this year's Confederation of Australian Industry's Award for Outstanding Achievement in Energy Research, presented on 6 November.

The award recognises the achievements of Dr Sowerby and his team in improving the efficiency of the coal processing industry in Australia, especially through COALSCAN, an innovative ash-content guage estimated to have been worth $158 million in productivity gains for Australia in the past five years.

Dr Sowerby disliked the fact that the award was given to him alone, and stressed the team nature of the achievement, particularly mentioning Mr John Watt, Deputy Chief of the Division, and Dr Nick Cutmore, one of the scientists involved in the work.

The new Industrial Participation Plan featured at left is only part of a developing human resources plan for CSIRO. The article below, submitted by the General Manager of Human Resources, Mr Arthur Blewitt, offers some background, and foreground, to the issue.

Human resources plan takes shape

Following a request in May from the CSIRO Board that a human resources strategic plan be developed for CSIRO, a working party made up of representatives from Divisions, Institutes, the Human Resources Branch, and the Staff Associations has consulted widely to determine the major human resources issues and develop an appropriate framework for human resources management in CSIRO.

A discussion paper outlining this framework will be submitted to the Board in December and is expected to be widely distributed in the new year. A White Paper will then be prepared by mid 1990.

The working party visited a sample of Divisions to discuss the development of the plan, and gave out questionnaires to get feedback on issues they had found to be of most concern to staff. The results are being analysed now.

The strategic plan is designed to increase CSIRO's productivity by improving workplace planning and staff satisfaction. It will make human resources policies more effective by linking them into the corporate planning and budgeting processes.

A few of the issues that have emerged as most important to staff are

- direction/culture of the Organisation
- career planning
- rewards and salaries
- tenure
- training
- mobility and separation of staff.

These will be given particular attention in the discussion paper coming around early next year. The paper will give all staff a chance to contribute to future human resources activities.

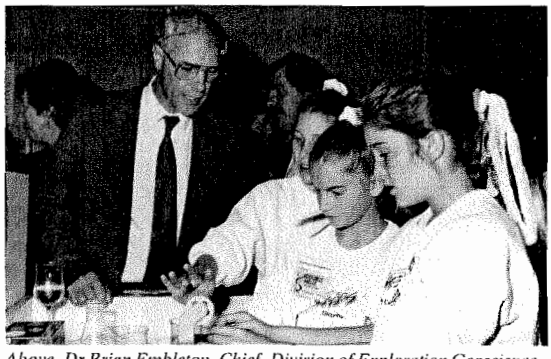
New centre for science-minded school kids

On Sunday 15 October the Western Australian CSIRO Education Centre opened its doors to the public, especially the school-going public.

Unlike the other Science Education Centres — CSIROSECs — scattered around the country as part of CSIRO's Education Programs work, this one has been created inside Perth's large Scitech Discovery Centre to offer an even greater wealth of facilities to its young clients.

The laboratory conducts experiments and interactive demonstrations for upper primary and secondary school students and uses equipment not normally found in school laboratories.

John Dawkins, Minister for Employment, Education and Training, spoke at the opening about the low numbers of top Australian students choosing science as a career. He saw the CSIROSECs as a positive step towards stimulating student awareness of science and its importance to Australia's future growth and economic development.



Above, Dr Brian Embleton, Chief, Division of Exploration Geoscience, with members of CSIRO's Double Helix Science Club for school children, at the opening of the new CSIROSEC in Perth. Club members did much to help make the opening a success.

Dr Brian Embleton, Chief of the Division of Exploration Geoscience, gave a speech in which he praised the Manager of the new CSIROSEC, Robert Namestnik, for the impressive quality of the centre and especially for the remarkable speed with which he had been able to prepare it for the public.

CSIRO research earns Fellowships

Seven CSIRO scientists were made Fellows of the Australian Academy of Technological Sciences and Engineering on Wednesday 4 October at the Albury Convention Centre in Albury, New South Wales, at an evening ceremony following the Academy's Annual General Meeting.

Dr Graham Allison, Chief of the Division of Water Resources — for his major contributions in the field of applied hydrology.

His achievements include the development of methods for determining the source of both surface and sub-surface waters and for evaluating ground water recharge and discharge rates.The new methods have attracted national and international attention and are widely used.

Dr Tom Denmead, Senior Principal Research Scientist at the Centre for Environmental Mechanics — for his international eminence in physical studies of plant ecology.

He has also made contributions of considerable practical importance to the understanding of the transfer of energy, water and gas between plants, soil and the atmosphere.

(Dr Denmead's work was also recognised by a Fellowship of the American Society of Agronomy. See p.8)

Dr Raymond Jones, Acting Chief of the Division of Tropical Soils and Pastures — for major contributions to animal science through his discoveries regarding tropical pastures. He identified a micro-organism in the rumen of Hawaiian goats that enabled Australian stock animals to thrive on nitrogen-rich plants.

His discovery has also brought benefits in South East Asia and Africa.

Dr John Lowke, former Chief Research Scientist at the Division of Applied Physics — for his outstanding contributions to the basic understanding of the behaviour of electrons in gases and the properties of electric arcs.

This work has had practical impact in industry in such areas as circuit breakers, arc lamps and arc welding, and has gained international acclaim.

Dr Dieter Plate, Assistant Chief of the Division of Wool Technology — for distinguished research contributions and outstanding leadership in the field of textile engineering.

Dr Plate has been responsible for major advances in the processing of Australian wool, particularly the 'Sirospun' yarn-spinning system, one of the most important developments in worsted yarn production in the last 40 years.

Dr Reginald Taylor, Senior Principal Research Officer at the Division of Soils — for research contributions of notable practical importance in soil science, the preparation of industrial catalysts, the treatment of industrial wastes, and medical technology.

Dr Brian Tucker, Chief of the Division of Atmospheric Research — for his contributions, through leadership and personal research, to all the main branches of meteorology.

Dr Tucker's leadership in the planning and implementation of the Global Atmospheric Research Program was formally recognised in the election.

Also cited was the uniquely successful role Dr Tucker had played in developing community awareness of the potential implications of the greenhouse effect, and of the need for research on the issue as a national priority.

CSIRO OVERSEAS TRAVEL AWARDS FOR TRADES, TECHNICAL, PROFESSIONAL (NON-RESEARCH) AND ADMINISTRATIVE SERVICES OFFICERS

Applications are now invited for CSIRO Overseas Travel Awards, which provide opportunities for staff to gain training and experience related to their careers.

Since the inception of the Awards in 1977, a number of staff have benefited from overseas study. The Board and Executive Committee place great importance on the provision of opportunities for developing CSIRO staff. These Awards are made available from four broad categories: trades, technical, professional (non-research) and administrative services officer.

Application forms and information for the Award are now available from the CSIRO Employee Development Unit, Phone (062) 48 4174.

Applications must reach CSIRO Employee Development Unit, on or before 5 January 1990.

ENQUIRIES:
Martin Smith: (062) 48 4172

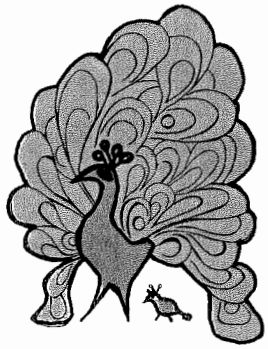
Excellence breeds excellence

When Plant Industry Chief, Dr Jim Peacock, was presented with his Bicentennial BHP Award for the Pursuit of Excellence in February last year, he didn't spend the $40,000 that came with it on drinks for the boys. ... Or did he?

He invested the money in a fund, but the interest on that fund went towards yearly prizes for his staff, to reward *their* pursuit of excellence.

The first Chief's Awards for the Pursuit of Excellence ceremony was held on October at Forestry House in Canberra, each winner being presented with a peacock feather and a cheque for $1,000.

The Award for Excellence in Research went to Dr Jim Haseloff for his work on the development of Gene Shears, the breakthrough in genetic research that has led to the largest commercial venture ever entered into by CSIRO — its partnership with the French company, Limagrain.



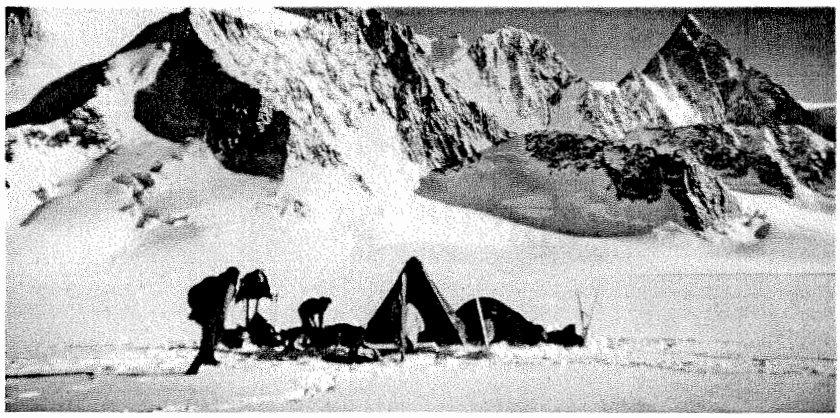
The winner in the Excellence in Technical Support category was Mr Craig Patrick, of the Division's Cotton Research Unit, for the major role he played in developing the Siokra and Sicala cotton varieties that now account for 70 per cent of Australia's cotton crop.

Ms Jen Price won the award for Excellence in Other Support for her part in changing the work atmosphere in the Division's Phytotron to one of real enthusiasm.

Book review

The Loneliest Mountain

By Lincoln Hall. Photographs by Jonathan Chester
Published by Simon & Schuster



The photographs in this new book portray the huge and portentous Antarctic as a serene, inviting wilderness. Read the text and you will learn about the 40 knot winds, the six gloves on each hand, the blizzards...

Together, you get the picture. It comes direct from Australians who love Antarctica enough to sail there in a 21 metre ketch and climb the highest mountain in the Admiralty Range.

Mt Minto is **The Loneliest Mountain.** *On the 4163m summit, the first humans ever to stand there had to cut the icicles from their eyebrows to photograph each other.*

The 11-strong group mainly had adventure in mind. Scientific interest centred on whale sightings by whale expert Peter Gill and rock samples collected by geologist and expedition leader Greg Mortimer.

They raised finance for the trip by selling the film rights to the Nine Network and the magazine rights to **Australian Geographic,** *and with donations from Sigma Data and private benefactor Alan Thistlethwaite.*

The book recounts the expedition in diary form. This allows the reader to share the human experience of the excitement and privations of the unique environment on the bottom of the globe.

Lincoln Hall's first book was **White Limbo,** *the story of the first Australian ascent of Mt Everest. Author Thomas Kenneally has described Hall's latest effort as 'one of the best and most engrossing accounts ever written about travel in Antarctica'.*

Photographer Jonathan Chester has gained a reputation as Australia's foremost expedition photographer. He also is an 'Antarctic addict', off there again this summer.

Their book is informative and entertaining, of interest to Antarctic and adventure buffs, environmentalists and anyone keen to discover more about the world without having to put on a parka.

Simon Grose

To order *The Loneliest Mountain*, send a cheque or money order made payable to Jonathan Chester Photography, or complete the credit card details below, and post to:

LONELIEST MOUNTAIN BOOK OFFER
GPO BOX 3362 SYDNEY NSW 2001

I have enclosed a: ☐ **Cheque** ☐ **Money order**
Please debit: ☐ **Bankcard** ☐ **Visa** ☐ **American Express**

Credit Card Number .....

Expiry Date ..... **Signature** .....

The cost of the book is $34.95, plus $5.00 postage and handling. **quantity** ..... **$**.....
An Antarctic Expedition poster is available for $7.00, plus $3.00 postage and handling. **quantity** ..... **$**.....
TOTAL **$**.....

Please post to:

NAME ..... **ADDRESS** .....

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Australian DNA Bank goes international

The CSIRO DNA Bank for cattle — a unique world facility — has scored its first international 'borrower'.

The bank, part of an ambitious project to develop a genetic map of cattle, is operated by the molecular genetics group of the Division of Tropical Animal Production in Rockhampton.

Project Leader Dr Jay Hetzel said the consignment of cattle DNA to the Texas A&M University was part of an international collaborative effort to develop a primary gene map of cattle.

The gene map will be used to identify genes of prime interest to cattle breeders, such as those controlling meat quality and production, disease and parasite resistance and reproductive performance.

Since cattle, sheep, pigs and goats are biologically very similar 'under the skin', the mapping information will also benefit Australia's other livestock industries.

Dr Hetzel said the A&M University group was looking at particular sets of genes.

"By analysing our material they can quickly find out where the genes are located on the map. In return, users of the bank submit their data to our database," he said.

"This exercise in national and international co-operation promises to yield a detailed gene map within a matter of years."

Dr Hetzel said the bank now had DNA from 124 animals and was the only one of its type in the world. It was made possible through embryo transfer programs and the detailed herd information collected at the National Cattle Breeding Station, Belmont (just outside Rockhampton) and by other industry breeders.

The project has received financial support from the Australian Meat and Live-stock Research and Development Corporation.

Dr Hetzel said about one litre of blood was collected from each animal, out of which 500 million white blood cells were isolated.

"The pieces of DNA are tightly packed in each cell, but if unwound and joined up each animal's DNA would stretch for a million kilometres," he said.

He said despite this seemingly limitless supply of DNA his only real concern was actually running out of DNA.

"It is a big task to set up and maintain a DNA bank but the end result will make it much easier to isolate DNA markers, particularly for traits such as disease resistance and carcase quality, thus providing useful new technologies for animal breeders," he said.

Letters

(Cont. from p.2)

Dear Editor,

M J Jones (*CoResearch* October 1989) is clinging to the old fashioned obstructionist view of work based childcare.

Firstly, work based childcare for CSIRO staff will not cost the individual parent less each week in fees as weekly rates will be roughly the same as other childcare establishments. It will save CSIRO through improved productivity and staff morale, and reductions in absenteeism, staff turnover and tardiness.

These are the compelling economic arguments for work based childcare that have convinced the 4,000 American companies who now provide it (as compared with 105 in 1978).

It is commendable that CSIRO, which competes internationally for its staff, has been quick to notice the demographic and social changes that mean work based childcare must be a priority in the 1990s.

Greg Tanner
Division of Plant Industry

Dear Editor,

It was gratifying to read of Alister K Sharp's enthusiasm for staff development and training (letters to the Editor, *CoResearch*, October). However, he may have conveyed the impression to some readers that advertised courses have been cancelled because of mismanagement of funds. This impression is incorrect. The vast majority of courses listed in the *1989 Directory of Employee Development Programs* have been conducted or will be held by the end of this year.

It is true that requests for specific courses in particular Divisions have exceeded our capacity to fund in the current financial year and several advertised courses were cancelled because of low demand or changed priorities. However, we are committed to an enhanced level of staff development through corporate programs, the activities of Regional Employee Development Committees and programs organised by Institutes and Divisions. An interim Directory of Employee Development Programs for the first half of 1990 will be issued early in the new year and a full program for the 1990–91 financial year will be issued in mid 1990.

Bob Marshall
Employee Development Unit

Dr Solomon wins Ian Wark Medal

On Friday the 13th of October Dr David Solomon, Deputy Director of the Institute of Industrial Technologies, did very well for himself, but it had nothing to do with luck.

A protégé of Sir Ian Wark's, Dr Solomon was presented with the Ian Wark Medal for 1989 in the Ian Wark Laboratories at Clayton on that day. It was given in recognition of his important contributions to Australian prosperity through the advancement of scientific knowledge and its application.

One of Dr Solomon's main contributions marked by the award has been the development of the plastic banknote. The note is more difficult to forge than existing notes and lasts longer. It has gained world interest for Australian science.

Dr Solomon was formerly Chief of Chemicals and Polymers, a CSIRO Division that took off from work started by Sir Ian Wark.

Orientation time?

Japan, with a gross domestic product of $US23,000 per capita last year, is the world's richest country.

Under a new fellowship scheme some of that Japanese GDP is now available to fund research in Japan by overseas scientists.

Three representatives of the Japan Society for the Promotion of Science (JSPS) visited CSIRO Headquarters early in November to encourage CSIRO researchers to take part in the scheme.

Shigeru Torikai, Head of the JSPS Exchange of Persons Division, his assistant Toru Sato, and Takashi Otsuka of their Domestic Programme Division were promoting the JSPS Postdoctoral Fellowship for Foreign Researchers.

JSPS began in 1932 as a private foundation. In 1967 it became a semi-government body and part of the Ministry of Education, Science and Culture. JSPS has always sponsored interchange of scientific personnel — the new scheme was instituted in 1988 to: '...provide selected young foreign researchers with opportunities to pursue collaborative research with Japanese researchers...'

To qualify a candidate must

- **be an Australian citizen**
- **hold a doctorate**
- **be not more than 35 years of age when the fellowship commences**
- **have established research plans with Japanese host researchers.**

Fellowships are awarded for 12 months with provision for an extension of up to a further 12 months. Travel and housing costs, living and family allowances, language training and insurance, are all covered by the fellowship.

Australia is one of 12 countries recognised under the scheme. The Australian Academy of Science is the official nominating authority in this country.

For more information and application details contact Dr Ta-Yan Leong of CSIRO's Centre for International Research Cooperation (062) 48 4444).

Lasers for furnace control

CSIRO scientist helps BHP save millions of dollars and market new instruments

The heat, the dirt and the noise of a blast furnace are a far cry from the rather civilised and gracious surroundings of the Division of Atmospheric Research in Aspendale. Scientist Mr John Bennett took up the challenge to venture into unfamiliar territory for some pioneering laser instrumentation work 'in the field' – and the results have been more than worthwhile. Here he tells his story.

My 18-month secondment to BHP Central Research Laboratories in Newcastle came about through a request from an ex-CSIRO colleague, Dr Chris Scott. Chris is now a Principal Research Officer with BHP.

Chris and I were involved in the development of laser instrumentation at the Division of Atmospheric Research.

My role at BHP CRL has been to design and co-ordinate the development of 'laser time of flight' instrumentation for use on the company's blast furnaces.

Very basically, laser time of flight ranging involves measuring the time taken for a very short laser pulse, typically two to three nanoseconds, to travel to a target and return. Knowing the time of flight of the laser pulse, it is possible to calculate the distance to the target.

During my secondment, I have been closely involved with the development of three laser time of flight ranging systems – OPSTOCK, Burden Surface Profiler and RAIDM.

OPSTOCK and the Burden Surface Profiler have been installed on furnaces at Newcastle and Port Kembla to measure blast furnace burden distribution, burden descent rate and peripheral uniformity.

RAIDM has been installed on blast furnaces at Newcastle, Port Kembla and Whyalla to measure 'raceway depth' and coke particle size distribution.

With no previous knowledge of the steel making industry, I was totally unprepared for what was involved in developing equipment for reliable and economical operation in the blast furnace. The furnaces are huge, with the biggest about 12 storeys high and with an output of over 7,000 tonnes of iron a day.

Temperatures exceeding 800°C are regularly encountered right beside them.

The air is highly contaminated with very fine grained iron ore, sinter and coke particles that pervade everything. Not exactly the pristine environment in which laser projects are developed at Atmospheric Research.

Strict safety conditions must be followed because of the ever present risk of carbon monoxide poisoning or explosions. Before I started at CRL, a tuyere (water cooled nozzle) at the base of one of Port Kembla's furnaces had failed, which resulted in molten metal flowing uncontrolled from the furnace. Electrical wiring to the control room was destroyed and the furnace had to be brought under control manually.

In an iron making blast furnace, iron ore, coke and fluxes which comprise the burden, are charged at the furnace top. At the base, pre-heated air at about 800°C is blown into the burden material at high pressure through tuyeres, to form regions known as 'raceways'.

Here, coke combustion generates hot rising gases which 'reduce' the iron ore in the descending burden. At the centre of the furnace is an area called the 'cohesive zone' where the iron ore is fully 'reduced' and forms molten metal.

The temperature in this region is about 1,200°C.

At regular intervals, a 'tap hole' in the side of the furnace is opened and the molten iron is drained off in rail rolling stock called Tredwells. Each Tredwell holds 200-220 tonnes and the metal remains liquid within them for several hours. During this time, it is transported to the Basic Oxygen Steel (BOS) making plant where it is converted into steel through the addition of oxygen and other elements.

For stable furnace operation, as well as avoiding damage to the furnace refractory wall, the hot gas blast from the tuyeres must be confined to the centre of the furnace and away from the wall.

Theoretically, this can be achieved only by maintaining optimum burden distribution, descent rate and peripheral uniformity within the furnace. Until recently, control of these parameters had not been possible.

The development of OPSTOCK, Burden Surface Profiler and RAIDM has changed this.

During normal furnace operation, the burden position or stockline historically has been measured at one or two fixed locations using a mechanical stock rod (a heavy weight on the end of a length of steel wire).

Consequently, this single point measurement has not been suitable for making fast three dimensional measurements of burden distribution or monitoring peripheral burden uniformity.

This situation has now been addressed using the three instruments mentioned above. Each is based on the concept of a short laser pulse being fired at a target, such as the burden surface. The time between transmission of the pulse and its arrival back at the laser is a measure of the distance to the target.

OPSTOCK is an electronic equivalent of the mechanical stock rod. This rod is very similar in principle to the oil dip stick on a car. A weight at the end of a cable is lowered into the blast furnace (burden surface). The length of the cable, and hence the depth of the burden, is recorded.

A laser pulse is fired at the burden surface and the time for the pulse's return journey is recorded. Knowing the time taken, it is then possible to calculate the distance to the burden surface.

Although still only able to make a single point measurement, OPSTOCK is capable of making faster measurements over a longer range than its mechanical counterpart.

In addition, it is able to make measurements during charging of the furnace, when the mechanical stock rod must be withdrawn.

Used in combination with the latter, it has proved invaluable during periods of mechanical rod failure, and during these times it recovered its development costs.

On two occasions, blast furnace operations were maintained while the mechanical stock rod was repaired. Had it been necessary to shut the furnace down, production losses of over $300,000 would have occurred. Since then, savings in production losses have exceeded $1 million.

The Burden Surface Profiler is an extension of OPSTOCK. While OPSTOCK only makes a single point measurement of the burden surface, the Burden Surface Profiler scans the surface with a pulsed laser to produce a three dimensional picture of the burden distribution.

It also incorporates a radiometer that produces three dimensional burden temperature profiles showing the distribution of hot gas flow and hence burden volume distribution in the furnace.

RAIDM is similar to OPSTOCK, though instead of measuring burden height it measures the depth of penetration of the hot air blast (raceway) from the tuyeres into the burden material.

The laser and its associated control system are located remotely and the laser pulse is transmitted to the tuyere boot cap and received via fibre optics.

RAIDM also measures raceway brightness and includes a CCD camera for visual monitoring of the tuyere and raceway zone, as well as providing near-frozen video images of coke particles circulating in the raceway zone.

The size of the coke particles is indicative of hot gas flow through the burden.

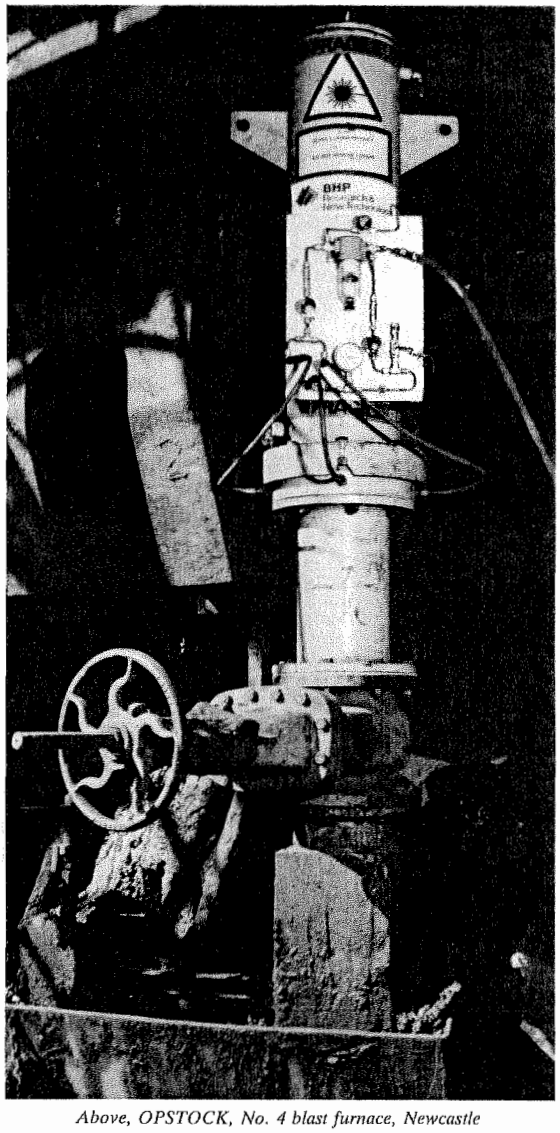
Testing of a single unit RAIDM has been successfully concluded and a multiple laser system is being developed for near simultaneous measurement at four equally spaced tuyeres around a furnace.

These instruments are generating considerable excitement at BHP, not only from the point of view of increased blast furnace performance, but also because of the income they may generate through overseas sales.

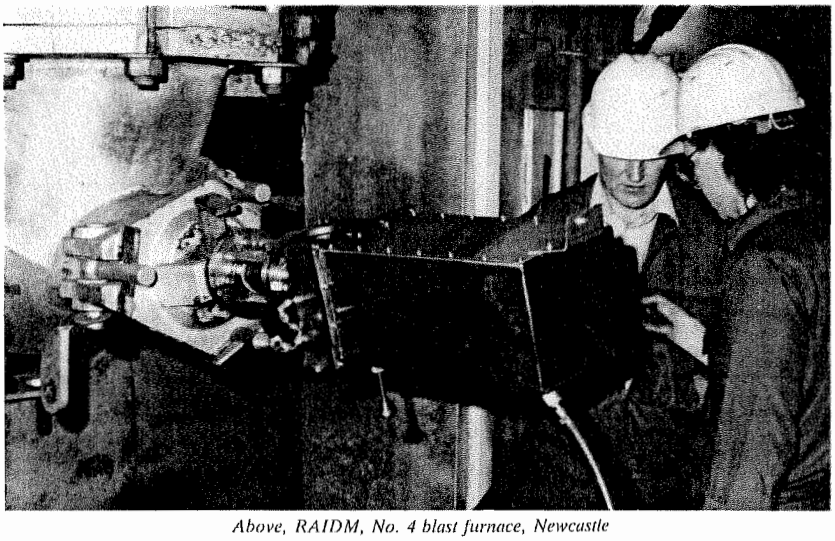
Individual development costs for the instruments were over $300,000.

Another division of BHP, BHP Instruments, will be producing them and at present is actively marketing them overseas.

It has been a great experience to have been involved in the development of instruments that will enable Australia to maintain its lead over the rest of the world in iron making technology.



Above, OPSTOCK, No. 4 blast furnace, Newcastle



Above, RAIDM, No. 4 blast furnace, Newcastle

Obituary Obituary Phillip Garritty Killed in Crash

Young scientist killed in crash

The tragic death of Philip Garritty in a two-car accident near Tenterfield in northern New South Wales on 28 October 1989 prematurely ended a career that had already contributed significantly to the Australian mining industry, and it deprived the Division of Geomechanics of one of its most innovative and promising scientists.

Born in the village of Ackworth in the county of Yorkshire, England, on 16 July 1956, Phil graduated from the University of Newcastle Upon Tyne. His BSc in Civil Engineering was followed by a PhD in Mining Engineering, majoring in rock mechanics.

He was a Research Associate at the University, and then lectured at the Department of Civil Engineering, Sunderland Polytechnic. He then became a Senior Geotechnical Engineer for a consulting firm, and specialised in the study of the stability of clay embankments and in underground coal mining in Brisbane.

From the start it was obvious that Geomechanics had obtained the services of an outstanding and dedicated scientist.

In the tragically short time allocated to him, Phil achieved enviable results, as the scope and diversity of his project work testify. These reflect the breadth of his interest, his drive, and his initiative. He built up facilities and staff, based largely on industry funds.

He developed a system for the surface monitoring of underground mining conditions that increases both the safety of mining workers and the production capability of the mine. This provides routine, real-time data acquisition on the surface, and has created considerable industrial interest, with subsequent installation in collieries.

He initiated the first large-scale use of ultra-light-weight concrete for cavity stabilisation in Australia, and was able to pinpoint reasons for the poor performance of tunnelling machines in Australian situations and to suggest ways of increasing their effectiveness.

He successfully commissioned a new base friction modelling machine and developed techniques for modelling coal mine roofs that can be applied to other uses.

Phil was involved in eight collaborative research projects, and supervised the NERDDC Roof Alert Project. He played an important part in a further successful NERDDC project in Coal Mine Design and was prominent in many CSIRO–University Collaborative Projects.

In addition, he published five papers in international refereed journals, and authored numerous CSIRO publications.

He was a Member of the Chartered Engineers, a Member of the Institute of Mining and Metallurgy, an Associate Member of the Institute of Civil Engineers and the CSIRO representative on a New South Wales Department of Mineral Resources committee on subsidence research.

Phil was an ebullient, self-confident Yorkshireman with a wonderfully wicked sense of humour. In him, boldness and brashness were accompanied by a strong sense of fair play and an absolute dedication to the achievement of objectives.

He successfully blended scientific theory with practical ability, and this enabled him to bring together industry and research requirements in a most effective way.

His drive, initiative and outstanding ability will be sorely missed. To his family and friends we offer our sincere sympathy.

Alan Scott and **Cliff Mallett**
Geomechanics, Brisbane
13 November 1989

Student Research Scheme

The presentation evening for the 1989 CSIRO Student Research Scheme was held in Canberra last month. Fifty local Year 12 students took part in the Scheme, undertaking research projects in a range of fields including environmental mechanics, laser physics, earthquake seismology and blowfly genetics. Donna Hajek, pictured above, undertook a project with Dr Kevin McCue of the Earthquake Seismological Centre, Bureau of Mineral Resources.

A new mountain (of old papers) for Colin to conquer

Mr Colin Smith, CSIRO's archivist since 14 November, 1978, has resigned to take charge of the archive of the Royal Australasian College of Surgeons in Melbourne. He leaves behind him an archive of considerable fame amongst historians. For example...

It is now two years since Professor Boris Schedvin completed the two-kilogram initial volume of what will be the first comprehensive history of the CSIRO — *Shaping Science and Industry: A History of Australia's Council for Scientific and Industrial Research 1926–1949.*

The research took him eleven years.

At the book's launch Professor Schedvin gave much of the credit for making that research possible to Colin Smith.

He said that Mr Smith, virtually singlehandedly and in the face of considerable odds, had established and built up the CSIRO archive, ensuring the preservation of vital and irreplaceable records of science in CSIRO.

Mr Smith doesn't blush at the praise heaped on his archive; in fact he heaps it higher. But he lowers a critical eyebrow at 'singlehandedly'.

Credit for the acknowledged excellence of the CSIRO archive, he says, is shared by 'about 20 people, who cared'.

He wrote a farewell letter to that select little group just before he left, and, though he didn't give their names, he did give permission to print part of the letter itself. Here it is.

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'... With the help of people like yourself, the CSIRO Archive has been able to secure and document — relatively safe, retrievable and available — the greatest single accumulation of twentieth century records of Australian science and technology.

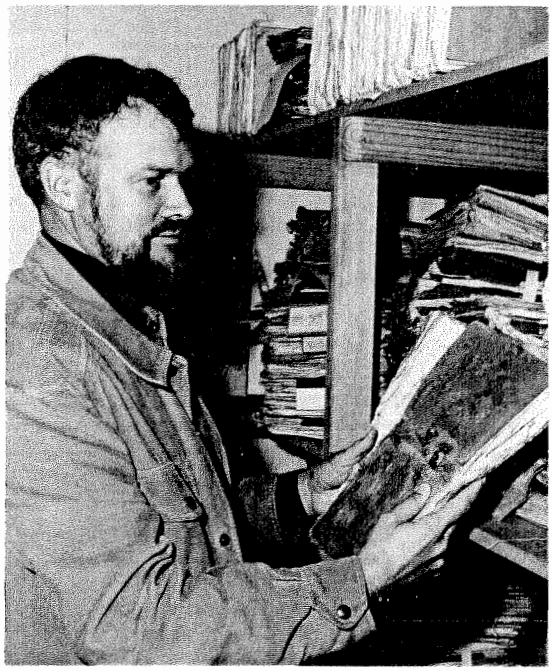
'Had this not been done, many of these records would no longer exist. Because it has been done, we have become a major source of evidence and information for a growing number of researchers in the history of Australian science and technology, and in related fields. The reference service we provide has been widely praised.

'I should also mention that, in two divisions, honorary archivists have been building in-house collections and providing reference service. These people deserve a special thank-you for their efforts, which have reduced the impossible demands on our central service. [The people referred to are Sally Atkinson, of Radiophysics, and John Spink, of Chemicals and Polymers. — Ed.]

'Between us, we have given CSIRO some grounds to claim that it is observing the *Archives Act* in its spirit as well as its letter. Indeed, we have done at least as well as many departments that are deploying, proportionately, far more resources.

'It has been a privilege and an education for me to work with the records of CSIRO. It has, in particular, engendered in me a profound respect for those brilliant, unpretentious, hard-working enthusiasts — the scientists. I hope I have done something to assist the development of a greater awareness of, and interest in, the story of their work.

'It is hard to think of much about modern Australia that does not reflect the impact of the research and creativity of our scientists and technologists. When this fact is fully realised, the holdings of the CSIRO archive will come into their own. They will be widely recognised, at last, as a precious resource of irreplaceable evidence and information about a major facet of Australian life and culture.'



Above, Colin Smith brings order out of chaos at Yarra Bank in 1981.

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Tom Denmead receives international honour

Dr Tom Denmead of the Centre for Environmental Mechanics in Canberra has been honoured by the American Society of Agronomy.

He was installed as a Fellow of the Society at its annual meeting in Las Vegas in October.

Colleagues in the Society make nominations based on professional achievement and meritorious service. Only 0.3 per cent of members of the Society may be elected Fellows.

Dr Denmead is a senior principal research scientist at Environmental Mechanics, where he leads the physical ecology program. He holds degrees from the University of Queensland and Iowa State University.

His research on physical aspects of plant ecology and on the biogeochemistry of ammonia and nitrous oxide has earned him world eminence.

Dr Denmead was an Underwood Fellow of the British Agricultural Research Council, Letcombe Laboratory, in 1984 and has served on several committees of the Australian Academy of Science.

Above, Dr Tom Denmead

Recently he was elected Fellow of the Australian Academy of Technological Sciences and Engineering.

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