



Go Research

CSIRO's staff newspaper

No. 369 February 1997

CSIRO spinoffs crack technology transfer

A study of forty two CSIRO 'spinoff' companies has shown that they have a greater success rate than other new businesses.

Chemical engineer, Chen-Woo Chin and microbiologist Chris McEvoy are part of a growing band of Australian scientists who are quitting their posts at universities and organisations like the CSIRO to chance their arm as entrepreneurs for their own technology.

Chin and McEvoy are working at the cutting edge of science. What sets them apart from their former CSIRO colleagues is they own the research bench they work at; they own the fruits of their ingenuity and labour.

In the case of the two former researchers at the Division of Forestry and Forest Products in Melbourne they have maintained a working relationship with the CSIRO since they started Preschem Pty Ltd, which manufactures timber preservatives.

Both the scientists and the CSIRO have profited and Mr Chin hopes their experience will become a model for others because it has helped them establish a company with an annual turnover of "several million dollars" and earned the CSIRO a large sum in royalties.

A study by Canberra-based technology management consultant, Lyndal Thorburn, (formerly policy and liaison manager at CSIRO's Institute of Information Science and Engineering) has uncovered as many as 60 companies Australia-wide that have

been launched in the past 10 years by frustrated or ambitious scientists.

She has made a detailed study of 42 companies started by former CSIRO scientists as spin-offs from their research programs. Collectively they have an annual turnover of \$110 million a year, employ more than 400 people, are mostly export-driven and have an unusually high survival rate — about 90 per cent — for new businesses.

Ms Thorburn says they form a significant group because most continue to have active R&D programs and have put Australian small business at the forefront of technologies across a range of industries.

In the case of Preschem, Chin and McEvoy had developed a new wood preservative, but final product development was thwarted when the project's funds ran dry.

"We had developed a paste for remedial wood preservation, but our customers (mainly state electricity commissions trying to get more life from their \$1,000 power poles) kept coming back, saying the paste was too difficult to apply.

"There were no resources at the CSIRO to develop the product further, yet we knew it could be done and that the demand was clearly there. So we resigned and started our own company. In the first year we lived off our long-service-leave payouts and marketed a clear timber finish to paint manufacturers to generate

enough cash flow to support our R&D work.

"When the product was ready to be tested we had no money and asked the CSIRO to do the testing in return for a royalty for five years after the product's commercial release. The amount of work they did for us could have earned them \$25,000 if they had just charged us, but they took a risk, as we were doing, and in the end earned \$300,000 from royalties."

The product, which has taken off in Australia and overseas and now has a prized US patent, is called a Polesaver Rod — a solid rod of chemical that looks like a stick of chalk. It is drilled into the base of power poles, house stumps, bridge supports and other timber structures where it dissolves, moves by osmosis through the wood and attacks rot and decay.

A similar product has been developed for external decay, and Chen-Woo Chin says he and Chris McEvoy have no shortage of ideas to maintain their R&D program and their association with CSIRO.

Lyndal Thorburn attributes the success of such science-born companies to the tenacity of people determined to see their technology move into industry. She believes Australia's science



Doing it for themselves. Former CSIRO scientists Chris McEvoy and Chen-Woo Chin outside their company Preschem Pty Ltd. The company has an annual turnover of several million dollars, and has earned CSIRO a large sum in royalties. Photo Mark Fergus

sector could become the birthplace for the next generation of dynamic and global high-tech companies.

"Spinoff companies are an important mechanism for technology transfer to industry which Australia has ignored for far too long," she says. "To achieve success, sometimes you have to

transfer people and their knowledge, along with the technology itself.

"Until now most research agencies and universities have tended to transfer technology to industry through licensing agreements." — Brad Collis

Lyndal Thorburn is keen to locate more spinoff companies. Email jathl@cslink.net.au

CRIMP crushes marine invaders

by Katherine Johnson

Parasitic castrators, endoparasites that feed on the gonads of pest species leaving them infertile, are just one option a group of CSIRO scientists is investigating to control marine pests biologically.

Scientists at the Centre for Research into Introduced Marine Pests (CRIMP), an arm of the CSIRO Division of Marine Research, are conducting groundbreaking research into safe and effective ways of combatting pests in the marine environment, a problem that has plagued Europe and America since international shipping began centuries ago, but has a relatively short history in Australia.

According to CRIMP leader Dr Ron Thresher, foreign species have already invaded virtually every coastal marine ecosystem in the world,

affecting major fisheries and overwhelming local marine life. Many of these invasive marine pests are transported in ballast water, though mariculture and other vectors have also been important historically.

"We are working towards measures that will minimise the number of new introductions. However, we also have to deal with the pests that are already here," says Dr Thresher.

We are fortunate in Australia, because there is widespread public and government support for achieving this goal, he says. This is a reflection of the importance Australians place on the marine environment.

Controlling these marine invaders is a daunting prospect. This is partly because of the complexity of restricting the spread of marine pests in a fluid environment where currents



The Northern Pacific Seastar, *Asterias amurensis*, is one marine invader CRIMP is working to control. It arrived in Australia in the 1980s, probably introduced in ship's ballast water. The specimens pictured were collected by volunteers from the Derwent Estuary in Tasmania.

can transport larvae long distances in a short amount of time.

Nevertheless the cost of not controlling the pests could be immense, as evidenced overseas with the demise of major fisheries collectively worth many millions of dollars, and large distortions in marine ecosystems that are directly attributable to the effects of introduced species.

"One of the most promising ways of controlling marine pests is biological control," says Dr Thresher. "On land, biological control has been practised for centuries and CSIRO has considerable depth and expertise in developing and applying these technologies. A large part of CRIMP's role will be

to adapt these approaches to the marine environment, something which has never been done before."

The work with parasitic castrators involves studies on parasites in Japan, Europe and North America looking into the life cycles of several such castrators, and assessing the extent of their host specificity.

Katherine Johnson is a Science Journalist at CSIRO Marine Research.

IN THIS ISSUE

National Science Briefings	2
Minerals examined	3
CSIRO's new Chairman, Mr Charles Allen, AO	4
Merger movements	6
Research roundup	7
Caption competition	8
CSIRO around the nation	8

Marine sector model for national awareness

The first of a series of CSIRO national awareness strategies is underway, with the marine sector providing the model.

Developed by Division of Fisheries Communication Manager Keith Bashford, and National Awareness Program Director, Julian Cribb, the strategy brings together a wide range of media, social and political techniques to maximise the benefits for CSIRO and the Marine Sector.

"Every sector has its unique characteristics which provide both problems and opportunities. In the marine sector, the problem is that the public and their politicians have tended to overlook the oceans," says Sector Coordinator Dr Chris Fandry.

"Only 6% of Australia's research budget is spent on the marine sector, despite Australia having one of the largest ocean territories of any country.

"Our task is to raise the awareness of Australia's Ocean Territories and the need to use science as the basis for its sustainable development."

The Marine Plan involves a series of campaigns under headings such as utilising the media, developing the national debate, involving and influencing politicians, publications, displays, Year of the Ocean, and national marine summit.

"We are seeking to influence the community and the politicians by involving other influential parts of the community such as arts and literature. For example the Hobart Marine

Laboratories are hosting a major art exhibition on marine themes, which features a painting by William Robinson "Creation Landscape, Earth and Sea."

"This painting has recently received massive press and television coverage as the most expensive painting by a living Australian artist. Fortunately we have been able to negotiate its loan and will reproduce it as a poster to distribute to stakeholders to announce the merger of the two marine divisions into the new Division of Marine Research," said Keith Bashford.

"The Prime Minister, John Howard, has agreed to launch the new Division and as part of the launch, to open the exhibition on February 7. Other aspects of the Program have a 'harder edge', but we have looked for a creative way to achieve our goals."

Julian Cribb said: "The Marine National Awareness program is the first of a series. We hope to develop similar programs for other sectors. Each sector has different requirements, but there are ideas and approaches here which can help show the way. The result for CSIRO will be stronger standing with the Government, industry and public, and therefore future funding."

Copies of the Marine Sector National Awareness Strategy are available from Keith Bashford (Keith.Bashford@marine.csiro.au) or Julian Cribb (Julian.Cribb@nap.csiro.au). **CSIR**

Australian-made cotton tales

by Lina Melero Nichele

CSIRO Plant Industry's cotton work scooped a winning double when it featured recently in the Woolworths Heritage Poster Series and received an award for its contribution to Australia's export sector.

Started in 1984, and sponsored by Woolworths Limited, the poster series is about Australia and its achievements.

The 1997 poster theme is "What do we make in Australia?" Previous themes have included threatened plants, notable women, Australians of the Year, exploration, flags, banknotes, coinage and endangered species.

This year's poster was sponsored by the Australian Chamber of Manufacturers, Manufacturers' Monthly Magazine, NSW Industry Supply Office Limited and Woolworths Limited.

As part of the Poster Series, the sponsors acknowledge the contribution made to manufacturing in Australia by giving awards in four major areas - high technology, social and environment; export; and employment.

CSIRO received the Export award for its role in sustaining Australia's

billion dollar cotton industry. Ninety four per cent of Australia's cotton is grown from CSIRO-developed varieties suited to Australian growing conditions, and 92% of the crop is exported to Asia each year.

Plant Industry's cotton research team, headed by Dr Gary Fitt, is based in Narrabri, NSW. Dr Chris Mallett, Deputy Chief Executive, accepted the Export award on behalf of the Organisation at the launch of the poster and award ceremony last month.

Since the launch of the 1997 poster series, Woolworths has agreed to print 40,000 posters featuring CSIRO's "billion dollar projects", for distribution to schools throughout Australia.

More information from your Divisional Communication Manager or Rosie Schmedding, CSIRO's National Awareness Program, tel (06) 276 6520, fax (06) 276 6821.

Lina Melero Nichele is Science Communication Manager at CSIRO Plant Industry. **CSIR**



At the Woolworths Heritage Poster launch in January were Group Managing Director, Woolworths, Mr Reg Clairs, CSIRO Plant Industry's, Ms Lina Melero Nichele, CSIRO Deputy Chief Executive, Dr Chris Mallett, Woolworths Board Member and former CSIRO Chairman, Professor Adrienne Clarke, AO and Special Projects Manager, Woolworths, Mr Tom Harvey.

National Science Briefings hit their mark

Australian science can make a big difference to the country's wealth, health and well being.

That's the message sent to parliamentarians, their staff and the media by the CSIRO-initiated National Science Briefings held at Parliament house in Canberra.

Set up by CSIRO's National Awareness Program, and hosted by Science Minister Peter McGauran, the National Science Briefings aim to provide information to help form better public policy.

The Briefings receive backing from some of Australia's most prestigious science bodies including the Australian Academy of Science, Australian Academy of Technological Sciences and Engineering, Australian Research Council, CRC Association, National Health and Medical Research Council, and the Federation of Australian Scientific and Technological Societies.

Five Briefings have been held so far with the first on October 10, 1996.



Minister Peter McGauran spools DNA, assisted by Plant Industry's Fiona McAllister. The Minister was attending a National Science Briefing on gene technology. Photo: Nick Goldie

Each addressed topical issues such as health and the environment, and how science can provide solutions to many problems facing Australians and Australian industry.

The Briefings help drive home the importance of maintaining Australia's research and development abilities, and its participation and influence in the international arena.

National Science Briefings organiser, Wendy Parsons, said the

Briefings give participants hands-on experience of the central role science plays in their lives.

"The five Briefings have looked at Greenhouse and alternative energy solutions, gene mapping, protective food, marine resources, and the possibility of life on other planets," Ms Parsons said.

"Everyone who has come along, and that's well over 300 people, has not only heard experts from CSIRO and other Australian and overseas organisations discuss their research, they've actually been able to taste the food that can help them live longer, to spool DNA, and to see an alternative power source in action."

Ms Parsons said the National Science Briefings will continue in 1997 during Parliamentary sittings. *More information about the National Science Briefings from Wendy Parsons on tel (06) 276 6615, or email wendy.parsons@nap.csiro.au. Wendy is also available to discuss ideas for future Briefings.* **CSIR**

Chairman's Medal to environmental study

by Karen Robinson

The 1996 CSIRO Chairman's Gold Medal for excellence in research went to the largest and most integrated piece of coastal marine research ever carried out in Australia - the Port Phillip Bay Environmental Study (PPBES).

Professor Adrienne Clarke, then Chairman of CSIRO, presented the gold medal, which also carries a cash prize of \$25,000, to PPBES team leader Professor Graham Harris at the annual CSIRO Medals ceremony in Sydney on November 20. Professor Clarke also presented three CSIRO Medals.

Located in Melbourne, Port Phillip Bay is subject to the pressures of an urban environment. The Study aimed to resolve concerns about the release of effluents into the Bay, by determining its environmental status in relation to

nutrients and toxicants, and to provide the basis for its long term management.

The Study was largely funded by Melbourne Water, and involved close cooperation between twenty seven contracting partners including CSIRO Divisions, Victorian Government agencies, and overseas scientific institutions such as the University of California (San Diego).

According to Professor Harris, PPBES a model for future management and understanding of large catchments in Australia and overseas.

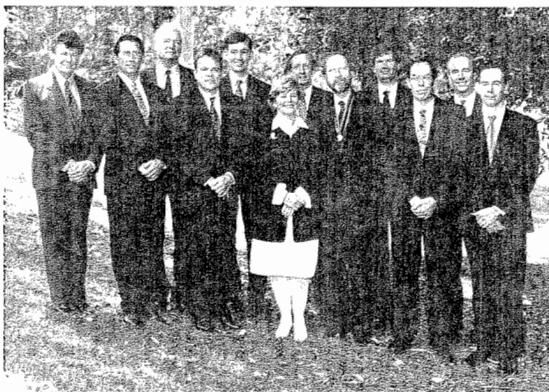
"As a result of the success of PPBES, we have recently signed an agreement with Sydney Water for a similar large scale study of the catchment and the Harbour," said Professor Harris.

The three CSIRO Medals were awarded to scientists working in a variety of fields.

One went to Dr Michael Dallwitz of the Division of Entomology, for his development of the internationally recognised DELTA taxonomic computer programs. Another went to a multi-Divisional team led by Dr Dave Abel from the Division of Mathematical and Information Sciences, for its development of interactive Spatial Information Systems.

The external medal, which is awarded to someone from outside the Organisation, went to Mr Kevin Kennelly and Ms Daphne Choules Edinger, from the WA Department of Conservation and Land Management, and Mr Tim Willing from the Broome Botanical Society, for research leading to the publication of the book "Broome and Beyond: Plants and People of the Dampier Peninsula, Kimberley, WA". **CSIR**

Karen Robinson is Public Affairs Officer with CSIRO Corporate Communication.



Pictured with Professor Adrienne Clarke, then Chairman of CSIRO, is the Port Phillip Bay Environmental Study (PPBES) team, winners of the 1996 Chairman's Gold Medal. From left to right are Dr Graham Harris, Dr Peter Jernakoff, Mr Brian Newell, Dr David Fox, Dr Stephen Walker, Professor Adrienne Clarke, Dr Graeme Batley, Professor Graham Harris, Dr Alexander Murray, Dr John Parslow, Mr Douglas Hall, and Mr Robert Molloy. Photo: Maria Basaglia

From the Editor...

1997 is another year and here is another issue of *CoResearch*... But not quite! You'll notice that it's not the same, in fact there's a lot that's new about it - new colour, new design, new size, new team.

Even now we're thinking about a new name. We don't know the origins of the name, *CoResearch* but if any of our readers do, and can hark back to the first issue published in 1958, we'd like to hear from you.

We'd also be interested to hear your views on a new name. Do you want the name of *CoResearch* changed? If so, what are your suggestions for a new name? Write to *CoResearch*, PO Box 225, Dickson ACT 2602, or email Jane.Kahler@cc.csiro.au.

Having said that it's new, you will notice some old favourites making a comeback.

By popular demand, Letters to the Editor and the Caption Competition are back, and we plan to cover more of our science and what the Organisation is up to around Australia and internationally.

The team here at *CoResearch*, Karen Robinson and I, hope you enjoy the first issue for 1997, and look forward to your input for the next issue in May.

Jane Kahler
Editor

Magnesium vision pays dividends

A decade of research by CSIRO paid off in January when Ford and other corporations announced they would back plans for a demonstration magnesium smelter in Gladstone, Queensland.

Queensland Metals Corporation (QMC) and CSIRO launched a joint research program in 1986 after QMC discovered in Central Queensland a world-class magnesite ore deposit.

This program resulted in the patenting of a new process for extracting pure magnesium from the ore. The process is highly competitive when compared with existing methods of magnesium production.

Dr Julian Land, the Chairman of the CSIRO/QMC Management Committee, praised Dr Malcolm Frost who was seconded from CSIRO to become the Project Manager. "Dr Frost has been a discerning and visionary manager who has represented the interests of all parties very effectively."

CSIRO Deputy Chief Executive, Dr Colin Adam, described the decision to proceed with the demonstration plant as "a vote of confidence in the science that has been done by CSIRO scientists and their colleagues. It is also a tribute to both those who saw the potential for Australia and had the vision to commit resources to the

project, and those who managed the project through its life."

"The outcome of this project highlights for us the importance to Australia of our involvement in significant, long term collaboration with industry partners."

The development of the demonstration plant and the feasibility study is estimated to cost \$73 million and to take two and a half years to complete. It is to be financed by funds from Ford, Normandy Mining Limited, QMC, and CSIRO.

This stage is intended to lead to construction of a commercial smelter in 1999, which will become operational in 2002. The \$700 million smelter will yield 90,000 tonnes of magnesium metal per year. The smelter is expected to earn \$4 billion in the first ten years and have scope to double output to 180,000 tonnes and beyond.

The Minister for Industry, Science and Tourism, Mr John Moore described the present project as "the outcome of farsighted initiatives by both the private sector, through QMC, and the public sector, through the involvement of CSIRO, a CRC and two Queensland Government funded bodies."

"This is certainly not the end of the magnesium story," said Dr Land. "We look forward to the establishment of a major new diecasting facility and the manufacture of components." **CSIR**

CSIRO must plan to avoid crisis

A leading public affairs expert has warned that CSIRO must not lose its high public approval rating.

Mr George Littlewood, Vice President, Public Affairs, for the mining giant CRA, was speaking at a seminar on crisis management at CSIRO Corporate Centre. He used the environmental record of the mining industry as an example of how not to do public affairs.

Public affairs, said Mr Littlewood, is really part of the overall management of an organisation, not something you reach for only when you have a crisis.

Mr Littlewood has had a long association with CSIRO through the Division of Atmospheric Research, and former Institute of Natural Resources and Environment Advisory Committees. He told his audience of Chiefs, Divisional Communicators and other staff, that the best way to handle a crisis is to manage to avoid the crisis in the first place.

"When the crisis occurs, it's almost too late," he said. "There are things to be done so that the recovery can take place. But the important thing is to have in place the structure, the management approaches, and a strategic vision of public affairs which minimise the chance of a crisis; or if the crisis comes, to handle it more effectively."

"In relative terms, you're doing very well at the moment," he said. "But make sure that you never lose the sanction you enjoy because, once it is lost, or diminished, it is far, far harder to build it back."

Deliberately using a marker-place word, Mr Littlewood went on to talk about the "protection of your brand".

"You have one of the most magnificent brands in the nation, and I think it is vitally important to safeguard that. It is important for various reasons... it is integral to long-term public affairs performance and indeed crisis management. The more you are understood, the more you are trusted... those who lose their brand reputation pay dearly."

"The first key thing in the protection of your brand is do not have yourselves tagged with the description 'honest broker'."

"You have to take careful steps to safeguard your reputation for objectivity when you are contributing to public debate as CSIRO scientists, with that label on your hat."

George Littlewood's seminar was organised by CSIRO National Awareness Program in Canberra. Transcripts are available from Wendy Parsons on tel (06) 276 6615, or email wendy.parsons@nap.csiro.au **CSIR**

Minerals puts itself to the test

by Andrea Boothroyd and David Symington

It's one thing to say that your Division is practicing world-class science. It's another to put yourself under the microscope by inviting a team of leading international scientists to review your science activity and achievement.

Yet that is exactly what the Division of Minerals did with its recent science audit, and with very interesting results!

"It is imperative that we take stock of the quality of our science," said Dr Rob La Nauze, Chief of the Division of Minerals. "Both for our own planning and for the information of our customers and our international colleagues."

Dr La Nauze said the audit delivered a positive outcome for the Division. The final report concluded that the Division has a strong science base, and in several areas enjoys a world dominant capability. It also commended the Division's role in higher education, and the establishment of the Senior Scientist position.

"We are very pleased with the audit," Dr La Nauze said. "The Division now has a report with specific recommendations for each of its core science and engineering activities. It also has an independent assessment of the calibre of its publications and staff, and the impact of the Division on collaborative R&D, the professional community and higher education."

Knowing that the audit needed to withstand rigorous examination, Dr La Nauze said the Division followed a precise methodology.

"We identified four areas that reflected the Division's main activities - hydrometallurgy and electro-

chemistry; mineralogy and solid state chemistry; mineral processing, process modeling, instrumentation and control; pyrometallurgy, computational fluid dynamics and electrometallurgy.

"Having identified these areas, we invited an eminent scientist to represent each one, and to join the panel for the audit under the chairmanship of Professor David Boger, from the Department of Chemical Engineering at the University of Melbourne."

On the panel were Professor Rod Guthrie, MacDonald Professor and Director, McGill Metals Processing Centre, McGill University, Quebec, Canada; Professor Tom Healy, Director, Advanced Mineral Products Research Centre, University of Melbourne; Dr John Herbst, J A Herbst & Associates, Utah, USA; and Dr Charles Prewitt, Director, Geophysical Laboratory, Carnegie Institution of Washington, USA.

Dr La Nauze said the Division asked the international audit panel to evaluate the scientific and engineering capabilities and achievements of CSIRO Minerals since January 1990 with respect to world benchmarks.

Dr La Nauze said the documentation was provided well before the visit and the audit panel was on site for four days.

More details on the Division's methodology from Dr Rod Hill, Deputy Chief CSIRO Minerals on tel (03) 9545 8602, email Rod.Hill@minerals.csiro.au

Andrea Boothroyd is Market Communications Manager at CSIRO Minerals. David Symington is Communications Manager with the office of Deputy Chief Executive, Dr Colin Adams. **CSIR**

Tree scientists turn Vietnam's forest loss

by Mick Crowe

Vietnam's forests are coming back after years of war, over-exploitation and shifting cultivation reduced the country's forest cover from 60% in the 1940s, to just 23% today.

Helping Vietnam make big leaps in its forest recovery are three CSIRO scientists, Mr Stephen Midgley, Dr Chris Harwood and Mr Khongsak Pinyopusarerk of the Division of Forestry and Forest Products.

The three were presented with medals by Vietnamese Ambassador to

Australia, Mr Tran Van Tung, on December 11, 1996 for their work with the Protection and Development of Forest in Vietnam.

After the return of peace in Vietnam, the Government established a policy to plant five million hectares of trees on denuded lands by the year 2000, to supply wood for the pulp and paper industries, sawn wood, mine poles and fuelwood, and to provide forests for environmental conservation.

Mr Midgley said the planting programs employ a range of

indigenous and exotic plant taxa, including many Australian tree species of the genera *Acacia*, *Casuarina*, *Eucalyptus* and *Melaleuca*.

"Since 1988 CSIRO Forestry and Forest Products has helped Vietnam towards this difficult but important objective, by providing good quality tree seed for trials and plantations, plus training, and scientific and technical advice. Much of this work has been supported financially by AusAID and ACIAR," said Mr Midgley.

The joint work is already beginning to bring economic and environmental benefits to rural Vietnam and to offer benefits to Australia.

It has resulted in production of improved seed from seed orchards, development of hybrid acacia clones, better protection from diseases, and identification of a range of species and provenances suitable for planting on a broad range of degraded sites. **CSIR**

Mick Crowe is Communication Manager at CSIRO Forestry and Forest Products.

Celebrating their Vietnam honours are (from left to right) Dr Chris Harwood, Mr Khongsak Pinyopusarerk, and Mr Stephen Midgley, with Vietnamese Ambassador to Australia, Mr Tran Van Tung, and Ms Maureen See, another medal recipient and formerly part of the Vietnam Australia Community Forestry Project. Photo Vlad Mosmendor.



Curious about

In November 1996, the Prime Minister announced Mr Charles Allen, AO had been chosen to succeed Professor Adrienne Clarke, AO as the Chairman of CSIRO. But who is Charles Allen and what are his views on CSIRO? CoResearch met with him to find out.

CoResearch: What was your reaction when you were first asked to become Chairman of CSIRO?

Charles Allen: Surprise. I was away in Dubbo at the time and my daughter called me to say a message had come through to ring a certain number in Sydney. I didn't know what it was about, so I rang, and the lady who answered said "The Prime Minister would like to talk to you". Then the Prime Minister invited me to become Chairman of CSIRO.

It had never crossed my mind as something with which I might become involved, but I was excited and flattered by the opportunity of being involved in an organisation and its staff which was so varied and intellectually challenging.

Although CSIRO has done quite a lot of work for Woodside, I had had no personal involvement with that work. Also, I didn't appreciate the Organisation's size and the spread of its science, though I was well aware of its very high reputation. I am still being amazed at the dimensions of CSIRO.

"If CSIRO has a really bright idea and tries to keep it to itself, the idea will be superseded."

CoResearch: What motivated you to accept?

Charles Allen: I suppose there is a tendency, when you retire, to revisit the things that interested you as a youth. This, in an intellectual sense, was what appealed to me. I have had a natural curiosity towards science — particularly natural science — and technology, in some of which I have been able to participate during my working career.

CSIRO is an organisation of curiosity and applied curiosity, curiosity which leads to things which are of general benefit to humanity. It is an Australian mine of knowledge, very important to a country like this.

Most people in the world don't even know where Australia is, let alone what sort of a place it is. They do not appreciate it is a highly sophisticated country and a very competent one. They are amazed if they visit something like the Northwest Shelf Gas Project, which is so vast and of such high quality in all aspects from technical right through to commercial and which you won't find bettered anywhere in the world. The Northwest Shelf project is far from being alone.

It was the fact of telling that story, of making people realise the quality

and the abilities that exist in Australia, that really attracted me to the Prime Minister's offer. I felt it was important in a way similar to the Northwest Shelf Gas Project — one a magnificent, world-quality industrial and commercial investment for the future, the other a world-quality research organisation generating ideas for the future.

The PM called CSIRO an icon, which indeed it is, but an icon has elements of retrospectivity about it. I would see CSIRO as focussed on our future, yet respecting the past.

I think that CSIRO is all about having a belief in the future and our ability, through science and technology, to improve humanity's world, and Australia's in particular.

CoResearch: How have your impressions of CSIRO altered as you have gained familiarity with it?

Charles Allen: I started with an open mind. I've been singularly impressed by the people I've met. Not only are they intellectually outstanding, but they are also ordinary people, without airs and graces, real Australians, with enormous ability, and no side.

The human capital has impressed me, as have the facilities. The capital investment in this organisation — the molecular biology facilities, AAHL, the Clayton site and so on — is enormous. Top-level people working in top-level facilities. I'm not quite sure that many Australians really understand that. CSIRO's National Awareness Program is very important, to help people realise the national investment in CSIRO and what it is capable of achieving for society.

CoResearch: Have you developed a view about the sort of challenges which face CSIRO?

Charles Allen: The Organisation has been through a lot of change in the past few years. It has now put a very sensible structure in place. It has a senior management of the very highest quality. I think that it needs a period of stability and the opportunity to perform and produce without the distraction of fundamental changes.

Just at the moment we need to see that everything that has been put in place can do the job, and I've every confidence it will. There is a tremendous spirit of support for the Organisation and the structure in place.

What I would like to see the Board do is provide a basis of experience to draw from and try to remove some of the burden from other people, such as the Minister — the shareholder — so that he can be quite confident that routine corporate governance is being looked after. In this respect, I would like to see greater

trust placed in the Organisation by more, but sensible, delegation to the Organisation.

The responsibility of a Board is to see that policies are properly in place and monitored on a regular basis, and that the Government isn't suddenly going to find CSIRO acting in an unbusinesslike manner.

I don't see it as my role, or the Board's role, to try to make radical changes, but rather to ensure that value is being achieved. There may have been reasons for such changes in the past, but the Organisation is run by the Chief Executive, Dr Malcolm McIntosh and, from the Board point of view, I am interested in seeing it well run, according to agreed objectives, by the people in it.

CoResearch: Do you see yourself as ever having to defend CSIRO?

Charles Allen: I'm sure there will be times when it will be necessary to defend something which we are doing, or the funding which we need for our activities. Provided we have thought it through and believe in what we are doing, there is little difficulty in such a defence — hopefully a successful one.

Australia is not in the same position as the US or Europe. We are a small country, with a very high living standard, a long way from the markets. We have to create a higher margin on what we do, whether we export things or ideas, if we are to maintain that high standard of living.

Government policy needs to be supportive of major lines of research that encourage this. Otherwise you are doing research for someone else — and I'm not sure we should be spending Australian resources on activities which are only going to benefit other people. If you are going into a major line of research, there needs to be followup to ensure some value is retained here in the form of employment, business activity or export income.

"I don't see it as my role, or the Board's role, to try to make radical changes, but rather to ensure that value is being achieved."

CoResearch: To what extent is technology transfer in Australia hampered by the larger corporations who take their instructions from overseas?

Charles Allen: There is a real difference between the ultimate decision-making of an Australian corporate and an international



CSIRO's new Chairman, Mr Charles Allen, has a natural curiosity about science and technology.

corporate. An Australian corporate makes its planning decisions in Australia. This is where the ultimate accountability rests.

An overseas company makes its decisions elsewhere, and however large the Australian subsidiary, the decision is made against many competing non-Australian demands. Without a reasonable body of major Australian-owned companies whose ultimate corporate decisions are made here, the country loses much of its economic independence.

As a nation becomes economically weaker — and in my view over the last ten years or so this has happened in Australia — your best assets are sold, not your worst. Among our national assets BTR Nylex, Ampolex, TNT, NML and CRA have all become, to a greater or lesser extent, overseas-controlled companies. This must have an impact on our national decision making.

If CSIRO has a really bright idea and tries to keep it to itself, the idea will be superseded. Before you can say "Jack Robinson", someone else will invent something similar and its value will be gone.

You have to move very rapidly towards developing the idea or licensing it worldwide, in order to ensure your technology is the one that stays in the vanguard. If you try to keep it to yourself, you're probably going to end up with nothing.

That's the most difficult commercial game that any company can play — and it is absolutely the game CSIRO has to play. CSIRO has to be able to invent ideas from which Australia can get real benefit.

If you can keep the commercial advantage so that people adopt your technology rather than others', even though your interest will be diluted,

you will still gain a lot of value from the process.

CoResearch: So Australia is basically having to sell the farm?

Charles Allen: We are having to sell good assets because we are not as strong as we should have been.

This is largely the consequence of spending more than we earned over the past 15 years. And we are still doing it.

"I think there is sometimes a danger in getting too close to industry, too bogged down seeking immediate answers."

CoResearch: What role do you see for CSIRO in the effort to reverse this process?

Charles Allen: The world is changing. We have the opportunity to generate new technology by which companies can take advantage of change.

Based on our resources such as agriculture, mining and an educated, skilled workforce, we should be able to generate significant growth through the injection of the fruits of research and technology.

The great companies of the world today are operations like Microsoft, which have grown from natural assets — in that case, mental ability. There are also thousands of smaller companies thriving on the application of science and technology.

Put the right people together and you can generate an extraordinary flowering of ideas.

CoResearch: So the intellectual investment we've made in fields such as agriculture, mining, IT and the environment is akin to the horsepower Gates has assembled at Microsoft?

Charles Allen: Yes. I would see it like that. It provides a seed that can grow business assets to create wealth and employment for this country.

CoResearch: What is your view on the present balance between strategic and applied research in CSIRO?

Charles Allen: Whilst we are clearly closely-linked to industry to apply the results of research, I think there is sometimes a danger in getting too close to industry, too bogged down seeking immediate answers. That's not always our role. We have to have people who can sit and think as well, because that's where the breakthroughs often come from.

In a way CSIRO has a harder job than a public company. Companies are normally highly focussed on what they do, and are looking for incremental return on it. A lot of CSIRO's value comes from commercialising the ideas it has generated — and that is the most difficult thing an organisation can try to do. There is a huge risk, and in business, there is a high failure rate.

Most of the unsolicited comments I've heard on CSIRO have related to the commercialisation of intellectual property. It is a very tricky topic, and there is no simple answer. But, deep down I believe that, given sufficient time, it is possible to have an organisation that can create a significant part of its revenue from the sale of ideas. CSIRO is already doing this very substantially.

To me that is a very big intellectual challenge. I'm not by background a commercial person. I'm a scientist/technologist. But I still find the commercial side very interesting. There is a sort of intellectual pride and independence for CSIRO to generate a significant part of its revenue from the commercialisation of its ideas.

We should not forget, however, that a very large part of what CSIRO does has no direct commercial gain — it focuses on reducing national losses, like bushfire damage, rabbit plagues and so on. There is no income from this, just a lessening of national loss.

"...I'm not sure we should be spending Australian resources on activities which are only going to benefit other people."

CoResearch: How do you view the present state of science education?

Charles Allen: In the UK and Australia, the sciences appear to have fallen behind the other professions in a reward sense. This is reflected in the university entrance cutoff marks. The reward system doesn't seem to attract engineers and scientists as it once did.

But lawyers, commercial people can only work with what they've got. They aren't going to create a different world. Science and technology will create the different world, the added value.

I don't think Britain or Australia appreciate that sufficiently. The cultures are very similar, and you don't change cultural values overnight. A lot of the problems of not being in the vanguard of change stem from that.

CoResearch: How has your own background influenced your views?

Charles Allen: At my school in England, Oundle, there was a huge emphasis on science. Since the 1920s, when most other schools had Classics in their mainstream, Oundle had science. Everybody in the school had to spend one week per term in the workshops — machine shops, foundries — working with their hands no matter what they studied.

I did the usual science, maths, some engineering, physics and chemistry — but having spent two years in the Army for my National Service immediately after school, I could not face these subjects when I went up to Cambridge, so I took geology and invertebrate zoology. After a couple of years I concluded that geologists spent most of their time inventing new words, and I thought I'd better get back to something more disciplined, and returned reluctantly to some physics and maths, which enabled me to go on to study geophysics at Imperial College.

"Science and technology will create the different world, the added value."

I then worked for 10–15 years as an exploration geophysicist and seismologist with Shell International, at a time when that technology was going through a revolution. The geophysical industry went digital in the 1960s and '70s, which was some 20 years ahead of most other industries. It was fascinating to be part of that technological advance.

Ultimately, after spending five years running a major part of Shell's production operation, I was posted here to set up the Northwest Shelf Gas Project. It involved me in business matters I had never seen before, in particular enormous commercial and financial negotiations. It was a privilege to be involved in such a mammoth undertaking.

So I've worked all over the world, in all sorts of companies and ventures, with all sorts of people — but advances in technology have been very much a part of my work. I certainly do not find CSIRO at all alien. Oil exploration in particular is very akin to research in many ways. It's a lot of fun, with plenty of risk.

Though my background is English in that I was born and educated in the UK, my father and his parents actually came from Melbourne. He was a mining engineer and worked most of his life in West Africa but we, as a family, grew up in England as there was a war on and there were no expatriate facilities at that time in West Africa. After travelling the world looking for oil, my wife (who is a Kiwi) and I have settled very happily in the city from which the paternal part of the family came — a strange coincidence. **CSIR**

Adieu Adrienne Retires

After five years as Chairman of CSIRO, Professor Adrienne Clarke, AO is moving on. In a farewell speech at the Windsor Hotel in Melbourne on February 17, 1997, the Minister for Science and Technology, Mr Peter McGauran, paid tribute to Professor Clarke and her contribution to the Organisation.

Professor Adrienne Clarke is unusual for many reasons. Despite our best efforts, women scientists are still rare; women Chairmen are very rare; the combination of woman scientist and leader of a great institution like CSIRO is extremely rare indeed.

But it could so easily have not happened. The evidence for this statement is a scientific paper — on the phagocytosis of glucans — written by a certain young doctor, who one day had an overwhelming wave of doubt.

She was pregnant, and she just didn't see how to combine a career as a mother with a career as a scientist. She got all her scientific papers together and put a match to them. But then she had second thoughts. "This is crazy!" she thought, and put the fire out. Which is why, to this day, her paper on the phagocytosis of glucans has singed edges.

And she went on, of course, to become:

- ♦ one of Australia's leading molecular biologists, the Head of the Plant Cell Biology Centre at Melbourne University's School of Botany;
- ♦ a fellow of the Australian Academy of Science, as well as the Australian Academy of Technological Sciences and Engineering;
- ♦ a member of the Scientific Advisory Board of the Friedrich Miescher Institute in Switzerland;
- ♦ a Director of Alcoa Australia;
- ♦ a Director of Woolworths; and
- ♦ the first scientist to serve as Chairman of the Board of CSIRO.

Professor Clarke says that she came to science because of her childhood on a farm—the family farm near Gisborne — riding horses, observing nature, watching the seasons go by.

But she was 'converted' by a trip to the Barrier Reef, and the experience of a glass-bottomed boat. She had a flash of insight into what we now call biodiversity.

Professor Clarke joined the CSIRO Board when it was established in 1986. When she became the second Chairman of the Board — succeeding Neville Wran in 1991 — the then Opposition spokesperson on Science* put out a press release in which he patronisingly warned the incoming Chairman that it behoved her to moderate her style. She would need, he said, to reassess her economic views.

"Professor Clarke..." he said "...will need to earn the respect of industry and Government to promote the value of scientific and technological research to the national economy."

And it was with great style that Professor Clarke performed her role as Chairman, and agitator for science.

She consistently argued the importance of science as an essential part of a modern civilised society. She addressed young people and teachers, warned them of the dark and dangerous times ahead. She warned of environmental degradation, overpopulation, and pollution. But she always held up the light of science to show the way.

Professor Clarke continually urged the need for Australian R&D, for Australian science, and for co-operative nurturing of Australian science and technology.

She recognised that while ventures are in their early stages, they need to be supported, and always argued that we must be in it for the long haul. We should not sell off ideas for a quick buck, not let good ideas slip away, not let our best people vanish over the horizon.

Professor Clarke presided over science during a volatile period. There was a new public perception of scientists when the

media showed pictures of mobs — very orderly mobs — of scientists in lab coats picketing Parliament House in Canberra. This was to protest plans to dissect CSIRO.

The public also noted — with approval — that when scientists went out on strike, as they did in the Marine Laboratories in Hobart — the strike took the form of an all-night work-in.

"We got lots of good research done!" the scientists said.

That's not to say that CSIRO resisted change. On the contrary, a strategic change in the organisation's internal structure was developed during the Clarke Incumbency.

Professor Clarke's position as Chairman of the Board needed both delicacy and strength, as reaction and progress met. The process is still happening, but the course is clear.

Professor Clarke has spent ten years with CSIRO — five as Chairman. An article in *Nature* in 1995 listed all of Adrienne's responsibilities — ALCOA, CRCs, CSIRO, the Commission on the Constitutional Centenary — and the writer asked:

"How does one person manage all that? She says she has one unchangeable rule: never miss a pre-arranged lab meeting about research. But she saves time by being quickly decisive... (and she) appears to have won the respect of her colleagues everywhere by being right most of the time, and sympathetic to the difficulties decisions always cause."

In another magazine interview, Professor Clarke said that it's important for our young scientists to work in labs overseas and get some post-doctoral experience — but even more important is to get them back again. To get them back again, she said, we have to offer them the opportunity to be part of a winning team. We must nurture not just our scientists, but also our young emerging high-tech companies.

This is what Chairman Clarke has offered CSIRO. She helped it maintain its status as a winning team, and to change as the world changes, to go on being a winning team. As she leaves CSIRO, we wish her well in all her future endeavours; successful research outcomes, the excitement of discovery, the satisfaction of adding something new to the sum of human knowledge — and to see it carried into reality by Australian industry.

And any team which has Professor Clarke as its skipper is likely to be a winning team. **CSIR**

This is the edited text of a speech, given by Science Minister Peter McGauran on February 17, 1997, to mark the retirement of Professor Adrienne Clarke as Chairman of the CSIRO Board.

**Mr Peter McGauran*



Chairman of CSIRO from 1991–1996, Professor Adrienne Clarke, AO helped maintain the Organisation's status as a winning team. Photo Richard de Chazal

Mergers in full swing

'Merger' has been the word on everyone's lips for over a year now — what does it mean? How will it happen? Well, Divisions are hard at it, with some more merged than others. This issue, we hear from six Divisions (that's at least 13 on the old scale) about their merger moves.

Merger to enhance plant-based agribusiness

by Katrina Nitschke and Lina Melero Nichele

The Divisions of Horticulture and Plant Industry will merge from July 1 this year, creating a scientific business unit with an enhanced ability to address opportunities in plant-based agribusiness.

Although the two divisions have traditionally focused their research efforts on different aspects of agribusiness, Horticulture and Plant Industry share many scientific disciplinary skills.

CSIRO Plant Industry works with broadacre field crops, the grazing industry, and native flora, while CSIRO Horticulture supports intensive industries such as viticulture and citrus, as well as developing industries such as native foods and tropical horticulture.

"There will be greater focus on quality science and the ability to form multi-disciplinary teams, which will allow increasingly creative problem-solving approaches," said Dr Elizabeth Heij, Chief of the Division of Horticulture. "I have no doubts that excellence in science will survive, flourish, and increase."

Chief of the new Division will be Dr Jim Peacock, currently Chief of the existing CSIRO Plant Industry.

According to Dr Peacock, the new Division will aim for excellence in strategic and applied research, work towards a high-profile in the scientific and business communities, and strive for high standards in research support.

"Agribusiness in Australia generates \$22 billion worth of primary products and has a \$37 billion turnover in the

food and beverage manufacturing industries," said Dr Peacock.

"The new Division with its increased scientific capabilities will be able to better respond to industry needs, without barriers between relevant research groups and with a strong degree of flexibility."

"It will be a research group with the great advantage to be able to call on a wide range of skilled plant scientists — from molecular biologists and geneticists through to plant physiologists, taxonomists and ecologists."

The new Division remains unnamed, but its headquarters will be in Canberra. Adelaide and Merbein, the present main laboratories of the Division of Horticulture, will remain as key horticultural industry-focused sites. **CSIR**

Pooling resources in CSIRO Land & Water

by Margaret Bryant

Mr Mick Poole, Acting Chief of the recently formed CSIRO Land and Water, sees marvellous opportunities for the Division ahead.

"It is a large, diverse and scientifically powerful Division and the timing is right for it to have a major impact on Australia," he says.

Formed by the amalgamation of the Division of Soils, the Division of Water Resources and the Centre for Environmental Mechanics, CSIRO Land and Water is one of the

Organisation's largest Divisions employing 480 people.

CSIRO Land and Water has organised its research activities into six new strategic research groups: sustainable agriculture; urban and rural water management; sustainable catchment management; environmental processes and resources; tropical soil and water management; groundwater management and site remediation.

Each group takes into account the significant skill base inherited from the three Divisions.

Mr Poole said "the research groups will comprise 40-75 staff, which is small enough to cohere professionally but large enough to undertake significant strategic research activities."

The new arrangements provide a more integrated approach to managing natural resources and the new structure reflects the aims and principles of ecologically sustainable development.

CSIRO Land and Water staff are based in the Australian Capital Territory, New South Wales, Queensland, South Australia and Western Australia. **CSIR**

Marine merger bodes well for ocean environment

by Fran Sugden

The much-heralded rescues of round-the-world yachtsmen plucked from almost certain death in the Southern Ocean generated a rising focus on the extent of marine territory that Australia either has responsibility for, or an interest in understanding.

Too often, the national appreciation of oceans has been restricted to what Australians can see from the shore or can be brought to the surface to consume.

With Australia now responsible for one and a half times as much ocean as land, and the strong signals from Government about the high priority given to marine issues, the timing is perfect for the merger of the Divisions of Fisheries and Oceanography into the Division of Marine Research.

The merging of CSIRO's two Divisions specialising in biological, chemical and physical research in the marine environment creates the largest marine research organisation in the country.

"The new Division will play a leading role in research related to the multiple-use and conservation of Australia's ocean, coastal, and estuarine environments for the sustainable development of marine resources," Acting Chief, Dr Chris Pandry said.



"Research in the new Division will support: sustainable development of wild fisheries, aquaculture and biotechnology; control of marine pests, and marine tourism."

"It will assess the fate and effects of marine contaminants, work to determine the ocean's role in climate, and support maritime operations and offshore engineering."

Through its research, the Division will provide knowledge and advice to Government, and to environment and industry groups. It will also assist in the development of management strategies for the sustainable development of marine resources in Australia's exclusive economic zone.

The new Division has 370 staff and an operating revenue of \$37 million. It operates from three sites, with headquarters in Hobart, Tasmania and laboratories in Brisbane, Queensland and Perth, Western Australia. The Division uses two ocean-going research vessels: the FRV Southern Surveyor and the ORV Franklin. **CSIR**

Can a remarriage work?

by Mick Crowe

The answer is a definite yes in the case of the Divisions of Forestry and Forest Products. Originally merged in 1988 and divorced in 1990, the two Divisions reunited in January 1996 a little ahead of other Divisional mergers in CSIRO.

Bringing the two Divisions together a second time around enabled it to build on some residual benefits of the first amalgamation, according to Division Chief, Dr Glen Kile.

"In its 'divorced' years, scientists continued to nurture and develop collaborative research born during the first marriage."

"In the same period, the two Divisions agreed to begin the very successful quarterly publication Onwood as a means of reaching a range of stakeholders."

The advantage of the merger is obvious, said Dr Kile. "The Division now covers the entire forestry-forest products business system from producing seed to developing the sophisticated and environmentally

friendly forest products that we all depend on."

Dr Kile believes the Division is interacting with a Sector that has a very positive future. Respected analysts predict a world shortage of timber to emerge over the next five to ten years. This, he says, presents the opportunity in Australia to grow more wood while at the same time providing other benefits to the environment and agriculture.

"National forest policy is an active area, and recently Federal and State Governments agreed to a national target of trebling the area of plantations, or farm forests, from one million to three million hectares by 2020," he said. "But there are some challenging issues to be dealt with before such a target can be achieved."

Dr Kile said the merger was a real grassroots effort, and remains philosophical about it, after all Rome wasn't built in a day.

"Cultural and behavioural changes take time, and we see that a merger like this takes more than 12 months to shake down." **CSIR**

Sharper focus on tropics

by Grant McDuling

Exports of northern Australia's agricultural products can expect a boost with the amalgamation of the Divisions of Tropical Animal Production and Tropical Crops and Pastures to form CSIRO Tropical Agriculture.

Already 70% of the agricultural product in northern Australia is exported, as opposed to 12% down south.

The new Division is well placed to contribute to the growing competitiveness of the region, by focusing even more sharply on its clients needs than before.

According to Dr John Taylor, Chief of the new Division, the merger will improve delivery of benefits to Tropical Agriculture's client-base, and redirect more funds into the research effort.

"We will focus on R&D for the beef, sugar, grains and aquaculture industries in northern Australia as well as on intersectoral issues and ecologically sustainable development of the region," Dr Taylor said.

"Our prime focus is on improving product quality, efficiency of production and resource management, but we need to get that blend right because we recognise these are the issues the industries are going to have to confront if they are to remain competitive."

"We have to work with industry and the wider community, and to get the right blend of basic, strategic and applied research to address these medium and long term needs. The challenge is to stay at least one step ahead of industry and community needs and I think CSIRO Tropical Agriculture is well positioned to do that."

CSIRO Tropical Agriculture is based at the Cunningham Laboratory in Brisbane, with research sites at the Long Pocket Laboratories in Brisbane, the Davies Laboratory in Townsville, the J.M.Rendel Laboratory at Rockhampton, the Molecular Animal Genetics Centre at the Gehrmann Laboratories in Brisbane, and the Agricultural Production Systems Research Unit at Toowoomba. **CSIR**

Merger benefits add up

by Carrie Bengston

A challenge for industry and government is to get good information from data. A complete solution to this challenge needs skills in databases, operations research, artificial intelligence and statistics.

These skills are now in one place — the newly merged CSIRO Mathematical and Information Science (CMIS). Before the merger, the individual groups making up the new Division, could each contribute only one or two of these skills.

Formed from COSSA, the former Biometrics Units, the former Division of Mathematics and Statistics and the former Division of Information Technology, CMIS is now in a position where it can provide solutions to larger, broader problems, and this will create new opportunities for strategic research.

Dr Ron Sandland, former Chief of Mathematics and Statistics, is the Division's new Chief, based in Sydney. Dr John O'Callaghan, former Chief of Information Technology is a CSIRO Fellow and has recently taken up the helm as CEO at ACSys, the CRC for Advanced Computational Systems, in Canberra.

"Our primary focus will be the Information Technology & Telecommunications, and Service sectors," said Dr Sandland. "But we envisage continuing strong interactions with other sectors."

CMIS has about 280 staff members located in Sydney, Canberra, Melbourne, Adelaide, Perth, Brisbane, Hobart and Geelong. **CSIR**

CoResearch will keep you up-to-date with the merger process in future issues when we hear from Telecommunications and Industrial Physics, and the Divisions of Materials Science and Technology, and Manufacturing Technology.

Research roundup

CSIRO research in the news, compiled by Nick Goldie

Cracking the ocean's code

CSIRO climate research continues to garner insights into our unique continent, and the effects of our weather.

CSIRO Marine Laboratories in Hobart have developed detailed simulations of the way in which ocean currents, temperature and salinity interact to affect sea-surface temperatures.

Oceanographer Dr Gary Meyers is confident that the team of researchers from Oceanography, Atmospheric Research, and the Bureau of Meteorology are close to cracking the code which links ocean surface temperatures in the tropical Indian Ocean to rainfall over southern and south-eastern Australia.

Meanwhile Dr Kevin Hennessy of Atmospheric Research has completed a study which shows that Australia's summer heat is a significant public health risk, inflicting several hundred deaths a year.

The study was carried out in five capitals – Sydney, Melbourne, Brisbane, Perth, and Adelaide. Climate scenarios for the year 2030 showed a rise in temperature, a rise in humidity, and decrease in cloud cover. A report on summer mortality has been presented to the Federal Department of Health and Human Services.

CSIRO has had long involvement in the history of cloud-seeding. Dr Brian Ryan of Atmospheric Research was recently asked to serve on an international committee which co-ordinates rainfall enhancement programs in the Middle East. "Disputes over water are increasingly being recognised as a trigger for conflict and even war," said Dr Ryan. "Middle Eastern countries trust Australia. This trust, and CSIRO's expertise in cloud-seeding, have led to our invitation to be part of the international committee."

Yachts are also making use of CSIRO expertise: satellite images gave yachts in the Sydney to Hobart race a 'fast track' as they took advantage of southward moving currents and a massive eddy east of Cape Howe.

Abalone accelerator

The fastest abalone in the world – at least in terms of growth. Dr Nigel Preston of the Division of Fisheries and his research team have shown that the tropical Ass's Ear abalone is ideal for aquaculture. With increasing worldwide demand for abalone, Australia is poised to fill a major market niche. The tropical abalone's convenient size and delicate flavour make it extremely attractive in markets such as Taiwan.


Improved diet is reported to be one of the keys to the expansion of oyster and abalone farming.

Gold, gold, gold!

'Black smokers' and sea-bed gold are the romantic ingredients of a research cruise by *ORV Franklin*.

According to the *Franklin's* scientists, there is a surreal landscape more than 1,600 metres below the surface of the Bismarck Sea, off Papua New Guinea. Massive chimneys, reminiscent of the smokestacks of a polluted 19th century city, belch a mineral-laden smoke into the turbid waters, depositing gold, silver and other metals on the sea floor.

According to Dr Ray Binns, of the Division of Exploration and Mining, the discovery of this second area of sea floor hot springs, close to the PACMANUS deposit which was found in 1991, gives scientists a unique 'natural laboratory'.

Ore-forming processes can be studied at a regional scale as they actually happen. This will be highly important for mineral exploration for land-based deposits in similar geological environments. 

Hotwork

The main purpose of (bush) fire-fighting clothing must be to *let* heat out, not *keep* heat out.

Phil Cheney was speaking at the conclusion of a three-year study by CSIRO and Worksafe Australia of firefighters in action in the bush.

"Heavy urban-style uniforms are physiologically and psychologically bad in the bush," said Mr Cheney. "Fire-fighting using hand tools generates about three times more heat than firefighters absorb from the fire. This can lead to dehydration and heatstroke."

"Firefighters must also never be under the dangerous illusion that their clothing can protect them, or save them from entrapment."

Anyone likely to be involved in fire-fighting should obtain a copy of the booklet *Safe and Productive Bushfire Fighting with Hand Tools*, from The Australian Fire Authorities Council, PO Box 713, Mt Waverley, Victoria 3149.

Chariot of fire

High-tech wheels gave wheelchair athlete Brett Macarthur an extra turn of speed for the annual Australia Day ten kilometre race in Sydney. Brett was travelling at close to 50 kilometres per hour when a spectator stepped into his path; the result was a bent wheelchair, and a broken leg for the spectator. Despite this, Brett finished the race well up in the field, and delighted with his carbon-fibre/epoxy wheels.

The wheels are the result of a collaboration between the Division of Chemicals and Polymers, with Monash University and several small specialist companies.

Originally developed for the aerospace industry, much of CSIRO's work on advanced composites can be used for light-weight engine parts, boat design, and parts for competition cars as well as cycle frames – and wheels.


Transgenic triumphs

Australia's first crop of transgenic wheat was harvested in January, at the Ginninderra Experiment Station outside Canberra.

The plants were harvested by hand by Dr Richard Brettell and his assistants, and carefully bundled for transport to the Plant Industry laboratories.

According to Plant Industry Chief, Dr Jim Peacock, there were two trial plots to be harvested. The first was a test of a 'marker' gene, to monitor the field performance of the enhanced wheat varieties. The second was aimed at measuring starch composition and grain quality in plants which were genetically enhanced.

Dr Peacock said that the trials, funded by the Grains Research and Development Corporation and with the cooperation of the CRC for Plant Science, were being run under the guidelines of the Genetic Manipulation Advisory Committee. Commercial varieties, he said, could be expected within a decade.

Meanwhile, the Division of Horticulture has created what may be the world's first gene-modified grapevine. Working with the CRC for Viticulture, CSIRO researchers are investigating genes which control the sweetness, flavour and colour of grapes. 



Working in the field, Dr Richard Brettell from CSIRO Plant Industry, harvests transgenic wheat.

CSIRO secures new mining export market

Australia's position as a world leader in mining technology has been further boosted by the commercialisation of new state-of-the-art software, designed by CSIRO to give a more accurate assessment of minerals.

Science and Technology Minister, Peter McGauran, recently announced the sale of the QEM*SEM technology (Quantitative Evaluation of Minerals using a Scanning Electron Microscope) to mining companies in South Africa, Chile and Australia.

"The export of local mining technology and services is already projected to be \$950 million this financial year, far greater than the combined export value of copper, zinc, nickel and diamonds."


"The sale of QEM*SEM systems is expected to contribute an additional \$3 million over the next three years," Mr McGauran said.

"The technology is already in routine use in Australia and is

delivering enormous benefits to the mining industry, both in terms of cost savings and processing efficiency."

Dr Ivan Adair, CSIRO manager for process mineralogy research said, "the technology is currently utilised routinely throughout the Australian minerals industry. The application of QEM*SEM technology has resulted in large financial returns to mining companies through significant improvements in mineral concentrate grades, coupled with enhanced base and precious metal recoveries."

The QEM*SEM system developed by CSIRO provides an automatic, off-line size-by-size and particle-by-particle mineralogical analysis of metallurgical products. It operates in a user-friendly PC Windows environment.

Applications range from exploration and ore assessment, through flow sheet development to improvement and control of plant operation. 

Bright sparks

Researchers from the Bushfire Research Unit have a new tool in their search for the causes and the behaviour of bushfires.

In a tall demotic style (corrugated iron) building behind Forestry and Forest Products, Yarralumla (ACT) is a new vertical wind-tunnel. In this, the researchers can study the behaviour of flying sparks.

Phil Cheney, Head of the Unit, says that there are a number of questions about these glowing embers.

"Spot fires are known to have started as much as thirty kilometres ahead of a bushfire," says Mr Cheney. "We need far more understanding of how spot fires develop. Once spot fires start, it is difficult and dangerous to control bushfires."

Speaking to the media, Mr Cheney warned that Australians have once again become complacent about bushfires.

It's all in the faeces

Cattle producers need to know the protein content and digestibility of the diet of their grazing cattle. A new technology uses what comes out one end, to determine the quality of what goes in at the other.

"Where plenty of pasture is available, it is the quality of the diet which determines animal productivity," says David Coates of CSIRO's Davies Laboratory in Townsville.

"It's been almost impossible to measure diet quality where cattle are grazing in open country. But by using Faecal NIR (Near Infra-red Reflectance) diet quality can be effectively and cheaply monitored in grazing experiments or on commercial properties," he said.

Nick Goldie is a Journalist with the National Awareness Program in Canberra.

Mailbox

State of the environment

Dear Editor,

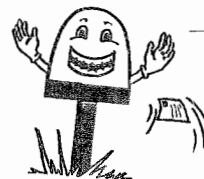
Late last year, the *State of the Environment Australia 1996* was produced. It is a comprehensive compendium of the state of knowledge on the Australian environment. The report has received a great deal of attention in both scientific and popular media. The increased awareness in the community is a great benefit. However, its major contribution is likely to be provision of a central resource for developing strategic management plans for the environment. It gives policy makers access to information on all aspects of the environment which should facilitate holistic approaches to environmental management.

I should like to congratulate the many CSIRO staff involved in the publication. Six of the ten chapters were co-authored and refereed by some thirty CSIRO staff, and CSIRO Publishing produced the final document. For those involved, this undoubtedly required a great deal of effort without the reward being apparent until entire the document was finally compiled.

I would personally like to thank the contributors. I believe that the resource they have collectively produced will be of immense value to the Australian community for many years to come.

Malcolm McIntosh
Chief Executive CSIRO

Send your Letters to the Editor to CoResearch Mailbox, PO Box 225, Dickson ACT 2602, or fax (06) 276 6273. Keep letters to 200 words or less, and note that all may be subject to editing.



CSIRO around the nation

CSIRO supports Smith Family Christmas



CSIRO staff helped load Smith Family Christmas hampers as DFST Chief, Dr Michael Eyles (far right) presented a cheque to Smith Family CEO Bob Turner (centre). Photo Ibrahim Mehmet.

CSIRO donated over \$400 to the Smith Family Christmas hamper campaign last year, as well as some much needed person power.

Division of Food Science and Technology (DFST) Chief Dr Michael Eyles handed over the cheque to Smith Family CEO Bob Turner, at the campaign's headquarters in Sydney on December 15.

With Dr Eyles, were DFST staff Kerry Easton, Tony Evans, John

Christian, Nancy Jensen and some of their family members, all helping to load the hampers onto trucks for delivery in plenty of time for Christmas.

Dr Eyles said the donations were really made possible through DFST's industry partners, who responded positively to an offer the Division made to donate \$2 to the campaign for each response it received to a market research questionnaire.

Contact the office receptionist on tel (03) 9662 7411 fax (03) 9662 7444 for full details including catering and parking facilities.

Well, well, well...

Dr Chee Tan, Project Leader with CSIRO's Division of Petroleum Resources, received \$10,200 for collaboration with US scientists on development of state-of-the-art technology in the design of optimal drilling fluids for efficient management of shale instability in petroleum wells.

Meeting in Melbourne?

CSIRO's offices in Collins Street, the heart of the city, are a great place to meet especially for interstate visitors, and industry people whose offices are in central Melbourne.

Spaces available for meetings include a Board Room that seats 20, and a Seminar Room for a cosy meeting of eight people. The Board Room comes equipped with video and projection equipment, and has a small sitting room and kitchen next to it.

CSIRO wins marketing excellence award

CSIRO walked away with a 1996 NSW Award for Marketing Excellence at the annual Australian Marketing Institute (AMI) awards in December for its campaign promoting the Food into Asia (FIA) Program.

The FIA program is a CSIRO Agribusiness initiative that aims to enhance Australia's exports to Asian markets. The program, which makes available \$6.5 million to match investments by Australian food companies in research with CSIRO, was publicised through a campaign running from October 1995 to May 1996.

Ms Judy Marcure designed and managed the campaign while working in the former Institute of Animal Production and Processing. Ms Marcure is now with the Division of Food Science and Technology as Marketing Manager for the Food Processing Research Sector.

CSIRO's campaign had been short-listed as a finalist in both the Non-profit Marketing and the Export Marketing categories, with the award made in the latter category. The awards recognise outstanding marketing promotional achievements in 16 categories.

During the award presentation, AMI NSW President Dr Ross Cameron said that the AMI awards are important not only for marketing, but also for Australia's export strategy.

"Scientific R&D is perceived by industry to be a high risk activity with



CSIRO Marketing Manager Judy Marcure accepted a 1996 NSW Award for Marketing Excellence from AMI NSW President Ross Cameron for the Food into Asia promotional campaign.

sometimes remote and uncertain pay-offs. When developing marketing campaigns, R&D providers must persuade industry that the benefits will vastly outweigh the risks.

"As a publicly funded organisation, CSIRO must undertake high quality marketing campaigns which reflect its world-class standard of scientific skills with very restricted, highly accountable promotional budgets.

"Judy Marcure, Marketing Manager of the CSIRO Food into Asia campaign, supported by a small Melbourne agency, The Workhouse, developed a highly successful integrated program to promote CSIRO research to help increase the level of Australian food industry exports to Asia."

Ms Marcure acknowledged the FIA team, including Russel Rankin, John Buhot and Annelea Bruce, as well as The Workhouse.

Scientists go with the flow

There's a new club for scientists working in fluid mechanics and heat transfer — the CSIRO Fluids Club.

Club coordinators Martin Welsh, Nick Stokes and John Perry, say it brings together scientists working in fluid mechanics and heat transfer, and builds awareness of resources within CSIRO.

So far, the CSIRO Fluids Club has members from the Divisions of Coal and Energy Technology, Exploration and Mining, Manufacturing Technology, Food Science and Technology, Telecommunications and Industrial Physics, and the former Centre for Environmental Mechanics.

More information from Martin Welsh on (03) 9252 6195.

Cyberspace aces

The Division of Water Resources (now CSIRO Land and Water) won a Gold Award for its Web site from NetGuide, USA. The site was among 100,000 sites examined in NetGuide's Best of the Web program.

NetGuide wrote "Australia's Commonwealth Scientific and Industrial Research Organisation lays out this exceptionally detailed site. It contains information about the Division of Water Resources from electronic publications and research programs, to related environmental Web sites."

The Division's Web site received an overall rating of four out of five points. In individual categories it received four points for content, three for design and four for personality.

Meanwhile, over at the Division of Entomology, Peter Room's Virtual Plants was picked up by the *Weekend Australian's* Syte section, and included in its "guide to the hottest sites on the Web." Next time you're surfing, visit Virtual Plants at <http://www.ctpm.uq.oz.au/Programs/IPI/ipivp.html>

Open daze

The Divisions of Atmospheric Research and Biomolecular Engineering braved the crowds and recently opened their doors to the public.

Paul Holper, Communication Manager at Atmospheric Research, said three thousand people toured the Division's laboratories. The best comment on the day, Paul says, was one he overheard from a lad aged about 10: "Mummy, can we come back next weekend?"

In a three day effort, Biomolecular Engineering's Parkville laboratory officially opened its new buildings, launched a book on the history of the Division, held a science forum where university and industry representatives came to hear about the Division's science, and opened its doors to 650 people at a public Open Day.

Attending the opening ceremony were Science and Technology Minister, Mr Peter McGauran, CSIRO Chief Executive, Dr Malcolm McIntosh, Deputy Chief Executive, Dr Bob Frater, and CSIRO Chairman, Mr Charles Allen, AO.

Dr McIntosh launched the book *The Lemnox Legacy: the history of the CSIRO laboratory at 343 Royal Parade Parkville*, on the same day.

O caption my caption!

Yes, it's back! By popular request we are re-introducing the familiar Caption Competition.

Not only will we publish a selection of the most imaginative/funny/ scientifically inaccurate captions, we will award a magnificent prize of a CSIRO Student Research Scheme coffee mug to the one entry judged the best.

The judging panel, drawn from the hard-working ranks of the CSIRO National Awareness Program — not called NAP for nothing — are of course not eligible to take part in the competition.

Have a go at the photograph below sent by NAP's Nick Goldie, and if you have a weird or wonderful photograph that needs a caption send it in! All entries, and photos, to *CoResearch* Caption Competition, PO Box 225 Dickson ACT 2602, fax (06) 276 6273, or email Jane.Kahler@cc.csiro.au



Star student wins AIP prize

A student working with CSIRO's Australia Telescope has carried off the annual postgraduate award of the Australian Institute of Physics (AIP).

Bryan Gaensler, a PhD student at the University of Sydney, won the award on November 12, 1996, for his presentation on the remains of an exploded star, Supernova 1987A, which he is helping to track using the Australia Telescope.

AIP offers the award each year to encourage excellence in post graduate work. Universities in New South Wales and the Australian National University nominate one student to make a presentation on his or her postgraduate work.

The talks are judged by a panel of three AIP members on their content, scientific quality, clarity and the presentation skills of the speaker. The winner receives a cash prize of \$1,000.

For his thesis, Bryan is studying supernova remnants — the remains

of exploded stars, which often glow brightly at radio wavelengths.

One of them is from Supernova 1987A. This supernova was a star that exploded spectacularly in 1987. It was the best and brightest explosion in 400 years and had the world's astronomers scrambling to watch it before it faded away.

Bryan says the fascinating thing about this supernova is that it is one of the few things in the sky evolving quickly enough for scientists to see it change.

Other supernova remnants, he said, will look much the same in 1,000 years as they do now, but this object is getting brighter each month, and its appearance is changing.

The supernova remnant has been observed about once a month since August 1990 and, working with CSIRO staff, Bryan has now built up a short 'movie' of images showing how it has evolved over the years.

Bike hike

Staff at Clayton's Division of Materials Science and Technology did their bit to reduce air pollution by getting on their bikes and riding to work for Bicycle Victoria's *Ride to Work* day in November. Well, 21 of them did, and that's up 13 on last year. This did not go unnoticed, with the Division winning "The Most Improvement in Numbers Riding to Work" category.

Some of the Division's riders travelled more than 20 kilometres to get to work, but the big winner was Natasha Rockelman, who won a Shogun TB1 mountain bike in the prize draw for first time riders. Well done team!

CoResearch is published by CSIRO's Corporate Communication/National Awareness Program for CSIRO staff and interested outsiders.

Editor: Jane Kahler

Assistant to Editor: Karen Robinson

Design and art production:

design ONE solutions, Canberra

Printed by: Pirie Printers, Canberra

Stories may be reproduced provided acknowledgement is given to both *CoResearch* and CSIRO.

Readers are encouraged to contribute or offer suggestions for articles.

Send contributions to CSIRO Corporate Communication, PO Box 225, Dickson ACT 2602. Tel (06) 276 6589.

Fax (06) 276 6273.

Email Jane.Kahler@cc.csiro.au or

Karen.Robinson@cc.csiro.au

Backpage



CSIRO Research

CSIRO'S STAFF NEWSPAPER

Clay NR 370 May 1997

**CSIRO's
links with
Indonesia
page 3**



**CSIRO
goes
on show
pages 4-5**



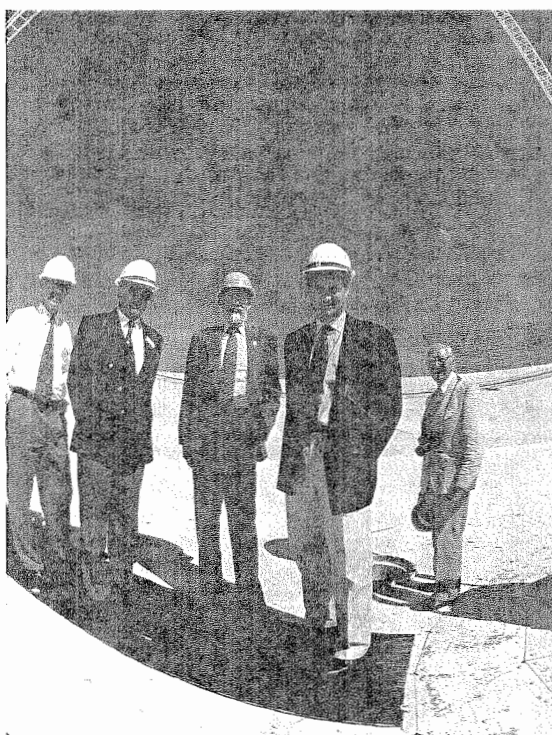
**Business
conference
report
page 6**



**Old
science
saves grain
page 7**



Hunt underway for hidden galaxies



The truth is out there. Riding the Parkes telescope are (from left to right) Connell Wagner's Mr Jeff Schafer, CSIRO Corporate Secretary Dr Ted Cain, Parkes Observatory Director Dr Marcus Price, Minister for Science and Technology, Mr Peter McGauran, and Project Engineer for the building of the Parkes telescope, Mr Harry Minnett, now retired from CSIRO. Photo D James

by Helen Sim*

CSIRO's Parkes telescope embarked on a world-first search for thousands of 'hidden' galaxies when it switched on new equipment that is faster and more powerful than any comparable instrument anywhere in the world.

On March 21, in front of 140 guests, Science Minister Mr Peter McGauran clicked on 13 switches to open the 13 'eyes' of the Parkes multibeam receiver system, which according to astronomer Dr Alan Wright, places CSIRO and Australia 'streets ahead in this game.'

The day had added significance with Mr McGauran and Mr Barry Gear, Deputy President of the Institution of Engineers, Australia, unveiling a National Engineering Landmark plaque.

"With the multibeam receiver system we expect to find thousands of new galaxies whose light is too dim to see," said CSIRO's Dr Lister Staveley-Smith, leader of the multibeam project.

Already the instrument is finding new galaxies hidden behind the stars and dust of the Milky Way.

Only the night before its official launch the instrument struck gold. The observing astronomers, red-eyed from lack of sleep, reported that on a test run they'd found a "good-sized new galaxy" right behind the Milky Way.

The Parkes telescope is a radio telescope, and the new instrument listens for faint radio signals from cool hydrogen gas. This gas is the raw material for making stars, and is found in most galaxies and in separate clouds in space.

Very faint galaxies that have few stars can still be detected from the whine of the hydrogen signal. And unlike light, the radio waves are not blocked by clouds of dust in space.

The hunt for the very faint galaxies is an international project led by CSIRO. Astronomers virtually ignored these galaxies until the mid 1980s because they are so hard to find. Yet they could account for up to half of all the galaxies in the Universe. Finding them is going to help sort out theories of how galaxies form, and tell us how much 'normal' (baryonic) matter there is in the Universe.

The multibeam system developed for hunting down these galaxies is analogous to a wide-angle lens for a camera. Normally the telescope can see only a small piece of sky at a time. The multibeam system lets it see much more — 13 times more.

Being able to see more at once slashes the time the telescope needs to search the whole sky for hidden galaxies — from the better part of a century to only seven or eight years.

The multibeam system was designed and built mainly by staff at CSIRO's Australia Telescope National Facility, which runs the Parkes telescope. CSIRO's Division of Telecommunications and Industrial Physics designed the array of 13 'horns' that are its 'eyes'.

Other institutions collaborating on the project are the University of Melbourne, Mount Stromlo and Siding Spring Observatories, the University of Sydney, the University of Western Sydney, the University of Cardiff, Wales, and the Jodrell Bank Observatory of the University of Manchester, UK.

The National Engineering Landmark plaque commemorates the Parkes telescope as an engineering work of outstanding national importance.

Other works honoured in this way include the Sydney Harbour Bridge and the Snowy Mountains Hydro-electric Scheme.

Designed by British engineering firm Freeman Fox and Partners, who also designed the Sydney Harbour Bridge, and built by German company, MAN (Maschinenfabrik Augsburg Nürnberg) in 1962, the telescope was expected to last 15 years. Thanks to its excellent design and construction, it has been working for more than twice as long.

*Helen Sim is Science Communicator at ATNF

\$19M Discovery centre unveils secrets of 21st century science

Australians will be able to witness scientific advances as they happen with the construction of a new science centre that brings the public into contact with a fully-functioning research laboratory for the first time.

Construction of the \$19 million Discovery complex had a spectacular start on April 16 when 150 guests, including Science Minister Mr Peter McGauran and CSIRO Chairman Mr Charles Allen, witnessed the demolition of a glasshouse, the first of nine old buildings to go to make way for the centre.

Due for completion in 1999, the complex will combine Discovery, a \$5.5million centre with an exhibition hall, café, merchandise outlet, The Green Machine and a

high-tech conference centre, with working CSIRO laboratories.

CSIRO Chief Executive, Dr Malcolm McIntosh says Discovery will increase public awareness of CSIRO and the high level of public support that is so important for maintaining the Organisation's research excellence.

Prime sponsor for Discovery is Optus Communications, with the ACT Government contributing strong support.

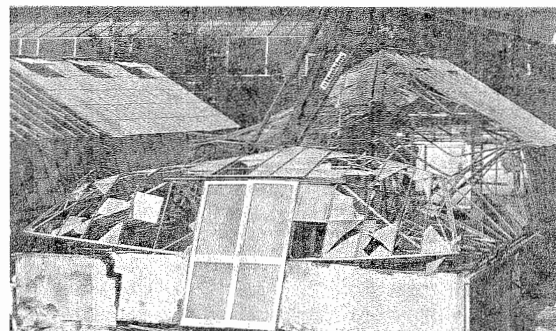
OPTUS CEO, Dr Ziggy Switkowski, said Optus was proud to continue its solid record of support for research and development in Australia through its sponsorship of the centre.

"Optus is pleased not only to offer support in terms of sponsorship,

but also to develop a partnership with CSIRO that will reap rewards in the areas of innovation, research and development. We plan for our staff to work closely with CSIRO's staff, with the aim of developing new technology that will result in far-reaching benefits for Australians," Dr Switkowski said.

"Optus is also proud to announce naming rights to a series of lectures, called the Optus Discovery Series, to be presented by eminent CSIRO and other scientists. These lectures will focus on the innovative achievements of Australian scientists."

ACT Chief Minister, Kate Carnell, said: "Discovery brings together two of Australia's great



CSIRO makes room for the Discovery complex at its Black Mountain site in Canberra. Discovery will be opening in 1999. Photo Plant Industry Visual Resources Unit.

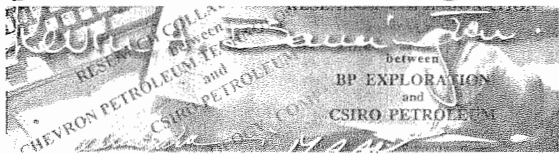
strengths — outstanding scientific research and our growing tourist industry. It will be aimed at visiting school groups, families and industry and government decision makers, as well as the general public."

Phase two of Discovery is underway with CSIRO working to

prepare the first series of exhibits, which will also travel around the country. Exhibits and the exhibition space will be funded by CSIRO's commercial sponsors.

More information from Lina Melero Nichele on tel (06) 246 5077, email lina.nichele@pi.csiro.au

Global networks boost petroleum growth



As the global petroleum industry continues its current trend of downsizing and rationalisation, CSIRO's Division of Petroleum Resources is establishing global collaborations with industry partners as traditional technology providers move out.

"Rationalisations have led to the downsizing of the technology divisions within the major independent petroleum companies at a time when, paradoxically, the introduction and use of new technology is recognised as one of the major trends and mechanisms for improvements in the industry," Petroleum Resources scientist, Dr Tony Addis said.

"Much of the research in the petroleum industry is undertaken and funded by the major operators and service companies, but the downsizing caused a reduction in the

R&D performed by many in-house."

These companies have a significant presence in Australia through their local operating branches, and through substantial holdings in Australian petroleum companies.

Several act as technology providers for local operators. For example, US company Chevron is the technology provider for West Australian Petroleum, while Shell of Holland/UK provides a similar role for Woodside.

But Dr Addis says few R&D capabilities exist in Australian companies in the petroleum sector, so for the Division to contribute to the Australian industries use and development of petroleum technology, it needs to form links with the international companies.

Links have so far been established through collaborative agreements, with two recently signed

by Chevron Petroleum Technology Company and BP Exploration. Further agreements are under discussion with Baroid, a major service company, and Petronas, the Malaysian state petroleum company.

"The petroleum focus in CSIRO is relatively new and in a period of growth," he said. "Establishing a contact network internationally is seen as critical in harnessing technology developed outside Australia for use by Australian companies."

"This international relationship with global R&D centres is critical at a time when local operating companies are organised financially into 'Asset' groups, addressing field-specific issues."

The agreements allow direct contact with the companies for R&D prioritisation in a global and local context, and enable CSIRO to undertake research service work as a preferred provider for specified technologies. The current scope of the agreements focuses on drilling and completion activities.

A final benefit is CSIRO's access to proprietary in-house technology and software. **CSIR**

Fuel cells move closer to market

Australia's efforts to commercialise Solid Oxide Fuel Cell (SOFC) technology have been boosted considerably by the recent successful operation of a 1.5kW SOFC unit, the equivalent of the average power demand by the typical Australian household.

The SOFC technology that Ceramic Fuel Cells Limited (CFCL) is developing, offers a more efficient, less polluting alternative to current power generation technologies.

Chairman of Ceramic Fuel Cells Limited (CFCL) Mr Peter Coates CBE, said the test is a "major step forward for the Company and Solid Oxide Fuel Cell technology."

CFCL Director R&D, Dr Sukhvinder Badwal, explained that the SOFC unit was assembled to demonstrate a number of key technologies including stack component performance, several balance of plant items such as heat exchangers, sealing technology and overall control functions.

All components were produced in-house, with a special grade of stainless steel alloy used as the major construction material.

"The stainless steel provides a much cheaper alternative to the more exotic alloys currently used in SOFC stacks and will substantially lower manufacturing costs," Dr Badwal said.

CFCL's next major step is to build a 3-5kW stack module scheduled for testing later this year, which will form the basis for a 20kW module test next year.

CFCL participants are BHP, CSIRO, Electricity Corporation of New Zealand Ltd, Energy Research and Development Corporation, ETSA Corporation, Pacific Power, Queensland Transmission and Supply Corporation, State Electricity Commission of Victoria, Strategic Industry Research Foundation Ltd, and Western Power Corporation.

CSIRO Deputy Chief Executive, Dr Colin Adam, said that CFCL provides an excellent example of benefits CSIRO can offer to Australian industry.

"It clearly demonstrates the value of CSIRO's strategic research and the capability of CSIRO staff to plan and execute large and complex development projects," Dr Adam said.

According to Dr Adam, CSIRO retains 42% equity in the project as a result of several years R&D within the Division of Materials Science and Technology (DMST). Several DMST staff, including Dr Badwal, are seconded into CFCL.

"The work performed in CSIRO before the incorporation of CFCL in July 1992, has proved instrumental in the Company being able to successfully achieve all major milestones for its initial five year R&D phase ahead of time and under budget," he said.

CFCL is now moving into the technology demonstration phase starting in July 1997, which will position the Company for market entry early next decade. **CSIR**

Scientists brief on wine and the future

The National Science Briefings have so far attracted audiences of over 450, with the most recent highlighting Australia's wine industry and the country's environment versus its economics.

Vintage Success — science and technology for the wine industry and *The Future of Oz* presented MPs and their staff with the latest scientific information on issues that have a considerable impact on Australia's economic and environmental wealth.

In *Vintage Success*, experts from CSIRO and industry delivered the message that Australia's wine industry is having a world-wide influence on wine-making and wine styles, thanks to a major investment in science and technology.

They told parliamentarians that the art of wine-making had been

transformed by good science and technology, setting the industry on track for \$4.5 billion in annual sales by 2025.

Dr Elizabeth Heij, Chief of CSIRO Horticulture, highlighted one of CSIRO's most spectacular recent advances — the production of Australia's first genetically transformed grapevines.

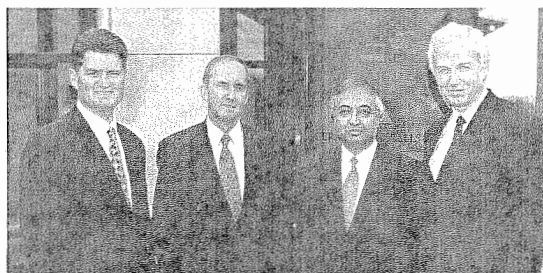
"It is probably impossible to over-estimate how important molecular technologies are going to be in plant production — the potential is staggering," she said.

In *The Future of Oz*, Mr Barney Foran, leader of the Population-Development-Environment Project at CSIRO Wildlife and Ecology, joined forces with Professor Ian Lowe, Griffith University, to discuss the future of Australia.

They discussed the opposing beliefs of economics versus environment, namely that Australia is a huge, sparsely settled country with a boundless potential for development, and Australia's economic potential is already limited by the life support systems in its cities.

Mr Foran and Professor Lowe also argued that water quality, soil productivity and biodiversity loss all present considerable challenges to Australia's organisational and technological prowess.

Mr Foran described how CSIRO's Population-Development-Environment Project aims to provide substantive data on future population size, in response to claims that submissions to a recent parliamentary report on Australia's Population, *Carrying Capacity*, contained little, if any, substantive data or analysis. **CSIR**



Minister for Science and Technology, Mr Peter McGauran (left) visited Ceramic Fuel Cell Limited's site in Victoria recently to see the Company's Solid Oxide Fuel Cell stacks in action. Pictured with Mr McGauran are (from left to right) CSIRO Deputy Chief Executive, Dr Colin Adam, CFCL Director R&D, Dr Sukhvinder Badwal, CFCL Deputy Director R&D, Dr Karl Foger. Photo Mark Fergus.

Looks good, but name stays

Reader's reactions to the February issue were positive overall with most liking the change in design and style, but choosing to keep the name *CoResearch*. Some did favour a name change, but apart from one suggesting *CoreResearch*, are still working on an alternative.

Max Day from Entomology (retired) helped piece together the mystery of the name *CoResearch*. Max has been with the Organisation since 1938, and reports that *CSIRO Research* was the initial choice, but to make it more punchy, the *SIR* was dropped, and *CO* and *Research* made into one word.

Delving even more deeply, Rodney Teakle from Corporate

Records Management and Archives, reports that the word 'Coresearch' appears on numerous telexes and cablegrams from the 1920s onwards. It turns out that 'Coresearch' was the Organisation's telegraphic address, and could be a contraction of CSIRO's former embodiment, CSIR — Council for Scientific and Industrial Research.

The vote for keeping the name *CoResearch* stemmed largely from the feeling that there has been enough change in the Organisation recently. Others want the name to remain because it is a known and understood brand name.

More feedback in *Letters to the Editor* on page 7.

Records management a wild experience

Concerns that records management from a long term grazing study on the pastoral property "Lake Mere" in north-western NSW were poorly coordinated prompted a CSIRO Wildlife and Ecology research program to trial CSIRO's best practice records management.

The National Rangelands Program, based in Canberra and headed by Dr Ken Hodgkinson, also aimed to determine how these practices could best assist research, and to establish a standard method that allowed easy retrieval of records.

Mr David Robinson, Divisional Records Manager, assisted Program staff in developing a records

classification structure based on the processes involved in conducting rangelands research.

He said it became clear early in the pilot that Program staff were in the best position to manage records under their control. The classification structure, he said, allows the Program to use its records as a resource and not a byproduct of its work.

Dr David Freudenberger, Senior Research Scientist with the Program, said the process of records management helped identify what the team had and did not have regarding its large and complex data sets.

"We discovered that some data sets were missing and had to be

retrieved from former staff. Other data sets were poorly documented as to when, where and how they were collected," Dr Freudenberger said.

The rangelands records classification has been merged with the existing administrative structure resulting in a complete records classification system.

"We're now able to record the existence of Program records on specific subjects such as "Lake Mere" and link these across different record types including photographs, maps, correspondence, notebooks, and data sheets," said Dr Hodgkinson. "So we're able to easily establish what records exist, and how to readily achieve them." **CSIR**

CSIRO builds science links with Indonesia



Division of Chemical and Polymers Assistant Chief, Dr Neil Galbraith (left) and Commercial Property Manager, Mr Bryan Loft (centre) get to know their LIPI counterparts while visiting a volcano outside Bandung, Indonesia in March. Photo Julian Cribb

CSIRO has joined hands with Indonesia's national science agency, LIPI, in a major project aimed at building Indonesia's national science management capability.

CSIRO is providing LIPI with advice, assistance and training to develop its contract research capability – including fields such as commercialisation of scientific R&D, financial, staff, information technology, project management and science communication.

The two organisations signed a 5-year, \$7 million contract in March. The contract, which is backed by the World Bank, involves Indonesian and Australian research managers in a two-way process to develop the best ways to plan and manage scientific research through to its ultimate commercialisation by industry.

CSIRO was chosen by the Indonesian Government from a worldwide field of research agencies to help meet a clearly-identified need for strategic science planning. "CSIRO's selection by LIPI reflects an international recognition of our effectiveness as a provider of contract research for industry, government and the community," Chief Executive Dr Malcolm McIntosh said.

"The contract is also important to us in a strategic sense, in that it gives Australia a significant role in helping to determine the long-term directions of international R&D collaboration in the Asia-Pacific region."

To undertake this consultancy, CSIRO has located three senior science managers, led by Dr Trevor Redhead, at LIPI's headquarters in Jakarta, and supported by a large team in Australia. A project analysis workshop held in Jakarta and Bandung during March to define the scope of the task was highly successful.

"The essential first step is for LIPI staff to feel fully involved in the process — and that is happening. There has also been an early involvement with the Indonesian private sector, which will be built upon. There has been a great deal of enthusiasm for the project on all sides, as well as commitment at the highest level in both organisations."

Involved in the workshop were two former Chief Executives of CSIRO, Dr John Stocker, now Australia's Chief Scientist, and Dr Roy Green, now with the International Oceanographic Commission in Paris.

"CSIRO has learned a lot of lessons about managing science and stakeholders, some of them transferable and others not," Dr Stocker said. "For example, LIPI is strong in value adding for Indonesian primary industries and some of the lessons Australia has learned in that area may be directly applicable."

"For the myriad Indonesian business enterprises in other industries, LIPI will have to develop its own culturally-appropriate model."

For its first two years the project will focus on enhancing the ability of LIPI's Research and Development Centre for Applied Chemistry to plan, manage and commercialise its research. In the third year, the focus will broaden to other industrial sectors.

Set up 30 years ago, LIPI is Indonesia's chief science and technology agency, responsible for research in natural and social sciences and engineering.

Researchers from LIPI and CSIRO have collaborated for more than 20 years. This project will consolidate the relationship into a closer, more structured and mutually beneficial one, Dr Redhead said.

Key to the success of the project will be LIPI's ability to develop sound links with the Indonesian private sector.

"The CSIRO team has considerable experience in working with the private sector," Dr Redhead said.

"Our team includes senior people from Australian companies and there will be opportunities for others to be directly involved later in the project."

The project, known as the MSS-LIPI Project, is managed by CSIRO's Environmental Projects Office. Set up in Canberra in 1989, the Office has established good links with both Indonesian Government agencies and the Indonesian private sector. It was through this experience that CSIRO was able to successfully submit the winning bid for this project.

Science push pays off

Increased emphasis on CSIRO's scientific advances and achievements appears to be paying off in improved media coverage.

There were 1,187 newspaper articles that mentioned CSIRO published between November 1, 1996 and February 28, 1997.

Analysis by Ms Rosie Schmiedding of the National Awareness Program indicates that, of these 627 were favourable to CSIRO, 521 were neutral and 39 were unfavourable.

"By favourable, we mean articles that reported a new scientific advance or breakthrough by CSIRO that is likely to reap economic, social or environmental benefits for Australia," she explained.

"We classified as neutral those articles which mentioned CSIRO in passing, in which the tone was neither too strongly positive nor negative. Those that showed CSIRO in a negative light, we classified as unfavourable."

The analysis also indicates that much of the favourable coverage is due to an increased effort across CSIRO to make the public more aware of the significance of the Organisation's work.

Of the 79 media releases issued over the four months, 59 were picked up by the media and resulted in 659 favourable reports: 295 press articles, 307 radio items and 57 TV

reports. These turned a predominantly neutral into a predominantly favourable news balance.

"The emphasis that most Divisions now place on reporting concrete scientific achievement appears to be paying off handsomely," Director of National Awareness, Mr Julian Cribb, observed.

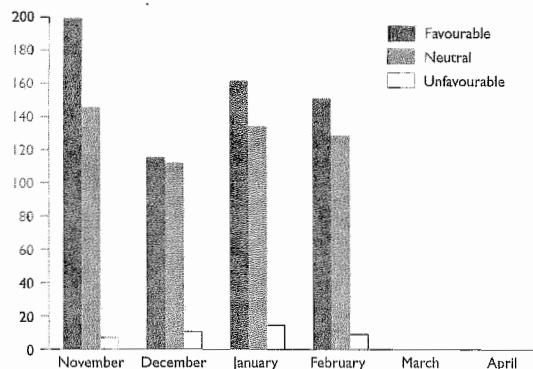
"Sixty-three per cent of our media announcements now deal with scientific advances, as opposed to 20 per cent at the same time last year."

"The number of statements is also up, by 157 per cent on a year ago, and by 57 per cent compared with the average of the previous three years."

"This is due to a magnificent effort by Divisional communicators and marketers, backed by their chiefs and scientists, to put our science back in the headlines."

Mr Cribb said that while it was impossible for an organisation the size and complexity of CSIRO to avoid negative publicity from time to time, the results of the last few months indicated it was entirely feasible to balance it with positive reports of the Organisation's genuine accomplishments.

"I still believe there are 1,000 good stories in CSIRO. We're just getting better at telling those stories," he said.



Total mentions of CSIRO in print media 1996–1997.

Fire research wins award

Fire Research and Engineering spanning ten years and leading to cost savings to industry of millions of dollars have improved public safety and received formal recognition for the Division of Building, Construction and Engineering.

In March this year, the Australian Institute of Refrigeration, Air-conditioning and Heating (AIRAH) awarded its 1996 Excellence Award to the Division for its part in developing a smoke control system for the Brisbane Convention Centre.

The Division shared the award with consulting engineers Norman Disney and Young who provided mechanical engineering expertise for the system.

Mr Hugh Allan, received the award at the AIRAH '97 conference in Hobart on behalf of CSIRO. Mr Allan specialises in smoke modelling,

and says the smoke control system is only one component of the overall fire safety package.

"Smoke modelling must take into account a number of related factors such as the potential for a high fire load in the exhibition halls, the unique geometry of the roofs which form smoke reservoirs and have an influence on smoke movement, and evacuation of a large population through a complex building in the event of a fire," he said.

Chief Larry Little said: "It is rewarding to have the industry demonstrate its support for the services we provide. Since there are no current standards for fire safety engineering in Australia, we are frequently approached to provide a credible, independent service that is based on the years of research we have undertaken in this area."

Modelling air quality in turbulent times

by Paul Holper*

Bill Physick peers out of the window of flight QF 27 as the pilot makes final course adjustments for the landing at Kai Tak airport. The mountains on Hong Kong Island and, from what he can see through the opposite window, those on the Kowloon Peninsula, look perilously close.

This view of ancient volcanic peaks rising from Hong Kong harbour is one that Bill finds familiar. It is the topography of the colony that Bill and Julie Noonan see whenever they fire up the air quality model they are running on the computers at the Division of Atmospheric Research.

The Division, along with the Division of Coal and Energy Technology, is part of an international consortium establishing a sophisticated

air quality modelling system in Hong Kong. The 18-month project will earn CSIRO almost a million dollars.

"We're modelling the main pollution problems. These include fine particles, nitrogen dioxide, ozone and toxics," explains Bill. "Hong Kong also receives sulfate aerosol from industrial activity in other regions."

Bill's colleague Martin Cope is running an air chemistry model to predict pollutant concentrations. Included in the chemistry model are known sources of pollutants throughout Hong Kong. Within the model, sunlight and heat initiate a complex set of chemical reactions. The result, when concentrations get high enough, is photochemical smog.

Modelling air flow in Hong Kong is challenging as the hilly terrain

strongly influences local winds. It is these winds that carry and eventually clear the air of pollution emitted by motor vehicles and industry.

"Hong Kong's complex coastline is also difficult to model," explains Julie Noonan. "There are countless rivers, bays and lakes that affect local wind patterns. Ultimately, we'll be running our air quality model at 500-metre resolution to make it as realistic as possible."

The modelling system will help the government assess the likely impact on air quality of proposed changes to vehicle fuel types and of urban planning. It will also show the likely effectiveness of pollution control options.

*Paul Holper is Communication Manager at the Division of Atmospheric Research.

MANUfest '97

CSIRO AUSTRALIA

CSIRO's manufacturing and related technologies were brought together under one roof at the first ever MANUfest, CSIRO's Expo of Technology, in Melbourne earlier this year.

Designed to bring industry leaders, business people and government representatives into direct contact with CSIRO's scientists, engineers and industry liaison managers, MANUfest challenged Australian industry to embrace innovation and creative change, and to realise the economic benefits that flow from such a commitment.

More than 400 people attended the three day event, which used interactive and static displays to promote CSIRO's ability to create multi-disciplinary teams that meet the needs of Australian manufacturers.

"It's difficult to do justice

to the depth of expertise available within CSIRO across widely different disciplines," said CSIRO's Dr Heather St John, one of the event's organisers. "MANUfest certainly took that message to a new audience, but there are many more success stories still to be told. We want industry to step forward with their own ideas for collaborating with CSIRO."

Organisers say MANUfest is to become an annual event, with seminars, workshops and exhibitions of examples of CSIRO science.

On show this year were up to 60 CSIRO technologies spanning the automotive, food, environmental, telecommunications, chemical, aerospace and healthcare industries.

Some highlights were —

- a revolutionary contact lens that can be left in the eye

for a month at a time — a market which could reach US\$4 billion by 2005;

- new X-ray technology to image soft tissues — a major advance in detecting tumours — as well as faults in composite aircraft components;
- new anti-ballistic armour made from advanced materials;

MANUfest also provided the perfect opportunity to launch the latest issue of *Research Results*. Issue number four has some fascinating case studies that show how close collaboration between industry and CSIRO has resulted in market-driven innovations.

A CSIRO initiative, co-sponsored by Business Victoria, MANUfest was launched by Victorian Science and Industry Minister, Mr Mark Birrell. **END**



On show at MANUfest - Pest control and detection. CSIRO with industry partners is developing biopesticides and engineered viruses for non-chemical control of insects, as well as techniques to clean up pesticide residues from commodities and the waste water of agricultural production and processing operations. Diagnostic kits, such as the LepTon test kit, enable rapid identification of potential insect pests. Photo Mark Fergus



Taking time over CSIRO's multibeam antenna technology at MANUfest are (left to right) CSIRO Deputy Chief Executive, Dr Bob Frater, Federal Science Minister, Mr Peter McGauran, and Victorian Science and Industry Minister, Mr Mark Birrell. CSIRO has been involved in the analysis and design of electromagnetic antennas, passive components and feed systems for wideband and multifrequency applications for over 50 years.

Photo Wombat Productions

CSIRO

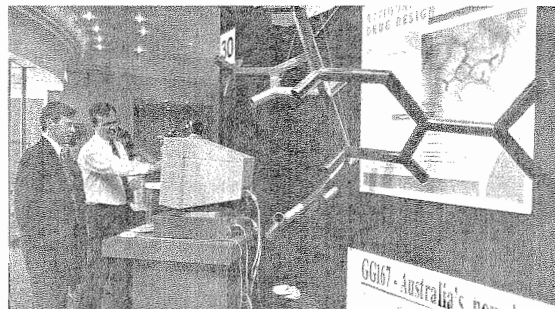
CSIRO is out and about taking its science and science laboratories. Karen Robinson compiled this report this year - MANUfest '97 and the Australian Science



Around 45,000 people over nine days visited CSIRO's stand at the "Amazing World of Science" exhibition



Electric motors based on rare earth 'supermagnets' are quiet, compact and highly efficient. These motors are now used in a number of domestic, commercial and industrial applications including film processing machinery, solar powered pumps, and as 'in-wheel' power units for automobiles. The solar powered car displayed at MANUfest uses supermagnet in-wheel units. CSIRO has worked closely on the development of supermagnet motors with the University of Technology, Sydney and a number of commercial companies. Photo Wombat Productions



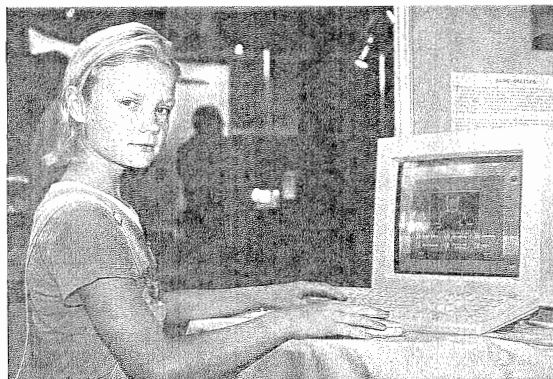
Rational drug design using advanced technologies and supercomputers to work out the structure of molecules involved in diseases such as cancer, diabetes, AIDS and Influenza, may be quicker than biological testing. CSIRO has successfully used the technique in a joint project with the Australian National University and the Victorian College of Pharmacy to develop a drug expected to be effective against all strains of the flu. Photo Mark Fergus at MANUfest.

on show

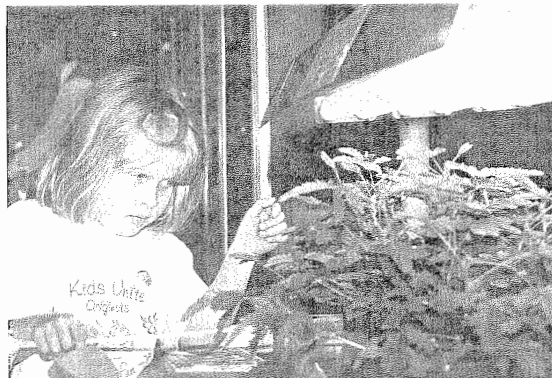
ists to the public or inviting them inside its
n CSIRO's presence at two major events so far
e Festival.



in the National Convention Centre during the Australian Science Festival. Photo Bronwen Healy.



Computer interactives, produced by CSIRO Publishing, let Festival visitors try their hand at environmental management, or learn about the wide world of insects. Photo Bronwen Healy.

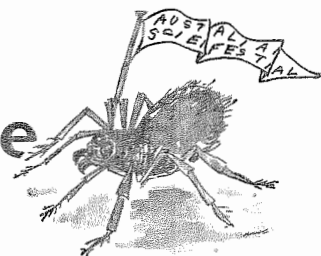


Touch sensitive plants proved a popular Festival exhibit on display from the Green Machine, one of CSIRO's Science Education Centres. Photo Bronwen Healy.



At the science soap launch with (centre) Heartbreak High's Sebastian Goldspink, and UK Chief Scientist Sir Robert May, are CSIRO's own science soap stars (from left to right) David Jacquier, Rowena Martin, Simon Torok, Sita Nerali and Helen Cleugh. Photo CSIRO Land & Water.

Move over Melrose, science soap is here!



Visitors at this year's Australian Science Festival saw the launch of the first ever web-based science soap opera, just one of many CSIRO activities at the Festival.

Held in Canberra in April, the Festival attracted an estimated 200,000 people to its numerous venues around the capital.

Chief UK Scientist Sir Robert May, joined star of ABC's Heartbreak High, Sebastian Goldspink, to launch the science soap *CO₂LAB*.

The web site is battling negative stereotypes of scientists, entertaining audiences with a soapie plot while educating them about science.

Brainchild of CSIRO Land & Water Communicator Dr Simon Torok, *CO₂LAB* takes a humorous

look at the social lives of six scientists, played by young scientists from around CSIRO in Canberra, as they struggle to solve the mystery of the missing carbon sink.

The 12-episode series, funded by the Department of Industry Science & Tourism's Science and Technology Awareness Program, is composed of photos, cartoons and text.

You can find *CO₂LAB* at <http://soap.csiro.au> on the WWW.

An estimated 45,000 people over nine days visited CSIRO's stand at the "Amazing World of Science" exhibition in the National Convention Centre.

The exhibit brought visitors face to face with red back spiders, funnel webs and rather large cockroaches.

Other activities during the Science Festival included an open day at CSIRO Land and Water where visitors were able to bring soil samples to be tested for texture, salinity and pH.

Hundreds of people, mainly school children, visited the Environmental Mechanics Laboratory where they were greeted by an anonymous member of staff dressed in a giant water drop costume, although some visitors used the drip as a punching bag!

Visitors were also able to enter the room housing the large boundary layer wind tunnel and see the effects of turbulence on cricket balls, windbreaks and other models. **CEB**



Spiders and giant cockroaches had eyes agog at CSIRO's stand at the Australian Science Festival. Photo Bronwen Healy.

Conference takes care of business

Restructuring, industry, litigation, external earnings and commercial challenges were just some of the issues broached when CSIRO Business Managers got together at a recent conference that discussed doing business in the 'new' CSIRO.

Doing business within the new sectoral arrangements was one of the key issues addressed at a conference of CSIRO Business Managers held in March.

Presentations by Dr Richard Head, Chief of the Division of Nutrition, and Dr Ron Sandland, Chief of the newly created Division of Mathematical and Information Sciences provided the framework for this discussion.

Dr Head suggested that the reorganisation leading to the Sector/Alliance arrangement had complicated the working life of many CSIRO staff and said "we need to recognise that our commercial groups have collectively maintained a major effort in difficult times and they represent the talent that must be utilised in this change process."

He saw the process of change as evolutionary because of the need to accommodate the heterogeneous nature of CSIRO's business, the ongoing commitments of Divisions and the financial accountability of Divisions.

Dr Sandland proposed that to date, Sector processes have been compliance-focused and that successful sector marketing/commercialisation will be the litmus test of the Sector/Alliance approach.

He called on the conference participants to "develop pictures of where we are and where we should be, define what needs to happen to take us from one to the other, and commit to actions that will allow this to occur."

In response to this call, a group led by Ms Judy Marcure of the Division of Food Science and Technology, has been established to identify the companies within one sector and specify the responsibilities of various staff who would be involved in a sector marketing plan. It is anticipated that this could act as a model for sector marketing plans across the Organisation.

A second but related issue addressed at the conference was strengthening the CSIRO/industry interface.

Two challenging addresses provided the backdrop for group discussion of this topic. These came from Dr Tony Peacock, the Executive Director of the Pig Research and Development Corporation (PRDC), and Mr Tim Landsberg, the Commercial and Marketing Manager of the Division of Materials Science and Technology. Both reported experiences with, and perceptions of, doing business with CSIRO from outside the Organisation.

Dr Peacock suggested that "levies and matching Commonwealth funds are unlikely to increase, but additional research funds are becoming available because Departments of Agriculture are moving to a purchaser-provider scheme, private companies are cutting back on operating research facilities, and venture capital is becoming easier to obtain.



The Minister for Science and Technology, Mr Peter McGauran, addressed the conference on the issue of what the Government expects of CSIRO.

The Minister indicated that the Government saw its own role as setting the context within which business could grow; to set the policies that enable businesses to expand and increase their profitability.

"CSIRO has the task of developing and increasing awareness of the benefits of research and development throughout the business community."

It sees the responsibility of CSIRO not just as providing excellent research and ensuring that research results are translated into the market, but also as being ambassadors for science within industry. Mr McGauran said "CSIRO has the task of developing and increasing awareness of the benefits of research and development throughout the business community."

One way in which this can be done, the Minister suggested, was for CSIRO to be successful in commercialising the results of its research.

He pointed to examples of excellence in commercialising CSIRO research results and indicated that the Government will continue to observe how well this is done in the future.

"This will have a major bearing in determining how well you succeed in your broader task of developing a more science and technology based business community," Mr McGauran said.

"Unless we can capitalise on our excellent science and technology base we will not be in a position to fully exploit the strategic opportunities and challenges that exist in the Asia-Pacific, or in the mature economies."

Both the Chief Executive, Dr Malcolm McIntosh and the Deputy Chief Executive with responsibility for commercial activity, Dr Colin Adam, addressed the conference.

The issue of negotiating ownership of intellectual property was one of the topics about which Dr McIntosh spoke. He remarked that a company's position on ownership of intellectual property (IP) will depend upon a number of factors including the position that the company has in a particular market.

"When intellectual property is not critical to a company's activity in a particular market they may be quite happy for CSIRO to retain all rights to the IP. However the same company may insist on ownership of IP which relates to a market in which they hold a dominant position," Dr McIntosh said.

"The role of the Business Manager is to advise the chief and the scientists about the company's position in a particular market so that its position on intellectual property can be anticipated."

Asked about external earnings, Dr McIntosh thought that CSIRO's current level of external earnings seems to be about right.

"It is important," he said, "that CSIRO does not subsidise, with its appropriation moneys, the work for others that should be done on a full cost recovery basis. The appropriation funds are essential for the Organisation to maintain its intellectual capital."

"This is not saying that CSIRO is engaged in two sorts of science. The selection of research to be funded by appropriation will be influenced by the advice of Sector Advisory Committees and so will often reflect long term market opportunities. However it is not in the Organisation's or the nation's interest to cross-subsidise research which does not develop CSIRO's strategic research base."

On the question of litigation, Dr McIntosh agreed that CSIRO is more vulnerable than some other bodies. "The Organisation should not however be risk averse, but rather should analyse and manage risk. The challenge to Divisional Business Managers is to handle risk management in a professional manner."

When asked about doing business with overseas companies,

Dr McIntosh said that there are reasons, including the nature of the global market place, which make it impossible to say that we should not be working with 'overseas' companies.

"The critical factor to be considered is the benefit to the Australian taxpayer. The Business Manager must ensure that for all of our activity we are able to identify the benefit to the Australian taxpayer in CSIRO participating in the activity."

Dr Adam spoke about a number of commercial challenges facing the Organisation and reported on ways in which many of these were being addressed. He outlined the role of the CSIRO Commercial Committee and the issues it was currently addressing. These included updating and revising of the Commercial Practice Manual (CPM).

A group of those who participated in the conference, under the leadership of Mr Trevor Thacker, are now involved in updating the CPM to reflect the Alliance/Sector structure and preparing a document which is a working summary of the CPM.

Another issue raised by Dr Adam was that of having an Organisation-wide system for sharing business information such as contacts with particular companies. A number of such systems are currently in use in various sections of the Organisation. For example, the Division of Telecommunications and Industrial Physics is using the "e-mail exploder" system to enable staff within the Division to share such information.

A specification for a CSIRO-wide contacts database is to be drawn up by a group led by Mr Mike Kenyon who has been involved in the development of a system used by some CSIRO Industry Liaison Managers.

CSIRO Chairman, Mr Charles Allen, and the Hon John Button spoke at the conference dinner. An evaluation questionnaire indicated a positive response by participants to the conference. The ultimate test of the conference's impact will be in the Organisation's performance in the business area.

Sir Ian McLennan Achievement for Industry Award 1997

Nominations are now being called for the Sir Ian McLennan Achievement for Industry Award. The Award goes to CSIRO scientists and engineers whose achievements have been of benefit to Australian industry.

Winners are given a grant of up to \$15,000 for an overseas study tour related to their achievement. They are also presented with the Sir Ian McLennan Medal at a lunch-time ceremony, which this year will take place in Melbourne.

In these cost-cutting times the Award should be quite a help to those trying to catch up with overseas developments, or to increase even further the returns on their development in this country.

The closing date for nominations is 30 June 1997 and the winner will be announced in November.

More details can be had from Ms Karen Robinson, CSIRO Corporate Communication, PO Box 225, Dickson, ACT 2602; phone 06 276 6108 or email Karen.Robinson@cc.csiro.au or see <http://www.csiro.au/doco/infocirc/simapp01.htm> on the WWW.

Research roundup

CSIRO research in the news, compiled by Nick Goldie

Inland bores a threat

Put in a bore, encourage heavy grazing, and you have created a threat to the biological diversity of native plants, animals and birds.

A study carried out on behalf of Environment Australia monitored 48 inland sites in arid and semi-arid areas of five States.

According to Dr Jill Landsberg of the Division of Wildlife and Ecology, as many as a quarter of species declined drastically near man-made water sources.

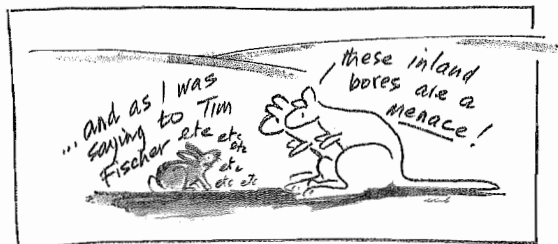
"The study is recommending that most man-made water sources be closed in nature reserves, and some selected ones on pastoral land," said Dr Landsberg.

Trawling for WOCE

Australian and US oceanographers have retrieved a series of underwater instruments from a depth of more than 3,000 metres in sub-Antarctic waters.

This marks the final phase of a seven-year international experiment to reveal how changes in the ocean influence global climate.

The United States oceanographic



vessel *Melville* docked in Hobart in April at the end of a month long voyage.

Deployed as part of the \$1 billion World Ocean Circulation Experiment (WOCE), the instruments have been measuring one of the world's most influential natural elements — the Antarctic Circumpolar Current.

"The deep sea observations provide a 1990s baseline from which we will be able to diagnose greenhouse changes in the ocean," said Dr Steve Rentoul of the Division of Marine Research.

Inflatable genitals

An invention for inflating the genitalia of insects is set to revolutionise insect classification. The CSIRO vesica everter, or

"phalloblaster" as it is affectionately known, has been developed over two years by CSIRO Entomology and LWD Engineering.

"Scientists have known for over 100 years that insect genitalia provide important clues to their classification," said Dr Matthews.

"But the shape of the genitalia is partially lost once the insect is dead. These often extraordinary and beautiful shapes are the key to separating different but closely related species.

"The vesica everter inflates the genitalia with a stream of pressurised absolute alcohol which dehydrates and hardens the genitalia. They then remain inflated like a balloon which never goes down," said Dr Matthews.

One man's meat

The Meat Research Corporation (MRC) has commissioned CSIRO scientists to find ways to improve food safety.

"New pathogens have emerged in the past decade," said Barry Shay, at the Division of Food Science and Technology. "Microbiologists believe that these 'emerging pathogens' might be changing their characteristics by acquiring genetic material from other organisms." Some can cause serious illness and death in humans, he said.

Division Chief Dr Michael Eyles announced three new research contracts with the MRC worth more than half a million dollars.

Green paint

A new generation of tailored resins developed by CSIRO and US chemical giant Du Pont will be the basis of cleaner, greener, more durable paints for the automotive industry.

Dr Ezio Rizzardo of the Division of Chemicals and Polymers says that one of the advantages of the technology is that it does not need new plant and equipment. "All that is needed is the addition of a small amount of a low-cost reagent to the standard polymerisation mixtures," he said.

Grain saved by mixing old science with new

by Brock Cambourne*

Recognising consumer concerns about chemical residues in foods and that heavy reliance on pesticides for grain protection is now incompatible with many markets, led Division of Entomology scientists to take a new look at old science.

Using the latest technologies, researchers at the Division's Stored Grain Research Laboratory (SGRL) have been repackaging and successfully employing old scientific concepts of residue-free grain storage to tackle grain storage problems.

SGRL's 'Smart Aeration' concepts and Programmable Microprocessor Control And Monitoring (PMCAM) system are the result of that work.

Aeration, or cooling grain by forcing ambient air through the bulk, is a powerful and well known tool for preserving stored grain, but its use has declined in the last 20 years.

"This is largely because of the success of chemical protectants and

fumigants for insect control, and the perception that aeration is a difficult and expensive technique that cannot meet industrial 'nil' tolerance standards for insect infestation," said SGRL's Head, Dr Jonathan Banks.

But SGRL researchers have reintroduced aeration to industry with the PMCAM system.

Using a computer and modem the PMCAM system allows remote monitoring of grain storage conditions such as temperature and gas concentrations, and monitoring and control of equipment such as aeration fans.


According to Dr Banks, the success of field trials has increased the acceptance and application of aeration to safely store other commodities with around 40 PMCAM trial units now used to monitor and store canola, rice, chick peas, barley and other cereal crops across the country.

Dr Banks said the applications of the system are being extended to

monitor the fumigation of grain bulks and electronic insect detection.

"Smart Aeration" combines aeration with other grain protection strategies, and better management of aeration. "The 'Smart Aeration' project has been successful with full scale industrial trials demonstrating that strategically applied aeration plus a 'minimal extra' such as a single phosphine fumigation, can produce

insect and residue-free grain that meets export market specifications, at about one-third of the power costs currently incurred," said Dr Banks.

PMCAM and Smart Aeration projects were funded by growers through the Grains Research and Development Corporation (GRDC), the Bulk Handling Companies, and the Australian Wheat Board. *Brock Cambourne works at SGRL. 



CSIRO staff set up a PMCAM system to monitor and control aeration in a bunker of chick peas at Murttoa, Victoria. Photo CSIRO Entomology

Enquiries holding the fort for CSIRO

Working at the frontline to satisfy the nation's interest in CSIRO and science in general is the team at CSIRO Enquiries.

A reincarnation of the CSIRO Information Network, which came under review last year, CSIRO Enquiries, provides information about CSIRO, its research and services to the public, industry, students and teachers, government, researchers and other CSIRO staff.

Headed by Rae Robinson, a small team of information officers handle over 40,000 enquiries each

year using an extensive collection of resources, including CSIRO research data bases and Divisional publications.

The scope of enquiries the team receives is vast and indicates the high regard with which the public holds CSIRO says Ms Robinson.

"We've had people call to ask general questions such as is there a chemical available to stop dogs from digging up lawns, and others call for help with a business or to enquire about collaborative R&D with CSIRO," she said.


CSIRO Enquiries has streamlined

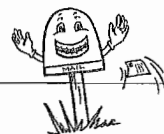
its services to ensure that each group of callers receives information tailored to their needs. "Karl Armstrong is responsible for the information needs of industry, Warrick Glynn and Naomi Lang prepare material for students and teachers, while Judith Maunders and Jenny Restarick look after the varied information needs of the public," said Ms Robinson.

"Supporting the team with administrative assistance and enquiry handling is Frances Mercer, and I make sure that CSIRO Enquiries is up-to-date with the activities and direction

of the Organisation as a whole."

Ms Robinson said that CSIRO Enquiries' relationships with Divisions and other CSIRO units is the catalyst from which the group provides an information service, so each team member also has a portfolio of Divisions to interact and maintain contact with.

Based in Melbourne, CSIRO Enquiries has a national telephone number - 1300 363 400. You can also find CSIRO Enquiries on the WWW at <http://www.csiro.au/communication/cin/cinhome.htm> 



Mailbox

Dear Editor

Just received the latest copy of the CSIRO *CoResearch* newspaper. After reading it I ran into the trouble of what to do with it. I pondered...as it is printed on a glossy-type paper, I didn't know if it could be recycled here at CSIRO.

There doesn't seem to be any recycle symbol on the newspaper, nor does it indicate if it was printed on recycled paper. Could you please clear up these issues for me? Is the newspaper recyclable?

CSIRO is a major leader (or wants to be) in environmental technologies. Shouldn't it be more of a role model to its employees and the public by printing its publications on recycled paper, and making a point of letting people know that the paper is not only printed on recycled paper, but is again recyclable?

I hope you can clear up this issue for me and my co-workers.

Carl Rye

Division of Chemicals and Polymers

The paper used for the last issue of CoResearch is recyclable. We're pleased to report that CoResearch is now printed on 100% recycled paper, with recycle symbol as suggested. - Ed

Dear Editor

I am pleased that *CoResearch* has reappeared, and has reintroduced Letters to the Editor. Here is my letter for publication in the next issue.

I find the latest issue of *CoResearch* (No 369) little better than a propaganda sheet! As an example, page six carried six stories regarding mergers of Divisions. All are written in glowing terms, without mention of any downside. Now, I'd like to believe this is true, but it stretches credibility!

As for subject matter, while I like to read of happenings in other Divisions, I also want to know of other issues relevant to the staff of CSIRO. From reading this issue of *CoResearch*, one wouldn't know that CSIRO is (once again) in the midst of great organisational change. Where is the critical discussion of Alliances and Sectors? Where is the discussion of industrial issues such as enterprise bargaining, staff turnover, and careers within CSIRO. I couldn't even find the usual column by the CEO! This is not a *CoResearch* worth continuing.

CSIRO takes great care to choose staff who can think critically. We deserve a staff newspaper that respects critical thinking. This is not a problem that can be solved by changing the name of our staff newspaper, as you offer in your Editorial. The question is whether to continue to publish a staff newspaper at all. I'd like to suggest that if we can't have a thinking newspaper with critical discussion of issues relevant to CSIRO, we should put it out of its misery. Now! Dr Alister K Sharp
Division of Food Science & Technology



CSIRO around the nation

Greener pastures for tropical scientist

Dr John Wilson retired earlier this year after 34 years working with CSIRO at the Cunningham Laboratory in Brisbane.

Dr Wilson spent most of his working career developing a world recognised understanding of how climate influences the growth of forage plants and their value as a feed for beef cattle.

He also developed a lawn-turf grass designed to grow under trees as well as in the open. Known as SIRO Shadegro, it is ideal for backyards that receive little sunlight, and is set to be on the market this year.

More recently, Dr Wilson has been involved in sugar cane research, looking at how to improve plant characteristics and increase sugar yields.

John said over the years he has seen a number of changes occur within the Organisation. The Division alone has had five Chiefs and four name changes.

"Science has become more bureaucratic with increased internal reporting and levels of accountability installed, and changes to management systems seemingly every year", he said. "Recent restructuring continues the trend unabated."

Dr Wilson says he entered CSIRO at a time when the economy was booming, and science and scientists were highly regarded. Research was on an expansion phase, and in the tropical north, exciting new research opportunities were taken on each year.

"For the younger scientist today, research is a daunting task, new information is coming forward at an increasingly fast rate, time is increasingly occupied away from the bench and studying the literature, there is poor job security, and pay levels are below those offered by other professions."

"But to counteract those negatives, in the fields of plant



Dr John Wilson retired after 34 years with CSIRO. Photo Don Thompson

physiology and biochemistry, the recent advances in molecular biology have opened up enormously exciting research opportunities in plant improvement that will revolutionise agriculture in the future."

Dr Wilson this year continues as a CSIRO Post-retirement Fellow, and plans to indulge in his hobbies of fishing, travel, gardening and photography. —Yance Jones

New labs in CSIRO

Two new lab complexes were opened earlier this year at opposite ends of the country.

In late January, CSIRO Chief Executive, Dr Malcolm McIntosh, braved north Australia's monsoon season to open an administration and laboratory complex in Darwin at the Tropical Ecosystems Research Centre (TERC).

During the opening, Dr McIntosh reaffirmed CSIRO's commitment to northern Australia, and stressed the importance of collaboration with local research and management agencies for maximum research effectiveness.

The Australian Animal Health Laboratory (AAHL) in Geelong, recently opened a new \$4.9 million facility. The facility creates an enhanced national animal health centre able to investigate disease issues with potential trade impacts including *E. coli* O111, John's disease and plant toxins.

Minister for Primary Industries and Energy, Mr John Anderson, and Minister for Science and Technology, Mr Peter McGauran, officially opened the laboratory.

Also attending the opening ceremony were Dr Malcolm McIntosh, local members of parliament, and National Farmers Federation President Mr Don McGauchie.

O caption, my caption!



The Caption Competition is off to a fabulous start with captions and photo offerings from all over the country. Here's a few of the best:

The very observant Barrie Hunt from Atmospheric Research suggested: "I won't tell anyone you've got a broken bra strap if you don't tell them I've got a hole in the armpit of my shirt."

Lynn Pulford from Education Programs got into ballroom glitz with: Rosalie saying "I like the pink tulle," and Arthur "I prefer the lemon myself."

Steve Davies from Telecommunications and Industrial Physics (TIP) told this tale: "Gripping stuff: devoted Malcolm McIntosh fan and fourth dan judo expert, Rosalie, takes hold, ready to disable her assailant, defying any attempt to divert her attention at one of Malcolm's recent gigs."

Anthony Thorley, also from TIP, sent: "In the most disgraceful incident of the entire conference, two of the world's most eminent scientists jostle one another after a serious difference of opinion over quark theory."

Pat King at Floreat Park, sent: "Testing - testing - yes we are both ripe", while Karl Armstrong of CSIRO Enquiries offered "He's promoting me, he's promoting me!"

Noel Tregoning, enjoying his recent retirement, suggested this retrospective one "Rosie! You CAN'T put Canberra Raiders milk in the Chairman's coffee. She is an AFL supporter!"

And the winner is — Barbara Haslam for "CSIRO staff perform the dance of the year — slow, slow, quick, quick, MERGE." Barbara, over at the Division of Horticulture in Adelaide, wins a magnificent CSIRO Student Research Scheme coffee mug (on its way Barbara).

This issue's pic comes courtesy of Barbara McKaige at the Tropical Ecosystems Research Centre in Darwin. The winning entry will receive a smart, new Double Helix t-shirt. Send captions and photographs to CoResearch Caption Competition, PO Box 225 Dickson ACT 2602, or email Jane.Kahler@cc.csiro.au



Chairman on tour

CSIRO Chairman, Mr Charles Allen, recently visited the Division of Animal Production at Prospect, NSW, and the Division of Entomology in Canberra.

Although animal production is a far cry from geophysics, the Division discovered a shared interest with Mr Allen — parasites!

Parasites in birds had been one of his interests, and the Division's parasitologists found the Chairman absorbed by projects involving biological control of worm parasites, and the detection of anthelmintic resistant worms.

Some of the comments at the end of the day were: "It's good to get to know the person at the head of CSIRO", and "This is the first time a Chairman has ever visited us".

During his visit to Entomology, Mr Allen spent the day being briefed by Dr Paul Wellings, Chief of the Division, and the five research program leaders who presented overviews of the Division's current work and future directions.

With insects making up a fair slice of the world's biodiversity, and with insect management a major economic issue for many industries, Mr Allen said he found the breadth of the Division's work quite fascinating!

Media workshops

Workshops on media skills for scientists are run by Jenni Metcalfe and Toss Gascoigne throughout the year.

The two-day Media Skills course aims to help scientists control their media appearances.

Dates for upcoming courses are: Sydney (June 16–20), Brisbane (July 14–19), and Melbourne (August 11–13).

More details from Jenni Metcalfe, email: jenni.econnect@b022.aone.net.au, or Toss Gascoigne, email: fasts@anu.edu.au

Beef study award

Ms Tricia Lerner, Librarian/Information Officer at the CSIRO Tropical Beef Centre received a \$15,000, ten week Meat Research Corporation Overseas Study Award to take her to the United States and Canada in April this year.

Ms Lerner gathered information on the use of internet facilities by US cattle producers, which could be applied in the Australian beef industry.

Because the US has an established electronic communication system working effectively, Ms Lerner said Australia has an opportunity to review US progress and avoid its pitfalls.

Ms Lerner delivered a paper entitled "Off the dirt track: connecting Australian beef producers to the Internet" to a joint conference between the US Agricultural Information Network and the International Association of Agricultural Information Specialists in Tucson, Arizona on April 3. —

Russ Boodie

Insect show in ACT

Renowned insect photographer, communicator, entomologist and world traveller, Dr Edward Ross, treated a Canberra audience at the Academy of Science to a public lecture earlier this year.

Dr Ross is Curator Emeritus in the Department of Entomology at the California Academy of Sciences in San Francisco.

His lecture, sponsored by the Australian National Insect Collection (ANIC), included slides taken during his 60 years of professional life, and showcased insects from around the world.

Dr Ross's skills as a photographer were recognised over 40 years ago when he was awarded the Guggenheim Fellowship in Nature Photography. He has also received grants from National Geographic and from the National Science Foundation.

Du Pont renews with DCP

US chemical giant Du Pont has renewed its strategic partnership with CSIRO's Division of Chemicals and Polymers in the area of engineered resins. The five year agreement will focus on the application of recent CSIRO breakthroughs in the control of polymerisation. The chemistry has application in the production of a host of commercial products including coatings, adhesives, dispersants, compatibilising agents and elastomers.

Public Sector Games 1998

The inaugural Australasian Public Sector Games are to be held in Melbourne from 15–19 April, 1998. The event will bring together public sector employees from Australia, New Zealand and Papua New Guinea.

Call (03) 9583 9178 for a brochure, or see <http://www/vicnet.net.au/~apsgame> on the WWW.

CoResearch is published by CSIRO's Corporate Communication/National Awareness Program for CSIRO staff and interested outsiders.

Editor: Jane Kahler

Assistant to Editor: Karen Robinson

Design and art production:

design ONE SOLUTIONS, Canberra

Printed by: Pirie Printers, Canberra

Stories may be reproduced provided

acknowledgement is given to both

CoResearch and CSIRO.

Readers are encouraged to contribute or

offer suggestions for articles.

Send contributions to CSIRO Corporate

Communication, PO Box 225,

Dickson ACT 2602. Tel (06) 276 6589.

Fax (06) 276 6273.

Email Jane.Kahler@cc.csiro.au

or Karen.Robinson@cc.csiro.au

100% recycled paper

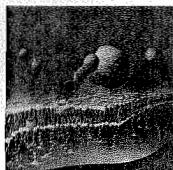


Co Research

CSIRO'S STAFF NEWSPAPER

No. 371 August 1997

**Nanomachine
sweeps the
media
page 3**



**CSIRO
gets smart
in Asia
page 4**



**Quest for
the ultimate
steak
page 5**



**National
Science
Briefings
page 6**



CSIRO in top ranking supercomputer facility

CSIRO and the Bureau of Meteorology have agreed to establish and operate a High-Performance Computing and Communications Centre (HPCCC) to be fitted with one of the world's most powerful supercomputers.

The SX-4 has been selected by the Bureau of Meteorology and CSIRO to support sophisticated weather and climate forecasting and advanced scientific research.

Under the collaborative arrangement, CSIRO and the Bureau have contributed half the costs each, and will have equal access to the world-class supercomputing system to be supplied and installed by NEC this month.

In its final configuration the processing speed of the SX-4 is many times faster than any supercomputer so far installed in Australia, and will rank as one of the fastest systems for scientific research in the world.

Supercomputers are able to perform unimaginably large calculations using huge volumes of data. At maximum processing power, the SX-4 configuration will run at 104 Gigaflips or 104 billion calculations

per second. A person making one calculation per second, eight hours a day, seven days a week, would take approximately 10,000 years to complete 104 billion calculations.

A contract signing ceremony for the multi-million dollar system took place in July at the Bureau's headquarters in Melbourne.

Mr Isao (Ben) Okamoto, Managing Director of NEC Australia, says the SX-4 supercomputer will help Australia's meteorologists and the broader research community deliver world-class services.

CSIRO Chief Executive, Dr Malcolm McIntosh, says that establishing the facility ensures CSIRO's computing and communications facilities are at the leading-edge.

The Organisation will use the supercomputer to carry out experiments with its global climatic model involving a range of future atmospheric concentrations of carbon dioxide.

Another application will be the design of pharmaceutical drugs from knowledge of the three dimensional structure of proteins. This knowledge can now be obtained from extremely

long simulations of molecular structures and their dynamics. The new supercomputer will allow more realistic simulations leading to better drugs.

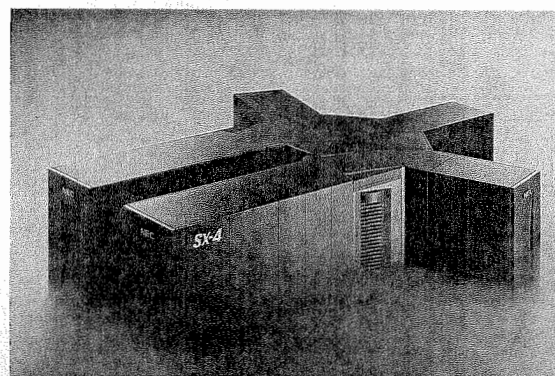
The NEC SX-4 supercomputer will also be used for research in air pollution, ocean currents, fire safety, plasma physics, polymer blend design, material composition and mineral processing.

Using the SX-4 supercomputer, the Bureau of Meteorology will be able to provide weather forecasts with significant skill up to seven days in advance in some situations, says Dr John Zillman, Director of the Bureau of Meteorology.

"The acquisition of the SX-4 supercomputer, in partnership with CSIRO, significantly strengthens the Bureau's capability to conduct essential meteorological research to improve the quality of weather and climate services to the community including such major vectors as aviation, shipping and tourism."

HPCCC is located at the Bureau of Meteorology in Melbourne.

CSIRO scientists can access HPCCC through AARNet2.



The NEC SX-4 supercomputer ranks as one of the fastest systems for scientific research in the world. Photo: NEC Australia

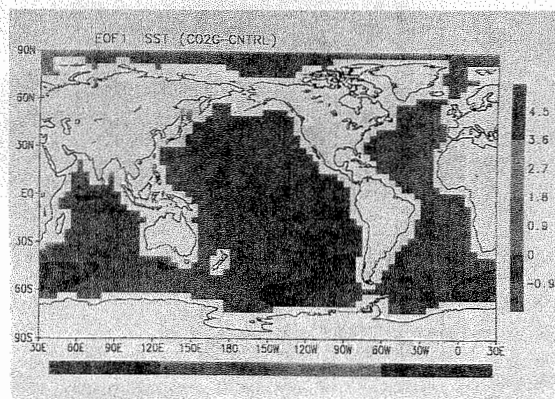


Chart created by data from the SX-4 supercomputer showing global warming patterns in the sea. Photo: NEC Australia

Micro-manufacturing laboratory meets market need



Minister for Science and Technology, Mr Peter McGauran, and Minister for Defence Industry, Science and Personnel, Mrs Bronwyn Bishop, unveil the plaque for the CSIRO Micro-Manufacturing Laboratory in Melbourne. Micro-manufactured products are expected to become big business in the next few years. Photo: Mark Fergus

In response to predictions that many of the tools of manufacturing will rapidly shrink to the microscopic, CSIRO has opened a world-leading micro-manufacturing research facility in Melbourne.

Minister for Science, Mr Peter McGauran, and Minister for Defence Industry, Science and Personnel, Mrs Bronwyn Bishop, officially opened the facility in June.

"These micro-manufactured products, designed to meet new market requirements, will become big business in the next few years," said Dr Mike Murray, Chief of the former Division of Materials Science and Technology.

"Instead of lathes and milling machines, the cutting tools of the new microtechnologies will be electron beams, ultraviolet laser light and intense x-ray beams," he said.

"This is not just pie in the sky. Already, micro-machines no larger than a thumbnail are used to control airbags in cars, their precision-sensing being the crucial technology behind the release mechanism, which is able to differentiate between a collision and hard or emergency braking."

"And an electric razor manufacturer is working on using micro-technology to add 'micro-combs' to the teeth of cutters to set up facial stubble for the closest shave possible."

"Micro-motors will become available to the medical industry, and they will be small enough to pass through blood vessels to clear away obstructions."

"They could be sent into the human body to diagnose or heal a specific ailment, transmit the results to a doctor's data recorder and be excreted when its task was done."

Dr Murray said that microsensors and micro-motors could continuously meter a patient and deliver minute doses of drugs into the bloodstream.

Slightly larger devices could be used to deliver powerful drugs to the precise tissue, such as a tumour, that needed treating.

At the opening, Mrs Bishop said the micro-manufacturing expertise will give a technological edge to the next generation of defence communication, electronic surveillance and radar system hardware.

"The world class facility we are opening demonstrates that we can satisfy Defence needs using industry

capabilities that have clear export commercial potential," she said.

"The facility uses electron beam and other methods, which for certain microelectronic patterning applications, are superior to competitive systems."

"It is an excellent example of joint development by Defence and CSIRO and importantly, involved Australian small to medium enterprises MITEC and KEL Aerospace, as well as British Aerospace Australia."

"An Australian company, ISATECH Pty Ltd, is collaborating on the technology to enter the world market for remotely identifying items such as parcels, containers, vehicles and even people in transport or security or production systems."

The Minister predicted ongoing research and development collaboration between CSIRO and Defence.

Real Aussies prefer science to sport

"Science Our Top Spectator Sport.... Aussie myths shattered as science scores over sport".... were among a spate of media headlines following the release of part of a new public opinion survey commissioned by CSIRO.

The study, by AGB McNair revealed Australians are more interested in news about scientific discoveries than they are in sport or politics.

The survey, which grabbed the attention of TV, radio and newspapers across the nation, found science, technology, medical advances and pollution outranked sport, politics, employment and crime as the subjects of greatest interest to readers, viewers and listeners.

"Medical discoveries had the strongest support, with 54 per cent of respondents saying they were very interested. These were followed by environmental pollution (47 per cent), technology (46 per cent), and science (43 per cent)," said CSIRO National Awareness Director Julian Cribb.

"In comparison 39 per cent said they were very interested in crime, 37 per cent in employment, 33 per cent in sports news and 22 per cent in politics."

The survey was the standard AGB McNair sample, involving 1,060 Australians in urban and regional Australia, male and female, aged 14 years and up and of all socioeconomic groups. "The question was asked among a range of other political and economic and

business questions, so respondents had no idea it was related particularly to science. We were careful to ask about sport, politics and other interests first," Mr Cribb said.

The poll indicated only 16 per cent were not at all interested in scientific discoveries — whereas 28 per cent declared they were uninterested in sport and 32 per cent in politics.

Men were about equally interested in science and sport (48 per cent to 47 per cent), but women were far more interested (39 per cent to 19 per cent) in science. Women also expressed very strong interest in new medical discoveries (64 per cent) and in environmental pollution (52 per cent).

Younger Australians were about equally interested in science, technology and sport — but 55 per cent said they had no interest in politics. The strongest interest in science was among older people.

"The survey suggests there is a much more receptive audience for science stories out there than certainly the media, and possibly even the scientific community, have been prepared to recognise," Mr Cribb said.

However the survey also reveals that the level of unease which ordinary people have about science and its power over their lives is continuing to rise — and hence the importance of a balanced and factual flow of information about science.

Forty-two per cent of respondents believed science had become so powerful it is dangerous

— while 33 per cent disagreed. This was an increase on 1994, when we last asked this question.

Forty-six per cent believe science is changing our way of life too rapidly, but 33 per cent are comfortable with the pace of change and 70 per cent believe science and technology offer greater opportunities for future generations.

More than two thirds of people consider it is important for them to have some knowledge about science for their daily lives. Only 22 per cent said it is not important.

And 71 per cent say most scientists want to work on things which make life better for the average person, while 12 per cent disagree.

Seventy-two per cent agree with the proposition that science and technology are making our lives healthier, easier and more

comfortable. Eight per cent disagree.

One in three respondents feel society today depends too much on science and not enough on faith — but 42 per cent disagree.

An overwhelming majority — 86 per cent — feel scientific research is vital in protecting and restoring the environment. Only 5 per cent say it is not.

But while 24 per cent feel that science and technology can prevent the earth's resources from running out, 48 per cent say that they will be unable to do so.

In other results, the poll findings indicate room for science agencies to do more to reach particular groups in the community, especially women, younger Australians and urban people.

TV emerges as clearly the most powerful medium for reaching most people. **CSIR**



Top honours for entomologists

Two leading scientists from CSIRO Entomology have been honoured by being admitted to national Academies of Science.

Dr Ebbe Nielsen has been elected as a Foreign Associate of the US National Academy of Science for his taxonomic work. Dr Robin Bedding becomes a member of Australia's Academy of Science for his work on nematodes.

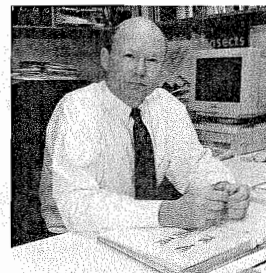
Dr Nielsen is Leader of CSIRO Entomology's Natural Resources and Biodiversity Program and Director of the Australian National Insect Collection. He is the author or co-author of eight books and 80 other publications on *Lepidoptera* (moths and butterflies), biodiversity, inventories, biogeography, information technology and biological collections.

A world leader in his taxonomic work, Dr Nielsen has developed and applied information technology to biological collections, allowing better use of these collections in the management of biodiversity.

Dr Bedding has received national and international awards for pioneering technologies to replace insecticides with insect parasitic nematodes.

His work on one kind of nematode, *Beddingia siricidicola*, has had a major impact on the forest industries of Australia, New Zealand, South Africa and Brazil. In controlling the siren wasp with this nematode, from \$1 to \$4 billion will be saved in every 30 year rotation of Australian pine forests.

Dr Bedding collaborated with China over the last 12 years to control the carpenter worm which killed 5 per cent of shade trees in northern China. He found that the apple borer moth, China's worst pest of 1 million hectares of apples, is also controllable with nematodes. **CSIR**



Dr Ebbe Nielsen has been elected as a Foreign Associate of the US National Academy of Science for his taxonomic work. Photo: CSIRO Entomology



Dr Robin Bedding becomes a member of Australia's Academy of Science for his work on nematodes. Photo: CSIRO Entomology

Oceans pivotal to nation's future, says new Chief

Fresh from a motorcycle tour of British Columbia, Dr Nancy Bray arrives in Australia in September as CSIRO's newest Chief.

Greater understanding of the ocean will play a pivotal role in determining Australia's ability to sustain development without long-term damage to the environment, according to the new Chief of CSIRO's Division of Marine Research, Dr Nancy Bray.

Dr Bray says Australia has marine territory totalling 14 million square kilometres including its Exclusive Economic Zone, and there are expectations that it could generate \$80 billion in economic activity by the year 2020. "Australia's Exclusive Economic Zone is a significant national resource where economic opportunities must be accompanied by management responsibility.

"The challenge facing marine research in Australia is to identify what aspects are most important to the nation's economic and environmental well-being, and then to use our knowledge to protect and develop the natural resources, including fisheries, reefs, petroleum and mineral deposits, and biodiversity," says Dr Bray.

According to Dr Bray, the role that ocean plays in determining



Dr Nancy Bray - new Chief of CSIRO Marine Research. Photo: CSIRO Marine Research

rainfall over Australia is another area where marine science and society's needs overlap.

The objective is to provide short-term climate predictions with potential savings to the nation measured in billions of dollars.

Dr Bray is formerly Director of the Physical Oceanography Research Division of Scripps Institution of Oceanography, part of the University of California's San Diego campus. She arrives in Australia in September to head-up the Division, formed

earlier this year by the merger of the CSIRO Divisions of Oceanography and Fisheries.

Dr Bray says marine science issues for the next decade will include - sustainability of fisheries; sustainable development of aquaculture; petroleum and mineral resource development; protection of the marine environment (coastal and open ocean); control of introduced marine pests; prediction of short-term climate change, and its impact on rainfall.

However, in order to continue to make progress on these issues, a broader base of funding and a better understanding by the public are needed.

"Perhaps the greatest challenge of all is to communicate the excitement and purpose we bring to research in marine science, and to convey to the public why we believe it is crucial to the nation's continued well-being," Dr Bray says.

A closer relationship between Australian researchers and marine scientists from South-East Asia on significant marine science issues also will be a likely outcome of Dr Bray's appointment.

A physical oceanographer who has worked in Asia, the Middle East and the US, Dr Bray has spent the past 18 months as a senior member of a CSIRO climate research team studying the oceans and seas south of Indonesia and how they influence Australian rainfall.

Dr Bray also acts as Chief Scientist aboard US and Indonesian research vessels, observing the Pacific and Indian Oceans, as well as the straits and seas in between, and Australia's North-West Shelf.

Other areas of Dr Bray's recent research include studying ocean circulation patterns off California, research that is intended to improve oil spill containment and risk assessment, as well as provide basic knowledge of coastal upwelling zones where high levels of nutrients are brought to the surface to support major fisheries.

Apart from her passion for motorcycles, Dr Bray also has a liking for country life, and a favoured pastime is training border collies for competition. She's bringing three of her dogs from the US, and is looking forward to trying her luck with Australian sheepdog trials. **CSIR**

Nanomachine sweeps the world's media

When news broke of a tiny machine that could detect substances with extreme sensitivity, its developers were in for a few surprises.

by Rosie Schmedding, CNA

After the June announcement of the biosensor development by the Cooperative Research Centre for Molecular Engineering and Technology (CRCMET), news of it swept the headlines, both in Australia and overseas.

CRCMET is a joint venture of CSIRO, the University of Sydney and the industrial consortium AMBRI* Pty Ltd.

First reported in *Nature*, news of the biosensor ran on the front page of *The Australian*, appeared at least 18 times in national papers, 27 international papers, 23 magazines including *New Scientist* and *The Economist*, and is soon to be in *Time*.

Broadcasts ran on at least 12 radio stations here and overseas, and 11 times on television, including the ABC's Good News Week.

Some of the more interesting international pickups were the BBC World Service, CNN News, Good Morning Japan, *South Dakota Bugle*, *Neue Zürcher Zeitung* in Switzerland, *The Guardian*, *London Sunday Times*, *Athens Daily*, *Morgunbladid* - Reykjavik, and the *Korean Daily*.

The coverage generated millions of dollars worth of positive publicity for Australian science, in particular the agencies and scientists involved, said Mr Julian Cribb, Director CSIRO National Awareness (CNA).

AMBRI's Mr Keith Daniel and CSIRO scientist, Dr Bruce Cornell, who represented CRCMET, were deluged with media inquiries.

Mr Daniel said he had been surprised and excited by the media response, but had to work out pretty quickly how to cope.

"We think we were very lucky, we were able to catch the public imagination. It was fantastic to have such a great, great impact. It took up a lot of our time, much more than we had expected, but we felt that we should respond to callers," he said.

"Basically we went into Andy Warhol mode - we knew it would be our fifteen minutes of fame and wouldn't last.

"Fortunately we had set up a website, which saved a lot of effort because we could direct a lot of people there to get basic information. Then they could call us back. We also worked out about a dozen quotable quotes that we could reel off."

Dr Cornell said the flurry of media activity was good fun, bolstering the group's self image, and actually less challenging than the normal reporting processes scientists are subjected to.

"We enjoyed it. The key was not to get carried away. We saw the media interest as a wonderful opportunity to show the value to Australia of scientific endeavours,

and it now means that the project will be orders of magnitude more secure," Dr Cornell said.

Planning for the announcement began months ahead. Dr Cornell and CNA drafted a catchy, media-friendly release. Many media picked up Dr Cornell's analogy of a sugar cube in Sydney Harbour.

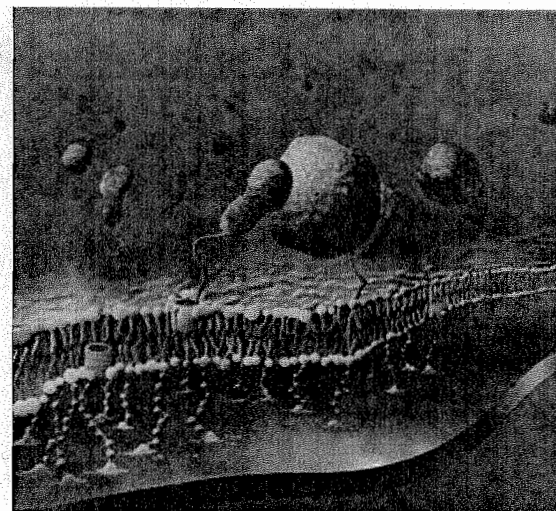
Peter McGauran, the Minister for Science, was invited to announce the development and agreed to hold a media conference in Parliament House.

AMBRI and Sydney graphics company, Infographic Design, designed a striking graphic of an artist's impression of the nanomachine in action. Demand for the graphic was enormous.

With approval from *Nature*, the media conference was held under a strict embargo, until 1am on the day the article was to appear. Several days before, CNA rang leading science journalists to brief them.

"We were surprised at how well behaved, methodical and concerned about accuracy many of the journalists were. Very few of the articles that went out had inaccuracies in them. Quite a lot of journalists sent their articles back to us to ensure they were correct," Dr Cornell said.

"My advice to other scientists when planning to work with the media is to consider carefully what



The winning graphic, designed by Infographic Design and CRCMET, is now an icon for the technology. © 1996 Infographic Design, Sydney & CRC for Molecular Engineering, Sydney

visuals you will use. The ability to present pictures was the real winner. They say a picture is worth a thousand words and it sure was in our case," Mr Daniel said.

"Produce a good graphic where you can, even if it is only representative like an artist's impression. Also a picture of the scientist that goes beyond just a face or a lab and lab coats. Try to put in the face and something next to it. Then put it all on the web in downloadable form in a number of formats.


"You will be surprised how many reporters pick it up. The artists impression of the AMBRI biosensor membrane was on the front page of *The Australian* and the Korean *Munhwa Ilbo* at least, as well as inside many more publications. It

was also in everything from the *Nature* issue to *Engineers Australia* magazine.

"It has become an icon for the technology.

"I also suggest you use email. Overseas reporters are almost universally email accessible and the use of email lets you operate at different times seamlessly."

More information:
<http://www.ambri.com.au/institute/index.html>

Media release:
<http://www.csiro.au/communication/mediarelease/1997/mr97109.htm>
*The Australian Membrane and Biotechnology Research Institute (AMBRInstitute) is a venture between CSIRO and subsidiaries of Pacific Dunlop Limited, one of Australia's largest manufacturing companies. 

Australia strengthens screw-worm defence

Australia's defences against invasion by the devastating screw-worm fly have been boosted by the recent opening in Malaysia of a mass-rearing facility for sterile forms of the parasite.

A major pest of livestock in the tropics of Asia and Papua-New Guinea, the Old World screw-worm fly (*Chrysomya bezziana*) is unlike other flies which attack dead flesh.

Screw-worm maggots feed on the living flesh of warm-blooded animals including humans.

Designed as a joint activity between the Australian and Malaysian Governments, the project will help Australian scientists determine how successful the 'sterile insect release method' is in controlling and eradicating this pest. The method relies on released sterile males mating with wild females, disrupting the reproductive cycle of the fly.

Ten million sterile screw-worm flies a week will be produced when the factory, located at the Institut Haiwan Kluang in Johor, reaches full production later this year.

Chief of CSIRO Entomology, Dr Paul Wellings, who attended the opening, said an outbreak of screw-worm fly in Australia could be devastating.



At the official opening of the screw-worm facility in Malaysia are (from left to right) CSIRO Entomology Chief, Dr Paul Wellings, CSIRO Entomology Program Manager, Dr Joanne Daly, and CSIRO Deputy Chief Executive, Agribusiness, Dr Chris Mallett. Photo: CSIRO Entomology

"It is truly a horrific pest," said Dr Wellings. "There is no doubt in my mind that Australia needs a rapid capacity for response in the event of an incursion. This facility is an integral part of that response.


"Bio-climatic models predict that screw-worm fly might spread throughout our tropical and sub-tropical areas and, in summer, extend into major livestock production areas of southern Australia. It would not only have a significant impact on

public health, it could cost livestock industries around \$280 million a year."

CSIRO Entomology, with the support of the Department of Primary Industries and Energy (DPIE), did the preliminary research on the ecology, physiology and artificial mass-rearing of the Old World screw-worm fly in the 1970s and 80s. This phase of the research will evaluate new rearing technologies and field trial procedures.

"The pilot facility is part of Australia's Screw-worm Preparedness Strategy. If the 'sterile insect release method' proves as effective with Old World screw-worm fly as it did with New World screw-worm in North and Central America, then a blueprint for a larger scale fly factory, producing up to 250 million screw-worm flies, will be drawn up for Australia," said Dr Wellings.

CSIRO Entomology's Dr Rod Mahon went to Malaysia in 1994 to work with construction engineers, set up a laboratory colony, develop novel mass-rearing techniques and train local support staff.

Malaysian Minister for Agriculture, Datuk Amar Dr Sulaiman Bin Haji Daud officially opened the factory. 

Scientist wins oil industry accolades

When the petroleum company BP Australia asked its London head-office for help on solving problems it was having exploring Papua New Guinea's difficult geology, it was told that the expertise it needed was in its own Melbourne backyard.

BP Australia's problem arose when drilling exploration wells in a region where the deep rock is under extreme pressure because the earth's plates there are still moving and folding. The risk of high-pressure well 'blow-outs' is high and potentially fatal for drillers.

To BP Australia's good fortune, one of the authorities on 'abnormally pressured rocks' is Palestinian-Canadian scientist, Dr Najwa Yassir, who is now with CSIRO Petroleum Resources in Melbourne.

Dr Yassir has developed software that draws on accumulated exploration data to help predict where high-pressure zones exist. It means the exploration companies can now have a better appreciation for subsurface pressure variations, which dramatically reduces the financial risk and the hazards for workers.

For her research on abnormal pressures, aimed at helping the oil industry to explore areas like Papua New Guinea (PNG) with greater

confidence, Dr Yassir was named winner of the Petroleum Exploration Society of Australia's 'Visiting Lecturer Award' for 1997.


The award has Dr Yassir travelling to each Australian capital, presenting talks and running workshops for the Australian petroleum community.

Her work here has complemented the research on wellbore stability in PNG, conducted by Dr Tony Addis of the same Division, which is aimed at minimising hole problems and cost over-runs in this highly tectonic compressive region.

Also at the Petroleum Resources Division, Sydney-based Dr David Whitford uses strontium isotope studies as an alternative to conventional seismic testing in PNG.

The surface layer of rock in much of PNG is limestone, which doesn't respond accurately to the sonic waves created by detonations.

The strontium isotopes offer an alternative indicator by mapping the age and thickness of the limestone.

This work could have huge ramifications, with PNG emerging as having prospective petroleum reserves, which could place a new economic platform under its economy. - Brad Collis 

CSIRO gets smart in Asia

After a relationship of over 20 years, CSIRO has a new focus on Asia.

by Jane Kahler
and Peter Martin*

In just over a decade, CSIRO Forestry and Forest Products sent more than 3,000 kilos of tree seed to 70 organisations to help restore Indonesia's declining forests.

In a major collaborative project, CSIRO Building, Construction and Engineering is providing housing solutions for 90 million Indonesians needing new homes over the next 25 years.

In the next five years, a multidisciplinary CSIRO team is assisting the Indonesian Institute of Sciences (LIPI) develop its R&D management and commercialisation capabilities under a \$7.5 million World Bank contract.

These three projects are just the tip of the iceberg: according to CSIRO's International Scientific Liaison office, there are 73 recent or current projects with Indonesia alone, involving around two thirds of CSIRO's 22 Divisions.

"CSIRO is making sure it remains a significant player in the Asian region."

Most of these activities are in agricultural or environmental areas, and are aimed at improving Indonesia's ability to feed itself, or at managing its environment. But some, such as the calibration and international recognition of Indonesia's measurement standards with the National Measurement Laboratory, aim to increase Indonesia's trading power.

Most projects are aid-related, funded by organisations such as the World Bank, AusAID and the Australian Centre for International Agricultural Research (ACIAR).

Of CSIRO's 600 or so international projects, around 350 are in Asia. Over half of these are with Japan, Indonesia and China, with others in Malaysia, Vietnam, the Philippines, Thailand, Hong Kong, Singapore, South Korea, and Laos.

Again most are aid-related, and include training and advisory visits, as well as research. Some, like improving diagnosis and control of foot-and-mouth disease in Laos and China, also aim to protect Australia.

In developed countries, such as Japan, scientists work collaboratively in cutting edge science such as at the Photon Factory in Tsukuba. Here, scientists use X-rays to study the molecular structure and composition of materials.

Scientists from the Division of Manufacturing Science and Technology helped build the BIGDIFF, a precision X-ray diffractometer for the Australian National Beamline Facility at the Photon Factory.

The BIGDIFF is used for work on viruses, proteins, ceramics, alloys,

semi-conductors and optoelectronic materials. In exchange for use of the BIGDIFF, the Photon Factory gives Australian scientists free access to its research facilities.

CSIRO's success in Asia has been because it has the expertise sought by Asian nations, says Dr Beth Heyde, head of CSIRO's Government Business and International Scientific Liaison (ISL) group. With globalisation gaining momentum, and 60% of Australia's exports going to Asia, CSIRO anticipates its presence there and its influence on Australia's foothold, to strengthen and grow.

At the same time, globalisation will elevate developing nations into competitors in markets that once were Australia's domain.

"It's really changed in the last couple of decades," says Dr Heyde. "But in most circumstances the benefits are going to be greater because you're building up a country that is going to be able to deal on a more equal basis in trade, and their businesses and our businesses are likely to interact."

Dr Ta-Yan Leong, Manager, International Scientific Liaison (ISL) puts it bluntly. "If we train these countries to that standard then we can trade with them, because if we want to trade with them, we need to recognise each other's industrial standards."

"Another argument is, if Australia is not doing that, other countries will, and in the end we lose out, because first in is the winner. They will buy their technology, buy their products from all those countries whom they are most familiar with."

"If you are in the market from the very beginning, then you can secure a better market place."

CSIRO is making sure it remains a significant player in the Asian region by becoming more strategic and focused, without ignoring or damaging existing relationships, or traditional links.

In the past, CSIRO's activity in Asia was driven largely by two forces: the nature of science, in which scientists establish informal networks internationally, and by the *Science and Industry Act 1949*, which stipulates that the Organisation must contribute to Australia's international performance by acting as the liaison between Australia and other countries in scientific matters and training.

More recently, successive Federal Governments have encouraged Australia and CSIRO to look to Asia as a centre of business opportunity.

Many of CSIRO's projects in Asia have come about through government to government linkages, which will continue to be an important point of contact.

One example is the cooperation between China's Shanghai Observatory, Japan's scientific space agency, ISAS, and CSIRO's Australia Telescope National Facility (ATNF)

on the Very Long Baseline Interferometry (VLBI) network.

VLBI links radio telescopes around the world simultaneously. It is part of the most complex space astronomy mission ever undertaken, and since the launch of Japan's space radio telescope in February this year, is providing astronomers with images of distant stars and galaxies 100 times sharper than those from the Hubble Space Telescope.

The National Measurement Laboratory, located within the Division of Telecommunications and Industrial Physics, is active throughout Asia in its role as Secretariat of the Asia-Pacific Metrology Program (APMP) and through the Asia-Pacific Laboratory Accreditation Cooperation (APLAC).

Dr Barry Inglis, NML Director and Regional Coordinator of APMP, says that this year the Laboratory is involved in seven projects, with the target of gaining international recognition of the measurement standards and national accreditation bodies in developing nations.

"APMP is trying to develop technical infrastructure and demonstrate that it is at a level that can be recognised for international trade," says Dr Inglis. "This activity is high on the list of APEC priorities, and receives government support through the APEC Sub-Committee on Standards and Conformance."

"NML's activities enhance Australia's technical reputation and strengthen Australia's trade negotiating position. Ultimately they provide the basis for removing technical barriers to trade."

CSIRO also has many institution to institution agreements with bodies such as the Chinese Academy of Sciences (CAS), the Indonesian Ministry of Forestry and the University of Indonesia.

"...there is a new dynamism and commitment to building research links with Asia..."

Exchange of air samples between the Division of Atmospheric Research and the CAS Institute of Atmospheric Physics has contributed to understanding global climate change.

Work between CSIRO Land and Water's Remote Sensing group and the CAS Institutes of Remote Sensing and Water and Soil Conservation led to the sale to China of technology, in this case microBRIAN, a system for environmental and resource surveys. Another project aimed at improving water use efficiency is using remote sensing, catchment hydrology and soil science to study China's irrigated and dryland farming systems.

Memoranda of Understanding (MOUs) between CSIRO and the University of Indonesia have led to



Against a background of Australian eucalypts, a farmer in a field of cassava. Photo: Nick Goldie

valuable spin-offs for the Organisation and for Australia. The Division of Building, Construction and Engineering was able to set up the Australian - Indonesian Centre for Sustainable Urban and Regional Development (CSURD) in Jakarta, and is in a position to assist Australian industry enter Indonesia to collaborate on development projects.

CSURD's Dr John Brotschie, based in the Division's Melbourne lab, points to the Centre's new APEC-AusAID project on sustainable urban development and national economic impacts as an example of how CSIRO's expertise can be harnessed through centres of this kind. As well as strategic planning skills, tools developed in CSIRO can often be directly applied.

"The Division's ALIGN 3D software, for example, has the potential to cut construction costs of roads, railways and pipelines by over 30% in many of the terrain types found in Indonesia," he said.

Training in the use of a range of software, including CSIRO-developed packages, is high on the Centre's agenda, says Dr Brotschie.

These ways of working internationally are important for CSIRO, and will remain an integral part of its international activities, particularly the aid-related projects, says Dr Leong.

"There is a saying: in the western culture two people can come together and do business and

after that they may or may not become friends. In the eastern culture you come together, you become friends first before you do any business."

Kron Aken, of the Australian Tree Seed Centre at CSIRO Forestry and Forest Products agrees.

"If you bring somebody from an overseas country to Australia for training, they'll remember that for the rest of their life, and because it's a personal thing, when you go to their country, you're always welcome. They'll show you around because that's the trust you build, and a lot of work has been built on that sort of trust."

Mr Aken says that over time as countries such as Malaysia have become more developed, the relationship becomes more equal, and CSIRO gains from the expertise these countries now offer.

"They're teaching us now. They have expertise that we have to learn from them."

While maintaining traditional links, CSIRO is evolving its approach to working in Asia, says Dr Leong. "The trend is to still do the aid, but to try to develop things that will be of benefit to Australia economically, environmentally and socially."

Setting up the ISL office was a first step in a more coordinated and strategic approach, he says.

Dr Leong says the office facilitates the flow of information between interested customers and Divisions, and provides assistance

with VIP visits, training programs, international contacts and information about overseas research agencies, government departments, universities and funding schemes. Customers often contact the office as an entry point to CSIRO, which can direct them to the appropriate Division and its relevant expert.

Fluent in Chinese and Japanese, Dr Leong often helps plan and manage visits in both directions. The group also has language skills in Indonesian, French and Italian.

Much of CSIRO's new Asian focus is on Indonesia. This is partly because the relationship dates back to the early 1970s when Australia, through CSIRO, set up the Centre for Livestock Research and Development in Ciawi. It's also because of geography.

"It's pretty clear that as our closest and largest neighbour it makes good sense to pay attention to Indonesia. We also know that Indonesia is interested in working with Australia," says Dr Heyde. "And it's not just CSIRO, I think Australia in general is giving particular attention to Indonesia."

CSIRO has formed its own Indonesia Committee chaired by Deputy Chief Executive Dr Colin Adam.

"It was decided that we should take Indonesia as an example, a first example, of trying to develop a strategy for what we should be doing in Asia," says Dr Heyde.

"The Committee has met several times and has held a workshop where representatives from all the Divisions with an interest in Indonesia talked about what they were doing there.

"From that we have drafted a strategy to develop a more corporate approach to how we deal with Indonesia. Depending on how this goes, there may be further exercises [for other countries] like that."

ISI's Training Officer and Secretary of the Committee, Ms Jackie Wright, facilitates an Indonesian network on CSIRO's internal email to keep the flow of information between members going.

CSIRO also has a representative on the Steering Committee for Collaboration on Science and Technology in Australia and Indonesia (COSTAI), and has recently joined the Australia-Indonesia Business Council (AIBC).

Through COSTAI, CSIRO expects to identify projects of mutual benefit to Indonesia and Australia. AIBC places CSIRO in networks with businesses working in Indonesia.

"We've always been good on the aid side, particularly agricultural through ACIAR and through AusAID," says Dr Heyde. "But where we have found it more difficult to make good progress, and everyone does, is in building up the business side of things.

"We need to do a lot more of that, and joining the Australia - Indonesia Business Council is a sign that we want to understand which companies are there, have more day to day contact with them so that we

Continued on page 6

The quest to serve the ultimate steak

CSIRO scientists are at the forefront of a far-reaching program to change the genetic structure of Australia's northern cattle herd — to produce a new animal based on British breeds, but acclimatised to the north to pull the industry there into the prime beef market.

The program is based on new reproduction technologies now being field tested in central Queensland, which will allow the cattle industry to change its basic herd structure in about eight years — half the time it would take using normal breeding systems.

CSIRO, along with the Meat Research Corporation and the University of Central Queensland, is putting the final touches to new breeding technologies, new production and processing systems, all designed to underpin a cultural shift from quantity to quality.

If successful, the industry will be able to drop its reliance on bottom-end markets like US manufacturing beef, and begin to tailor, accurately, its product to the premium markets.

The breeding program is linked to broader efforts by the Australian Meat and Livestock Corporation to establish an 'Eating Quality Assurance Scheme' — an attempt to have a grading system for meat based on eating quality. The scheme is being trialed already at five-star restaurants in Sydney and Brisbane.

A CSIRO scientist involved with the scheme, Dr Gregory Harper, says the determining factor for meat quality — tenderness — is a complex chain of circumstances beginning with the animal's genetic composition, growth rates, and how it is handled during and after slaughter. These can all influence the two main components which determine tenderness — 'myofibril tenderness' and 'connective tissue'.

"Myofibril tenderness is most affected by processing ... how long the carcass is chilled and how long the meat is aged. The connective tissue in a piece of steak is determined by the animal's genetic composition, age at slaughter, and growth pattern.

"The experience you have when you first bite into a steak is a measure of its myofibril tenderness. If you keep chewing and end up with a lump of gristle, that's the connective tissue.

"Ageing by the butcher can reduce the myofibril component, but nothing can reduce connective tissue once it's there, which takes us to the herd's genetic composition and the animal's growth rates — the older at slaughter, the tougher the meat."

Some of the most far-reaching advances in reproduction technologies have now emerged from this quest for a better product — with the collection of oocytes

from young heifers marking a revolutionary shift away from male sperm for high-volume breeding of a new, improved animal.

At the tender age of two months, a heifer calf identified with the genetic traits of an animal most likely to produce prime beef under Australian conditions, can have 50 to 100 offspring gestating in surrogate mothers — which, unlike the 'parent', are old enough to give birth.

The object is to fast-track the breeding of an animal better suited to the Australian environment, which reaches slaughter weight younger, and is genetically predisposed towards meat tenderness and an appropriate fat content.

The scientific breakthrough underpinning this is the development of gene markers which identify and isolate the genes responsible for these and other traits such as heat tolerance, and disease, parasite and tick resistance.

"...by the time the calf is only a year old it could already have hundreds of offspring."

Dr Jay Hetzel, head of the CSIRO's Molecular Animal Genetics Centre in Brisbane, says the focus is on raising the quality of Australian beef and adding predictability to the product. Gene markers have been found for fat and fat composition "to separate out the nasty fats from the good fats", and tenderness — "the one area where Australian beef most fails."

"Our animals don't grow fast so they are older by the time they reach slaughter weight. This makes the quality of Australian beef variable. Feedlotters supplying the Japanese market are losing money because only 60 per cent of the cattle coming through have the required marbling. This comes from them selecting visually whereas the new technology will allow them to select genetically, and more accurately."

The science behind the creation of a new genetic stock, especially for the northern pastoral areas whose product has traditionally been for the low-grade US manufacturing meat market, is at the cutting edge of animal reproduction technology.

"What we're doing is speeding up the creation of a new breed, with advanced artificial insemination technology based on the female's reproductive capacity," says Dr Michael D'Occhio, head of reproductive technologies at the Tropical Beef Centre — a research facility run jointly by the CSIRO, Queensland Department of Primary Industry and



CSIRO staff behind the new breeding program, from left: Mr Graeme Halford, manager of the Belmont National Cattle Breeding Station near Rockhampton, and Mr Tim Whyte, Miss Lisa Maclellan and Dr Michael D'Occhio, all from the Tropical Beef Centre. Photo: Brad Collis

University of Central Queensland at Rockhampton.

"The new approach is to 'super ovulate' the female to produce more follicles. Chemical stimulation of the ovaries can produce up to 50 eggs at a time which are fertilised *in-vitro*. We thus can have a genetic super-mother producing the desired embryos and the rest of the herd acting as surrogates.

"Now we've taken the next step and are stimulating ovulation in two-month-old calves. They can't mate at that age, but they can produce a large number of eggs for *in-vitro* fertilisation. A heifer calf at birth has between 100,000 and 150,000 primordial follicles, each containing an oocyte. So by the time the calf is only a year old it could already have hundreds of offspring."

Dr D'Occhio says an advantage in being able to switch to the female's reproductive capacity is not having to wait for the male to reach puberty before breeding can begin.

The genetic starting point is European cattle breeds already known for their meat quality. Four years were spent identifying individuals with the genetic traits that will enable this type of animal to be as equally productive under harsh northern conditions, and the fast-track breeding program is now building up a foundation herd.

"This technology is going to have a huge impact on the industry. It will allow producers to hit the spot," says Dr Hetzel. "The commercial breeder will be in a position to say, 'OK I've listened to the consumer ... I've listened to the Japanese, I will use gene markers to screen the herd for those

specifications and multiply from there."

"It's all about value adding, and it will force much more vertical integration and alliances between producers and processors to ensure the efforts of each are not diluted.

"While the big producers will target the main markets, there will be opportunities for smaller producers to market breeding stock with specific attributes."

This is the first major genetic restructuring of the northern cattle herd since the late 1940s when Brahman were introduced because of their adaptability to the climate.

Over the years, however, Brahman have become better known for their meat quantity than their quality. This has been satisfactory for the North American processed meat market, but since the late 1980s this market has been steadily diminishing.

The time has come now to breed from European stock that can handle northern conditions and reach slaughter weight at a younger age.

One proposal, says Dr D'Occhio, is to use northern Australia as a nursery, and to finish the cattle off in southern feedlots.

"That's another reason why you need a new set of genetics in the north. Brahman don't perform well in feedlots," he says.

Dr D'Occhio says the change won't mean an end to Brahman because of a developing live export market for them in Asia.

Brad Collis



Food for thought at lunchtime briefings

Will the Universe go on forever? Will it end with a bang, a whimper or a crunch?

Blue-green algae affects nearly all political electorates.

Marine pests are likely to cause as much damage to Australia's marine environments as rabbits and feral cats do on land, and are more persistent than oil spills.

Plenty of food for thought for parliamentarians and their staff attending the latest round of CSIRO's National Science Briefings in Parliament House, Canberra.

In May, astronomers Professor Jeremy Mould, Director of the Mt Stromlo and Siding Springs Telescopes and Dr Rachel Webster, University of Melbourne revealed the latest evidence on the future of the Universe.

Ideas about the Universe have changed a lot in 100 years. In 1890 it was thought that everything we could see belonged to one entity - our galaxy. By 1929, the American astronomer Edwin Hubble had confirmed that not only were there other galaxies, but they are moving away from ours; and the further off they are, the faster they are travelling.

"We know that it is expanding and evolving and to predict its fate we need to know how fast it is expanding and how much mass it contains," said Professor Mould.

"The Universe could expand forever and slowly cool. Or it could stop expanding and everything would collapse back upon itself. We still don't know..."

In June, the Briefing audience heard the results of CSIRO's three year blue-green algae research program.

Dr Richard Davis, CSIRO Land and Water, told parliamentarians that blue-green algae problems were now felt in every state in Australia, and affected almost all Australians.

"Little is known about these blue-green algal blooms, which become more toxic over time, and poisons can persist in the water for

months," Dr Davis said.

The study concludes it is possible to manage Australia's rivers and waterbodies to reduce the frequency and impact of blue-green algae.

Water control strategies designed to minimise the risks to human health include: taking drinking water from deeper levels below the algal bloom; increasing flow through river weir pools; discharging water in "pulses" through weir pools; siphoning water over weir walls; and artificial mixing of water to prevent blooms in reservoirs.

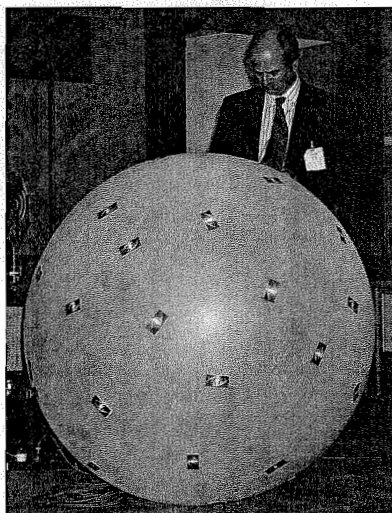
Leading-edge Australian-made scientific instruments now exist to monitor waterbodies for the chemical and biological changes which lead to blooms, Dr Davis said.

Also in June, speakers from CSIRO Marine Research, the Australian Shipowners' Association and the Australian Quarantine Inspection Service presented the latest on imported marine pests.

Dr Ron Thresher, head of the CSIRO Centre for Research on Introduced Marine Pests (CRIMP) reported that more than 172 alien marine species had been recorded in Australian coastal waters.

Ranging from exotic seaweeds to large fish, from crabs and starfish to worms and molluscs, the invaders are found in all States.

One pest alone, the adult European green crab, is able to consume over 1000 native clams per month, he says.



With the help of a weather balloon, Professor Jeremy Mould, Director of the Mt Stromlo and Siding Springs Telescopes, shows a National Science Briefing audience one possible scenario for the future of the Universe. Photo: Nick Goldie

Most of the introduced marine pests are believed to have hitchhiked into Australia in ships' ballast water or attached to their hulls, he says.

"On any given day, there are more than 3000 species being transported by ships around the globe - and Australia probably suffers one new invasion every month, mostly unnoticed."

Dr Thresher suggested a national three-stage strategy to handle the invasion.

The first step, he says, is to devise ways to slow the rate of new introductions or the rate of spread by pests already here by treating ships' ballast water.

Second, is a national system for notifying each new invasion as it is discovered, and responding before it gets out of hand.

Third, is devising ways to control the worst of the invading species, to curb their numbers if we cannot find a way to completely eradicate them. **CSI**

CSIRO gets smart in Asia continued from page 5

know what they're doing, and whether there can be fruitful collaboration we can be part of."

CSIRO's work with Australian companies in an effort to help them break into the lucrative Asian market or strengthen existing ties, is another part of CSIRO's new focus. The Food into Asia Program is one example.

Apart from working out how to please the Asian palate, this multi-Divisional project involving the Divisions of Food Science and Technology, Human Nutrition and Plant Industry, helps food manufacturers understand consumer profiles, manufacturing operations, distribution networks, and packaging technology.

Outsized prawns for Japanese tables, small 'cocktail' abalone for Taiwanese markets and soybeans satisfying the discerning tastes of Japanese, Korean and Taiwanese consumers are other examples, this time with CSIRO Marine Research and Tropical Agriculture.

Saving China's stored grain from insect pests and mould by modernising its grain handling and storage facilities is another project with the Division of Entomology and a consortium of Australian companies.

In an extra effort to boost Australian companies and CSIRO's success in Asia, CSIRO has a representative, Mr Paul Sims of the

Division of Food Science and Technology, working in the influential Itochu Trading House in Tokyo, with a brief to promote commercial outcomes from R&D in food and agriculture.

"Overall there is a new dynamism and commitment to building research links with Asia that is very exciting and encouraging," says Dr Heyde. "A key role of our office is to support Divisions in their efforts as much as possible, ensuring that we inform, advise and coordinate so that CSIRO always goes in well informed and prepared. Our future in Asia depends upon it." **Peter Martin is with CSIRO's International Scientific Liaison Office. **CSI***

More say for staff in enterprise bargaining

In a major departure from the more traditional industrial relations process, CSIRO is providing an opportunity for broader participation by staff in Enterprise Bargaining.

CSIRO recently commenced discussions to initiate a new round of Enterprise Bargaining against a background of major change introduced by the Government.

This change is designed to encourage employers and employees to negotiate mutually acceptable terms and conditions by eliminating some of the rituals of the industrial relations system.

CSIRO established a reference group comprising about 22 employees drawn from across the Organisation to consider issues which could be included in an enterprise agreement. This group will make recommendations to both

CSIRO and the unions on these issues, says CSIRO Industrial Relations Manager, Mr Warren Smith.

"The group is broadly representative of functional areas, geographic location and gender. Group members will collect the views of fellow employees, and provide a valuable 'reality check' for both CSIRO and the unions by ensuring a broad consideration of the issues.

"This process has the potential to generate better understanding by all staff of the issues and increase acceptance of the changes developed through Enterprise Bargaining."

The Reference Group is likely to meet for the first time in mid August in Canberra, says Mr Smith.

Mr Smith says the group will meet on three or four occasions, each of a few days duration, and should finalise its recommendations by November. **CSI**

Megascience in ACT

International cooperation in biological informatics was significantly strengthened when the Biological Informatics Working Group of the OECD Megascience Forum held its third sitting at CSIRO in Canberra recently.

"Biological informatics is the interface between all kinds of biological information - past or present, collected, correlated, analysed - and computers and computer networks," said Dr Jim Edwards of the US National Science Foundation, and meeting chairman.

Hosted by the Australian Department of Industry, Science and Tourism (DIST) and organised by the Head of the Australian delegation, Dr Ebbe Nielsen of CSIRO Entomology, the meeting reviewed the overall report and reports from the Subgroups on Biodiversity Informatics, Neuroinformatics and Ethics & Intellectual Property Rights (IPR).

"There is now an extraordinary megascience opportunity in the explosively beneficial combination of biology and computers. Biological data are more complex than any other kind of data, and computing and software systems that can deal with that complexity have been developed only recently," Dr Edwards said.

A subsidiary body of the Organisation for Economic Cooperation and Development (OECD), the OECD Megascience Forum works as an international inter-governmental committee, and is a venue for discussion by governments of policies, priorities and expenditure, and collaboration for large international scientific research projects.

The Paris based Megascience Forum establishes working groups to advise on these issues. There are at the moment two Working Groups. One for neutron sources, the other for biological informatics.

Dr Edwards said that the Working Group was particularly pleased with its progress in areas such as environmental management, medicine, agriculture and biotechnology.

He predicts that the most important commodity on the world market in coming decades will be information. "At the same time the critical natural resource is going to be biodiversity and its derivatives," he said.

Members of the Australian delegation are Dr Ebbe Nielsen (Head of Delegation and Biodiversity), Dr Tim Littlejohn (Ethics & IPR) and Mr Arthur Chapman (Biodiversity). **CSI**

1998 CSIRO DIARY

The 1998 CSIRO Diary is available to order now at the special price of **\$30** — **half the recommended retail price!** Packed with features like a business card holder, notepad, reusable cover, stylish open/close mechanism, and moon cycles for fieldwork planning, the 1998 Diary is great value for money.

CSIRO Contacts is also available for half price — **\$6**.

ORDER TODAY FROM CSIRO PUBLISHING
sales@publish.csiro.au or tel (03) 9662 7666.

*Account code must be used for all official CSIRO orders. Postage and handling \$8.



Research roundup

CSIRO research in the news compiled by Nick Goldie, CNA

Kitty litter falls from the air

Oil spill? Pollution? Drop clay on it.

A powder made from finely ground Australian clay, sprayed from an aircraft, is to be used to clean up oil spills at sea.

Dr Jock Churchman of CSIRO Land and Water has shown that the clay is an effective way of causing an oil slick to form manageable clumps. And Australia has large deposits of the most useful form of clay. Up until now it has been little used, notably for cat litter.

Dr Churchman suggests that clay may be used to clean up abattoir effluent, blue-green algal blooms, and carcinogenic contaminants from groundwater.

Eucalypt veneers: quality uncovered

Australian hardwood is generally used for low grade applications such as fencing or building frames. But properly handled, it can show a lustrous beauty.

Dr Barbara Ozarska of CSIRO Forestry and Forest Products has been developing eucalypt veneers, both as panels and as decorative mouldings.

"This will take the pressure off rainforest species, but it is also showing the real beauty of some of

our timber," she says. CSIRO is working with commercial sawmills in Tasmania and Victoria to develop the veneers to a marketable stage.

Woolly comfort

Sufferers from pressure sores may be comforted by the Australian Medical Sheepskin, launched by the Ministers for Health (Mr Michael Wooldridge) and Science (Mr Peter McGauran) in July.

Bedsore caused by prolonged hospital stays are not only painful and unpleasant, they cost the taxpayer an estimated \$350 million. Sheepskin has long been used to keep patients comfortable, but the Australian Medical Sheepskin, developed by a team led by Dr Ken Montgomery at CSIRO's Leather Research Centre with industry support, meets new standards. The processed sheepskins can withstand high-temperature hospital disinfection and cleaning, as well as the wear and tear of daily use.

Gene shears at cutting edge

St Vincent's Hospital in Sydney is testing CSIRO's 'gene shears' technology in clinical trials in adults as a first step towards a treatment for AIDS.

The basis for the trial is the original discovery by CSIRO Plant

Industry molecular biologists that naturally occurring enzymes called ribozymes can be used selectively to chop up pieces of genetic material.

CSIRO's original patent was granted in 1987, and in the following year Gene Shears Pty Ltd was established by CSIRO and the French seed firm Groupe Limograin Pacific Ltd. In 1991 the partners were joined by Johnson & Johnson.

Over the next three years, Gene Shears plans to test the ribozyme gene therapy against a range of human diseases, and research is well advanced in the development of virus-resistant crops and other agricultural products.

Wrinkles, aging and heart attacks

All the things we don't want to know about (except taxes) are being held at bay by CSIRO research.

Dr Robin Holliday of CSIRO Molecular Science and his colleagues have shown that Beta Alistine™ (β alanyl histidine), a substance naturally present in human and animal tissues, has remarkable properties when it comes to fighting the aging process.

Beta Alistine not only extends the number of times that human cells can divide, it rejuvenates aging human cells and helps preventing 'cross-linking' of collagen and other



skin proteins. It is this linking which leads to wrinkling and loss of elasticity in the skin.

Beta Alistine is the primary active ingredient in three new Australian products - a face cream, a hand cream, and a serum, launched commercially in July by the Beta Peptide Foundation Pty Ltd.

Wrinkles can also take comfort from Dr David Belford and his team at the Division of Human Nutrition and CRC for Tissue Growth and Repair, who (following Cleopatra into her bath of asses' milk) have found a healing agent in whey. According to Dr Belford, growth factors purified from whey promote cell growth and skin repair, and the whey extract may be used for wound dressings and as a wrinkle-remover in cosmetics - though Dr Belford warns that such applications are still a fair way down the track.

The healing of wounds is David Belford's main interest, and he is

negotiating a clinical trial in Adelaide, to test the whey extract on problem wounds such as diabetic ulcers, pressure sores, and leg ulcers.

Still at the Division of Human Nutrition, Dr Ted McMurchie and Mr Wayne Leifert say that, not only can the right foods help prevent heart attack, but they have also developed a way of studying the 'heartiness' of foods. Using the new technique, food extracts can be tested on a single heart cell beating under a microscope.

It's well known, says Dr McMurchie, that certain foods can help prevent heart attacks. Now new evidence suggests that the heart cells may be storing some substances from food. Fish and fish oils, for example, contain fatty acids which help the cells of the heart to beat together in harmony, preventing the arrhythmia that brings on cardiac arrest.

Ultimately, says Dr McMurchie, people at risk of heart attack could follow a diet that builds up a store of

Retirees notch up 176 years of dedicated service

After a combined length of service of 176 years, four CSIRO staffers say farewell.

Mr Bruce Kennett of the Division of Food Science and Technology, Mr Graham Quint and Dr Victor Maslen of Manufacturing Science and Technology, and Mr Bob Lewis from Entomology retired from the Organisation recently, after long and distinguished careers.

Mr Kennett joined the Division of Food Preservation and Transport in 1949, when the Organisation was still CSIR. According to official records, Mr Kennett's 48 years, 6 months and 7 days with the Organisation makes his period of service the second longest for a member of scientific staff.

In the 1950's, Mr Kennett constructed one of the first two gas chromatographs in Australia, and

continued to design gas chromatographic equipment that kept the Division at the forefront of gas chromatography for the next 20 years.

When the Division acquired its first mass spectrometer in 1964, Mr Kennett was the first in Australia to directly couple the gas chromatograph and mass spectrometer.

In 1970, he used the Division's first computer to acquire and process mass spectral data on-line and in real time.

In 1978 the Food Division together with Divisions in the Minerals Institute acquired an NMR spectrometer. Mr Kennett was joint manager of this facility and, working with Dr Frank Whitfield, obtained NMR spectra of compounds collected from a gas chromatograph. These samples were often very tiny, and the achievement made the Division a world leader in micro NMR analysis.

In the mid 80's at his Chief's request, Mr Kennett devoted his time to guiding the Division into the computer world of the 80's and 90's.

In retirement Bruce plans to build radio controlled boats and restore antique furniture.

With 48 years, 4 months and 24 days service up his sleeve, Mr Quint also joined the Organisation when it was CSIR. In the 1970s, he was an original member of the Currency Note Research and Development

group at the Division of Applied Organic Chemistry.

The group developed plastic banknote technology, and Mr Quint developed special software and operating system modifications for the electron beam lithography used on the 1988 plastic ten dollar banknote. He also specialised in computer graphics software for use in computational chemistry applications at the Division.

In 1993 Mr Quint returned to the field of electron beam lithography software development when he joined the Materials Science and Technology Electron Beam Lithography program. He helped develop software for the development and commercialisation of PIXELGRAM and EXELGRAM technology.

Mr Quint will continue with the project on a part-time basis, and assist in training new staff.

Mr Lewis started with the Division of Wildlife and Ecology in November 1954, where he worked on the Myxomatosis program. He



Mr Bob Lewis reflects on his 42 years of service, 20 of those years working with plague locusts and grasshoppers. Photo: CSIRO Entomology

moved to the Division of Entomology in 1958, and clocked up 42 years, 7 months and 15 days service.

For 20 of those years, Mr Lewis worked with plague locusts and grasshoppers and is renowned for his expertise in identifying immature stages of grasshoppers. His work led to the discovery of a species, *Lewis's lexisbilla*, named after him.

In 1984 he moved to the Biological Control of Weeds group where he worked on the heliotrope rust fungus (*Heliotropium europaeum*) and continued to do so until his last day. In the late 1980s he took on getting the Division's quarantine building functioning properly.

Mr Lewis is a recognised macrophotographer, and has photographed many insects for the Division of Entomology. His photograph of the Northern Territory's Leichhardt's Grasshopper illustrated Australia Post's 1991 Insects of Australia stamp issue. During his service he was awarded an Australia Day Achievement Medallion.



Dr Victor Maslen an expert in the complex process of Optical Variable Devices (OVD) artwork development. Photo: Mark Fergus

Mr Lewis won't be severing ties with the Division, and hopes to work on a grasshopper book with colleague Dr David Rentz, and continue his macrophotography.

Dr Maslen worked with CSIRO for 38 years, 7 months and 2 days.

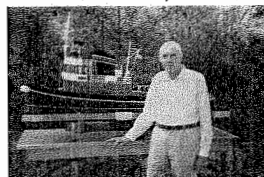
From the early 1960s until the 1980s he worked in the Theoretical Chemistry section within the Division of Chemical Physics at Clayton.

From 1982 until 1993 he worked on the scattering of electrons in crystals, solving a calculation that had eluded workers in the field for nearly half of this century.

In 1993 he joined the Optical Variable Devices (OVD) project in which he demonstrated great skill in software development for unusual applications, and became an expert in OVD artwork development.

Dr Maslen will to continue on a part-time basis until a replacement can be appointed and trained.

CoResearch wishes all a long and happy retirement. **cat**



Mr Bruce Kennett retires as the second longest serving member of CSIRO scientific staff. He's pictured with his 1.8 metre radio controlled tug, modelled on an English Sun 21 class tug. Photo: Division of Food Science and Technology



Mr Graham Quint, an original member of the Currency Note Research and Development group that developed the plastic banknote technology. Photo: Mark Fergus



CSIRO around the nation

Obituary: James Vickery, OBE, FTSE

Dr James Richard Vickery, a pioneer officer of CSIRO and the father of food research in Australia, died on 13 June, 1997 aged 94. Dr John Christian, Honorary Fellow of the CSIRO Division of Food Science & Technology, pays tribute to him.

Dr James Richard Vickery graduated in science from the University of Melbourne, and received a grant from CSIR to augment his Exhibition of 1851 Scholarship to Cambridge University, beginning a lifelong association with the Organisation.

Appointed in 1931 to lead the newly formed Section of Food Preservation and Transport, Vickery's first project with a small group in Brisbane led to chilled beef exports

to the UK, the classical work for which he is still best known.

To embrace studies on other foods, including temperate fruit, fish and eggs, the Section moved to Sydney's Homebush abattoirs in 1938, where it shortly became immersed in studies pertaining to the war effort. The Section became a Division in 1940 with Dr Vickery as its first Chief.

Post-war expansion, and "JVR" himself, demanded better facilities, and in 1961 the Division moved to new laboratories at North Ryde. In 1967, Vickery became Foundation President of the Australian Institute of Food Science and Technology, was appointed an OBE, and retired from CSIRO. In that year the meat

laboratory for which he had pushed so hard was opened in Brisbane.

Dr Vickery was not only a distinguished scientist but also a far-sighted scientific administrator of international standing. He was very highly regarded within the Organisation, Sir Ian Wark saying of him: "The Executive used to hold him up to the rest of us as a paragon". According to another colleague "He was Rivett's white haired boy - he never asked for more". But JRV always asked for more for his staff, who admired him greatly and whom he supported and encouraged in every way.



Chief Executive's Study Awards 1997/98

This year's Chief Executive Study Awards go to:

Mr Bruce Barker, Division of Marine Research, to visit the USA to investigate photographic techniques, data processing and archiving, underwater video and laser techniques for habitat survey and trawl effects. Visits to a number of companies to investigate mapping techniques and technologies, and latest product developments.

Ms Robyn Cross, Division of Exploration & Mining, to study organisational culture and discuss marketing planning and resource allocation. To investigate general marketing activities, relationships with industry and changes over time and strategic marketing issues in a number of countries.

Mr Graeme Edwards, Division of Telecommunications & Industrial Physics, to attend a Flow Measurement Course at the National Engineering Laboratory, Glasgow, UK. To visit the USA to obtain knowledge and experience relating to the ultrasonic transducer fabrication.

Ms Irene Fernandez, Division of Manufacturing Science & Technology, to visit the USA to undertake training in the area of novel mechanical properties, testing of advanced ceramics including coating structures, and in particular, using National Institute of Standards and Technology's bonded-interface technique for examining damage in these materials.

Mr Paul Holper, Division of Atmospheric Research, to visit the UK and USA to investigate stakeholder communication, marketing and government linkages, stakeholder interactions and internal communication.

Ms Michelle Lincoln, Division of Entomology, to visit Rhodes University, South Africa to learn about yeast genetic systems and to undertake a field trip to collect *Heliothis*, a caterpillar that attacks cotton.

Mr Alexander Webb, Division of Building, Construction & Engineering, to visit New Zealand to study the BRANZFIRE fire growth computer package.

Queen's Birthday Honours 1997

Dr Roy Green, former Chief Executive and Institute Director was made an Officer of the Order of Australia (AO) for service to scientific, technological and environmental policy in Australia and to marine science.

Dr John Floyd, formerly of CSIRO's Mineral Engineering, was made a Member of the Order of Australia (AM) for service to

Australian scientific and industrial research.

Dr Peter Manins, from CSIRO's Atmospheric Research Division, received a Public Service Medal (PSM) for outstanding public service in his leadership and commitment to the development of practical applications of strategic research in air pollution and meteorology for use in air-quality assessment and planning.

Enquiries on www

CSIRO Enquiries has updated its web-site to include pages for industry, education and general public. Visitors will find information sheets, which can be printed, and a facility for emailing specific questions.

Access to the site is via the CSIRO corporate homepage (www.csiro.au). Just hit the 'CSIRO Enquiries' button, or go there directly: <http://www.csiro.au/enquiries/index.html>

Poultry award

Dr Harvey Westbury of the CSIRO Division of Animal Health (AAHL) recently received the Australian Poultry Industry's 1997 Achievement Award, in recognition of his outstanding contribution to the poultry industry in Australia.

Intelec 97

Intelec 97, the 19th International Telecommunications Energy Conference, will be held at the Melbourne Convention Centre, 19-23 October. Steve Placko, tel (03) 9634 5699.

Excellence award

Ms Jenny Bower, a PhD student at CSIRO's Division of Plant Industry, has been awarded the 1996 Medal for Academic Excellence for honours students by the University of Western Sydney.

Chinese on water course

A group of 20 high ranking Chinese officials attended the first CSIRO Land and Water Environmental Management Workshop, held in Canberra in June.

Executives from five different Chinese Provinces, including the Deputy-Director of the Guangdong Provincial Department of Water Resources and Hydropower which controls 85 percent of Hong Kong's water supply, visited Australia specifically for the course.

The one-day workshop covered topics like the management of environment and water resources, the use of IT in managing coastal

Academy awards

Dr Trevor McDougall of CSIRO's Marine Research, has been elected a Fellow of the Australian Academy of Science for contributions to the sciences of oceanography and climate prediction, in particular the discovery of four oceanic mixing processes, and the representation of the contribution of ocean eddies to mean advection.



Innovation award

The CSIRO Information Access Group (IAG) has won the 1997 Australian Library and Information Association Award for Innovation in Victoria. The IAG won the Award for its leading role in establishing a corporate digital information infrastructure for CSIRO.

Fitting award

Jamie Harnwell, a fitting and turning apprentice from the CSIRO Division of Atmospheric Research, is the winner of the 1996 Arthur Frost Award for Most Improved Apprentice.

CSIRO's Chairman, Mr Charles Allen, presented Jamie with an inscribed plaque and a cheque for \$500 on 17 April this year.

Each year, CSIRO presents the Arthur Frost Award to the person who demonstrates the highest level of achievement during the course of their apprenticeship. The award commemorates the life of Arthur Frost, who was a workshop supervisor with a special interest in the welfare and development of apprentices. He died in 1972, at 45, and the Award was instituted in 1974.

O caption, my caption!



Last issue's pic (above) prompted some interesting responses. Here's a few: John Blackwell of Land and Water sent: "By Jove, you are right Brian, the vesica everter does work on living specimens!"

From Pat King at Floreat Park: "We're getting more funds! - go on, tell us another one."

One entry from outside the Organisation, came from Bill Smith, an Editor in NSW Agriculture: "It's not funny - it's caught in my zip!"

An anonymous, but brave entry: "...and they thought it was spread by bush flies!"

And the winner is - Peter Baines from Atmospheric Research for: "Candidates for the position of Chief of the new Division of Dental Research present their credentials." Peter wins a Double Helix t-shirt.

Try your hand at the pic below sent by Nick Goldie of CSIRO National Awareness, and you could win a fabulous CSIRO Student Research Scheme coffee mug.

Keep sending in photos and captions to *CoResearch* Caption Competition, PO Box 225, Dickson, ACT 2602, or email Jane.Kahler@cc.csiro.au



CoResearch is published by CSIRO National Awareness for CSIRO staff and interested outsiders.

Editor: Jane Kahler

Assistant to Editor: Karen Robinson

Design and art production:

design ONE SOLUTIONS, Canberra

Printed by: Pine Printers, Canberra

Stories may be reproduced provided

acknowledgement is given to both

CoResearch and CSIRO.

Readers are encouraged to contribute or

offer suggestions for articles.

Send contributions to CSIRO Corporate

Communication, PO Box 225,

Dickson ACT 2602. Tel (06) 276 6589.

Fax (06) 276 6273.

Email jane.kahler@cc.csiro.au

or karen.robinson@cc.csiro.au



100% recycled paper



Co Research

CSIRO'S STAFF NEWSPAPER

No. 372 December 1997

**Staff
opinion poll
announced
page 2**



**Bandicoots
looking
good
page 3**



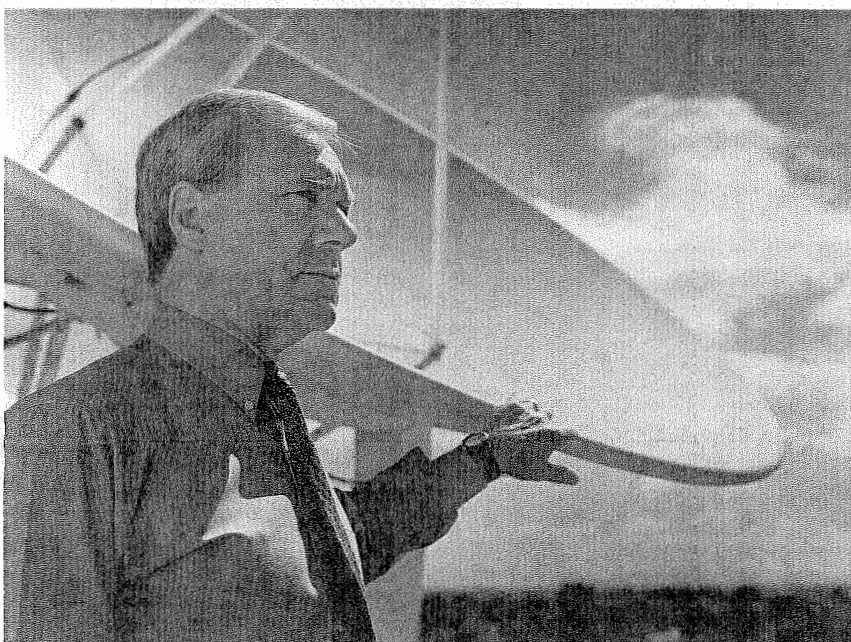
**CSIRO's
ozone
warrior
page 5**



**Waste reuse
needs public
support
page 6**



CSIRO has energy for a better future



CSIRO's Dr Graeme Pearman: with the help of science and technology Australia can build a sustainable energy economy. Photo: Mark Fergus

by Paul Holper, DAR

In October Chief Executive Dr Malcolm McIntosh invited a group of Divisional Chiefs and scientists to a conference on what advice CSIRO might offer government on sustainable energy.

"CSIRO is often asked for technological or scientific advice about controversial issues. Because of the breadth of its research activities, it sometimes seems that it gives diverse or even contradictory opinions," said conference organiser, Dr Graeme Pearman of the Division of Atmospheric Research.

"A classic example is the future of energy production and use, and the concept of sustainable energy. Energy and energy options are inextricably linked with Australia's future and underpin just about everything we do, so this is of great importance to government and industry. The Federal Government has been examining its own sustainable energy strategies."

CSIRO's views on energy take into account the interests of miners, regulators and the general public, combustion technologies, end-use technologies and environmental consequences such as mine-site rehabilitation, air pollution and greenhouse gases.

The first task of the *Sustainable Energy Conference* was to agree on words. Sustainable energy, it was decided, could be defined as: "the longer-term capability of providing the community's need for energy in economically, culturally and environmentally acceptable ways."

The conference considered 14 papers on topics such as efficiently converting fossil fuels to petrol or electricity, developments in rechargeable batteries and fuel cells, and effective energy use in cities.

"The challenge is to come up with options that allow economic development while protecting the environment now and for future generations," said Dr Pearman. "CSIRO needs to provide objective policy advice to government and industry that has the broadest possible perspective of both current and future options, and integrates the ideas of scientists close to the community sectors which CSIRO serves."

Dr Pearman said the conference had, for the first time, tested CSIRO's ability to provide this sort

of integration. Not an easy task, he said, but the result had been strikingly successful.

"There are many promising ideas from CSIRO and other researchers in the energy area: energy-smart buildings, clean coal, smart motors, city modeling and new transport systems," Dr Pearman later told the National Science Briefing, *Sustainable Energy - Solutions to the Greenhouse Dilemma*.

The enhanced greenhouse effect presents a good test of the sustainability of our approach, according to Dr Pearman.

"Environmental and economic impacts of climate change must be considered. Energy efficiency, renewable energy, fuel switching and better combustion techniques are all important options if we are to ameliorate global warming," he said.

"It is in Australia's interest to be up with the latest science and technological developments, and to encourage our industries to seek opportunities in these developments."

Co-generation, the harnessing of heat generated in producing electrical power, and the latest developments in hybrid-drive, lightweight vehicles which promise to halve fuel consumption and dramatically reduce air pollution, are two technologies Dr Pearman said will be important developments in the first part of the new century.

"There are also enormous opportunities to improve end-use efficiencies. These lie in the way we cook our food, heat our homes and offices, conduct business and manufacture products," he said. "Just turning off electrical appliances rather than leaving them in stand-by mode would save energy and money for most of us."

A sub-committee is producing a short document on sustainable energy and options for the future, drawing on the outcomes of the Canberra Conference and CSIRO's expertise.

Sub-committee members are Graeme Pearman, Peter Newton (Building, Construction and Engineering), Annabelle Duncan (Molecular Science), Alf Ekstrom (Coal and Energy Technology) and Barney Foran (Wildlife and Ecology). **END**

Enterprise Agreement vote 1998

CSIRO staff will be invited to consider the long awaited new Enterprise Agreement likely to be finalised early next year following negotiations between CSIRO, the Commonwealth Public Service Union (CPSU) and the Australian Manufacturing Workers Union (AMWU) in December.

The negotiations come after a series of meetings of CSIRO's Enterprise Bargaining Reference Group (EBRG) held since August.

"All staff will be given the opportunity to consider and vote on acceptance of any proposed Agreement next year," said Mr Warren Smith, CSIRO's Workplace Relations Manager.

"An agreement can't be forwarded to the Industrial Relations Commission for ratification unless a majority of staff approve its terms."

Established earlier this year, EBRG consists of 22 employees from around the Organisation reflecting a cross-section of CSIRO staff, classification levels, functional areas and geographic locations. Each

employee was jointly nominated by the unions and CSIRO.

An external facilitator, Mr Bruce Wilson from the Union Research Centre on Organisation and Technology, was also selected by the unions and CSIRO.

"This Group's work represents a new approach to agreement making in CSIRO where a representative sample of employees advise the negotiating parties on what they believe should be in the industrial agreement," said Mr Peter O'Keefe, General Manager, Corporate Human Resources.

Job security, flexibility, salaries and rewards, improvement of people processes, and research and workforce planning were key issues identified by EBRG.

"The Group has met on several occasions each of three days duration to work through key issues and consider input from the unions, Chiefs, Corporate Human Resources and staff," Mr Wilson said. "It has also been working to identify principles that will sustain CSIRO's science,

people and finances into the future."

CSIRO Chief Executive Officer, Dr Malcolm McIntosh, also met regularly with the Group to share his views on the Organisation and to answer questions.

At its final meeting in late November, EBRG concluded its recommendations, taking into account further feedback from individual staff and Divisional representatives.

The recommendations cover redundancy, strategic planning, workforce planning and career development, contracting out, one-off rewards, clause 10(d) contracts, casual employment, level 2 and 8 anomalies, graduate salaries, post doc and term appointments.

Other issues include salaries, management accountability, and people management, including PPE, promotions and career development.

EBRG reports are available to CSIRO staff on the WWW at: <http://www.csiro.au/services/humanresources/essentials/blocks/enterpriseagreement97/discussions/report4.htm> **END**

CSIRO spin-off company in worldwide market drive

by Rosie Schmedding, CNA

A revolutionary new editing system for the film, video and multimedia industries was released onto the world market at the end of September by CSIRO high tech spin-off company, MediaWare Solutions (MWS).

Tasmanian Senator Brian Gibson launched the product at the Sun Microsystems office in Canberra, praising MediaWare Solutions for showing such initiative and CSIRO for its role in its development.

"MediaWare and WebFlix is yet another success story for CSIRO, and I believe that if the early signs are right, it's also going to be a great success story for Australia," Senator Gibson said.

WebFlix is a piece of software that allows users to navigate quickly through very large 'MPEG' files. Users can see quickly what is on a piece of footage, to see examples, and to cut and paste parts of huge files into smaller files, or many smaller files into larger application targeted videos.

"Our first release locates camera

related events - such as where a cut or dissolve has occurred, thus helping people search quickly through hours of footage," said MWS Managing Director, Mr David Keightley.

The software is being marketed internationally with Sun Microsystems Australia Pty Ltd and Silicon Graphics Pty Ltd. Mr Keightley says that MWS has already received expressions of interest from overseas for the product and they have delivered beta software to customers in Canada, the USA and Germany.

"We are very pleased to see that our technology is not only being recognised as world class, but that it will also generate a local industry and derive export revenue," Mr Keightley said.

"The digital-media market is in a period of rapid growth. With prices getting lower and lower, digitised video and digital MPEG video cameras will soon become accessible to home users as well as big film houses. This means that MPEG digital videos will be stored on home computers, connected to the Internet and, just like videos

now, we will need to sort, edit and browse them," Mr Keightley says.

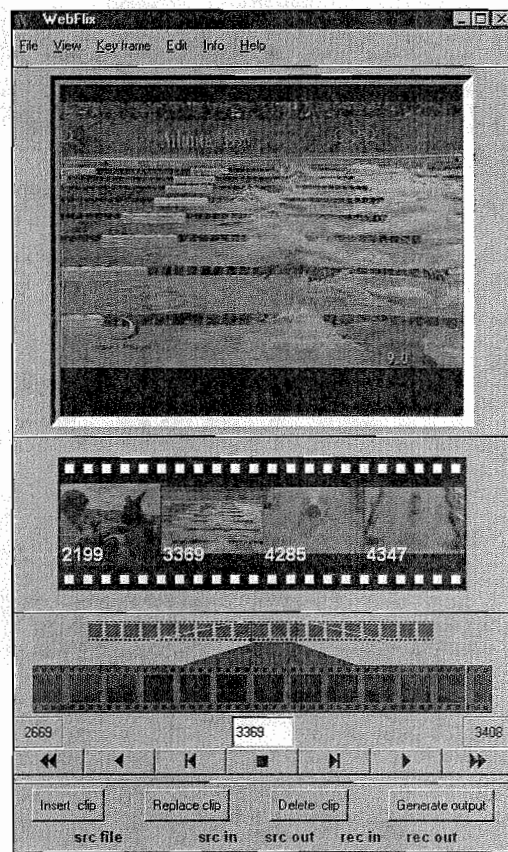
MWS was formed by three multimedia research staff from CSIRO. At the launch, they expressed their appreciation to CSIRO Mathematical and Information Sciences.

"We greatly thank CSIRO for having the foresight to nurture the pure and applied science that provided the basics for us to develop this technology," Mr Keightley said.

He said the company still enjoys a close relationship with its Division, and in the future there may be opportunities for staff to collaborate on research projects critical to MWS product development.

Dr Ron Sandland, Chief of CSIRO Mathematical and Information Sciences, said the Organisation is very pleased to see its technology being commercialised and reaching the international market place.

So far CSIRO has generated over 50 spin-off companies since the early 1980's with a collective annual turnover of about \$170 million and employment of almost 900. **CNA**



WebFlix allows users to navigate quickly through very large 'MPEG' files

Worms corner industry award

An environmentally friendly form of pest control that has saved the Australian pine forest industry \$50 million a year and protected a million hectares of apple trees in China has won CSIRO entomologist Dr Robin Bedding, this year's Sir Ian McLennan Achievement for Industry Award.

Using different species of nematode worms, Dr Bedding developed a way of controlling insect pests in pine plantations, bananas, currants, apple orchards and glasshouses without the need for chemicals.

The nematode technology offers no threat to other, non-target organisms and leaves no polluting residues.

International sales of the technology are on the increase as forest managers from Brazil, Chile and South Africa use it to control the *Sirex* wasp, a major pest of pine plantations.

Commercialisation of the technology first with Biotech, then with Ecogen Inc and currently with CSIRO while negotiations are continuing with other companies, is

expected to result in global sales worth \$100 million a year within ten years.

Set up in 1985 by leaders of Australian industry, the Award recognises outstanding contributions by CSIRO scientists and engineers to national development.

Sir Ian was Chairman of BHP for many years and later Chairman of the ANZ Banking Group and Chairman of Elders IXL.

The winning scientist receives the Sir Ian McLennan medal, and a grant of up to \$15,000 to undertake an overseas study trip. Companies involved in the innovation receive the Sir Ian McLennan Achievement for Industry Award plaque.

Two scientists received a Certificate of Commendation at this year's ceremony. Dr Mary Fama from CSIRO Exploration and Mining, for the contributions of the Highwall Mining Design Team to highwall mining in Australia, and Dr Allan Green from CSIRO Plant Industry for inventing and developing the new oilseed crop *Linola*. **CNA**



At the Sir Ian McLennan Achievement for Industry Award ceremony in November were (from left to right) CSIRO Exploration and Mining's Dr Mary Fama, Victorian Plantations Corporation's Resources Manager, Mr Tony Manderson, this year's Award winner CSIRO Entomology's Dr Robin Bedding, and CSIRO Plant Industry's Dr Allan Green. Photo Mark Fergus

Wattle we do to help the African diet?

Hungry journalists in the National Press Gallery received a press release with a difference on World Food Day (October 16). Stapled to each release, which came from Minister for Primary Industries John Anderson, was a little bag containing a wattle-seed biscuit.

Australian wattles are providing vital sustenance for families living in Sub-Saharan Africa, said the Minister.

Wattles, or more correctly, dry-zone acacias, were introduced to Africa some decades ago to combat erosion and to provide firewood.

In 1989, CSIRO forester Dr Lex Thomson explained to people in Maradi, a town in southern Niger, that

the seeds of *Acacia colei* were edible and, indeed, were an important part of the traditional diet of many Australian Aboriginal people. The Maradi people at once began to try various ways to prepare and cook the seeds.

Working with the Aboriginal women, CSIRO's Mr Jock Morse has made new seed collections of *Acacia colei* and other edible-seeded wattles.

"The Aboriginal experience in Australia gave us confidence that flour made from the seeds of *Acacia colei* could be incorporated into regular human diets in Africa," Mr Morse says.

Meanwhile Dr Chris Hairwood of CSIRO's Australian Tree Seed Centre in Canberra coordinated nutritional

tests on different wattle species. The seeds of *Acacia colei* were found to be a nutritious food containing 23 per cent crude protein, 53 per cent carbohydrate and 11 per cent fat.

With support from CSIRO, Nigerian researchers from Obafemi Awolowo University ran trials with laboratory animals, and then at Maradi with human volunteers. These trials showed the seeds were safe to consume at rates up to 25 per cent of the human diet. The volunteers rated the taste of foods made with wattle seed flour blended with local grains to be acceptable. Some villagers now eat wattle seed flour as part of their regular diet. **CNA**

CSIRO staff opinion poll

by Malcolm McIntosh, CEO

In February 1998, I will be asking all CSIRO staff to take part in a survey to help gauge morale and commitment, and to identify areas of concern that might be improved in future.

I am very interested to hear staff views on a range of matters, from workplace flexibility to the effect of the new sector structure.

It's important that we know whether the policies that define our working conditions are helping or hindering our productivity and excellence as an organisation.

The formal terms of reference for this project as agreed by the Executive Committee are:

"Establish staff attitudes on a range of issues for the purposes of improving policy and processes in CSIRO;

Establish a framework and



processes for this and future polls which enhance opportunities for staff to influence CSIRO's policies and directions and which maximise the likelihood of implementing the poll's outcomes."

Each Division and Unit has nominated a contact person who will be kept up-to-date with information on arrangements between now and February. This contact group will help facilitate the survey in the Divisions.

The survey will be run by Falls Corporate Research Pty Ltd. Between now and Christmas a questionnaire will be developed through discussion and the input of a number of focus groups in Divisions. Following the census in February 1998, I expect the full report to be available by the end of April 1998.

This project is being overseen by a Steering Committee chaired by Dr Glen Kile, Chief, Forestry and Forest Products. Committee members are Dr Bob Blagrove, Molecular Science; Ms Lyn Wojtszak, Entomology; Dr Doug Shaw, Mathematical and Information Sciences; Mr Gary Knobel, Corporate Human Resources; Dr Sarah Ryan, Wildlife and Ecology; Mr Michael Berry, Animal Production; Ms Wendy Parsons, National Awareness.

I look forward to your support and involvement. **CNA**

Bandicoot prognosis looks good

by Jane Kahler, CNA

The western barred bandicoot, extinct on the Australian mainland for over 50 years until reintroduced in April, is alive and well and breeding in its specially prepared refuge on Heirisson Prong in Western Australia.

Back from a field trip in October to check the progress of the bandicoots, CSIRO Wildlife and Ecology scientists, Mr Jeff Short and Ms Jacqui Richards, report that of the eleven animals released, they were able to locate seven of them.

While this is good news, Mr Short said it presents a bit of a mystery.

"We can't use radio collars to keep track of the bandicoots because it interferes with their ability to hunt insects so they lose weight," Mr Short said.

"Instead we have to rely on relocating them by trapping. Females typically have home ranges of several hectares so if they move away from the release area they are very difficult to locate. At the moment, we don't know whether the other four bandicoots have moved off the area, or whether they've been taken by predators."

The western barred bandicoot was once widespread across two thirds of Australia, ranging from the north west of WA to the Liverpool Plains of central NSW. It hasn't been seen on the mainland since 1929 and until now, survived only in small colonies on Bernier and Dorre islands of the WA coast.

Its reintroduction is part of a program to turn the tide of extinctions

which has seen 18 Australian native animals disappear in the last 200 years.

The bandicoot's release follows an earlier project to reintroduce the burrowing bettong, another rare marsupial, to Heirisson Prong in 1993.

"The bettongs are well established now with their numbers capped by foxes which can occasionally break into the area. Our regular fox control program makes sure that this is a rare event," said Mr Short.

The Heirisson Prong refuge is a 12 square kilometre zone that, with the help of the local community, scientists and Earthwatch volunteers, has been fenced off and cleared of feral cats and foxes. It is surrounded by a larger 200 square kilometre buffer zone where cat and fox numbers are controlled by trapping and baiting.

Serendipity is also playing a part at Heirisson Prong. Mr Short reports that another native, the pale field-rat, has established itself in the area. Although not endangered, Mr Short said this species had retreated to coastal fringes in the north of Australia. He believes the population at Heirisson Prong is probably the only one inhabiting an arid zone.

The program's success so far was highlighted at a National Science Briefing, *Back from the Brink*, in Parliament House recently. Scientists discussed Australia's efforts to preserve its flora and fauna, which include research into artificial breeding and cloning techniques. **CNA**



Ms Jacqui Richards holds a western barred bandicoot at Dorre Island. The bandicoots are making a comeback on the mainland after a 50 year absence. Photo: D. Ribbey

What the public really think of CSIRO

by Jane Kahler, CNA

Results from a public opinion survey conducted by AGB McNair in May this year indicate that while 85% of Australians had heard of CSIRO, most know very little about what the Organisation really does.

Commissioned by CSIRO, the survey involved 1,060 Australians in urban and regional Australia, across all socioeconomic groups, male and female, and aged 14 years and over.

Those respondents who said they had heard of CSIRO were asked to state what areas of research they had heard about - unprompted and then prompted by a list of the Organisation's 22 research sectors.

In both categories, the research sector best known to the public was Field Crops, followed by Horticulture. Least recognised were Measurement Standards and Services.

Also faring well in both categories were Meat, Dairy and Aquaculture, and Land & Water, while many industrial research sectors like Coal & Energy and Integrated Manufactured Products, rated low on the awareness scale.

"This result shows that the public perception of CSIRO is unbalanced, with most Australians seeing the Organisation as largely working in agricultural research," said Mr Julian Cribb, Director, CSIRO National Awareness.

"The Organisation really needs to work hard to achieve a more balanced coverage that does justice to all its excellent science."

When it came to who was most aware of CSIRO's research, regional Queenslanders came out on top, with Tasmanians trailing behind the rest of Australia.

Despite the apparent discrepancy in the awareness of CSIRO's research compared to overall awareness, the survey reveals that 64 per cent of respondents believe CSIRO gives value for money, while 7 per cent do not.

Seventy per cent of respondents also think that CSIRO does very good or good quality research, while 21 per cent say they don't know, 9 per cent think the quality of research is fair and only 1 per cent judge it as poor. Approval rating increased with age, and over 55's think most highly of the quality of CSIRO's research.

Similar surveys conducted in 1992 and 1994, asked respondents opinions of CSIRO's value for money, and comparison shows that the Organisation's rating remains steady at 65.5 per cent and 63.9 per cent respectively.

However the most recent results show that while overall awareness of CSIRO increases with age, there are signs of a decline in awareness among those aged between 14 and 24.

More younger people on the other hand appear to rate CSIRO's value more highly than previously, although they still see it as less valuable than older age groups do.

Women judge CSIRO more harshly than men with only 57 per cent believing it gives value for money compared to 71 per cent of men. Women's opinion of CSIRO in this area is declining, down 2 per cent from 1994. Women also rate the quality of CSIRO's research lower than men do.

People from Melbourne, Tasmania and Western Australia now hold higher opinions of CSIRO than they did three years ago, but the approval rating of Sydneysiders, and people living in the ACT/regional NSW and Brisbane has declined.

When comparing responses to CSIRO's value for money and the quality of its research, the survey shows that people regard the quality of CSIRO's research as higher than its value for money.

"The results of the survey identify areas where CSIRO as a whole and individual sectors, can do more to let Australians know what we are doing and why we are doing it," said Mr Cribb.

"We are responding to the findings by developing major TV and radio programs on our scientific advances and discoveries." **CNA**



Awareness of CSIRO research unprompted, then prompted by a list of the Organisation's 22 research sectors.

Strategic Research Plan released

by Andrew Pik*

"When you are up to your neck in alligators, it is hard to remember that the plan was to drain the swamp. Plans are a measure of the difference between hopes and reality. Presumably the CSIRO plan is to guide those who guide those who guide those who do the work. Thus by definition it must be very useful."

So wrote a senior scientist answering a 'trivial pursuit question' on the release of the CSIRO Strategic Research Plan for the funding triennium 1997-98 to 1999-2000. The document is the culmination of a year-long effort by CSIRO staff and Sector Advisory Committees (SACs) following the introduction of the new management arrangements in March 1996.

The process included the Sector Stocktake, the Sector Outlook Forum, the Executive Workshop, the Sector/Alliance and Sector Advisory Committee meetings, the financial 'reconciliations', and the formal endorsements by the SACs, the CSIRO Board and approval by the Minister. Plus all the work that went on behind the scenes by countless individuals juggling their time between meeting contract reporting deadlines, winning new customers, or doing research.

While showing stakeholders the intended direction, planned

outcomes, strategies and makeup of CSIRO's research portfolio at the Sector level, the Plan is not a straitjacket immune to changing circumstances. In the words of one of the SAC Chairs, it has to be a "living document".

There are two distinguishing features of this Plan. The first is the wide authorship represented by the 22 Sector Coordinators responding to the sector outlooks and the Executive Committee's messages and challenges. The second is the involvement of the SACs and their frank comments in the Sector Forewords.

Underlying the Sector overviews which make up the publicly

available Plan, are the individual Sector Plans detailing the work program at what is called the component level - research programs of the order of \$1 million to \$3 million per annum. These Sector Plans are internal documents available from the respective Sector Coordinators.

Hard copies of the Plan (149 pages) and a Summary of the Plan (8 pages) have been distributed widely. Copies are available from Strategic Planning and Evaluation (spe@exec.csiro.au) and can be accessed via the CSIRO home page or at <http://www.csiro.au/csiro/stratplan9700/index.html> **CSIRO**

*Andrew Pik is General Manager, Corporate Activities, Canberra.



Getting it right: the social and industrial mix

by Jane Kahler, CNA

Big decisions by big business should take account of community and stakeholder views. CSIRO Minerals has come up with a program to help cross the cultural barriers.

Prompted by the growing complexity of financial, technical, environmental and social issues in the minerals industry, the research program is developing decision support tools which take a systems, or 'holistic' approach, and allow social values to be incorporated into engineering models.

The tools also look at the entire life cycle of an industrial

process, from the raw materials, through the manufacture and then the disposal of a product, presenting companies with a 'big picture'.

"We're looking at helping metal producers and other industries evaluate what they need to meet social, economic, environmental and engineering objectives," said Program Manager, Mr Graeme Hedley.

"Companies know that their 'licence to operate' is affected by community acceptance of what they do, where they do it, what they produce and how they produce it."

The system works by keeping an audit trail of social values affecting an issue, so when the time comes for a decision to be made, companies can trace all inputs from stakeholders and the community.

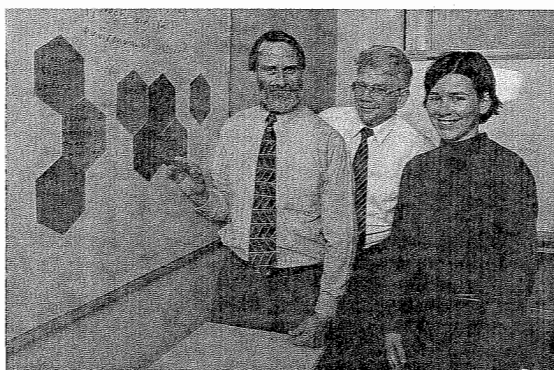
"It's not an 'expert system', so a computer doesn't make the decision," Mr Hedley said. "You can't turn social values into algorithms or money values."

Mr Hedley and his team are working alongside industry to develop the system, devising techniques for companies to use in their consultative processes with stakeholders.

The research will also provide a way to enhance Environmental Impact Assessments (EIA) used to gauge the effect of industrial or other human activity on a particular environment.

"EIA tends to focus on one way of doing things and evaluates the environmental effects. If the systems approach is used, companies may be able to find a better way to do something that suits more people, because it brings more information and involves more people."

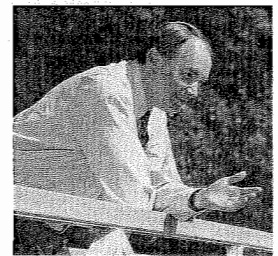
"What we ultimately hope to achieve is a 'business' flight simulator where a mining company for example can set up several scenarios on a model, and make mistakes there rather than in the real world," Mr Hedley said. **CSIRO**



Mr Graeme Hedley (left), Mr Jim Thurlby (centre) and Ms Fiona Solomon (right) are developing a 'systems approach' that will help industry take account of environmental and social values in its decision making. Photo: D. Risbey

Moore steps into science seat

Science has a new Minister - Mr John Moore, Minister for Industry, Science and Tourism. Mr Moore, the only Queenslander in Federal Cabinet, represents the Brisbane metropolitan seat of Ryan. Before entering Parliament, Mr Moore was a businessman and stockbroker. He was first elected in 1975, and served (1980 - 1982) as Minister for Business and Consumer Affairs in the Fraser Government. While in opposition, Mr Moore held a number of shadow portfolios including Finance, Communications, Transport and Aviation, Business and Consumer



Affairs, and Industry and Commerce. Mr Moore has a notable sporting background. While today he enjoys golf and fishing, in 1956 he played tennis at Wimbledon. **CSIRO**

Star boffins baffled by tiny twinkler

Using CSIRO's Australia Telescope, University of Sydney student Ms Lucyna Kedziora-Chudczer and her colleagues captured the signal of an extraordinary quasar - challenging current theories of how quasars 'work'.

Quasars are tiny, star-like objects that emit a tremendous quantity of energy. Located at the outer reaches of the Universe, quasars have intrigued astronomers for years and the quest to find out more about these enigmatic objects like how they are formed, what turns them on and how long they live, has seen theories come and go.

For her PhD thesis Ms Kedziora-Chudczer has been studying radio emissions from quasars and other violent galaxies. One, called PKS 0405-385, stood out from the pack because of its bizarre behaviour.

"We saw this astonishing variation in the source strength - 50 per cent in half an hour at high [gigahertz] frequencies," said Ms Kedziora-Chudczer. Other varying radio sources are known, but PKS 0405-385 is "more than an order of magnitude faster, and many times stronger, than any other extragalactic source," she explained.

Explaining the quasar's hot-shoe shuffle has been quite a challenge.

More than a decade ago, astronomers started finding other distant 'radio galaxies' whose emission varied markedly from day to day. This variability implied that these objects must be very small, because some kind of 'signal' or process must be telling all parts of the object when to fluctuate, and that 'signal' can't travel across the object faster than the speed of light.

This means that the radio source can be no bigger than the distance light can travel in the time the sources take to vary. The faster the fluctuations, the smaller the source must be.

Crunching the numbers implies that PKS 0405-385 has a radio-emitting region so small it would fit inside the orbit of Jupiter.

To pump out all its radiation - equal to that from a whole 'normal' galaxy - from such a tiny volume, PKS 0405-385 would have to be incredibly hot, about 10^{11} degrees.

But the current theory of how quasars work says a quasar can be no hotter than 10^9 degrees - 1,000 million times less.

According to Ms Kedziora-Chudczer, this quasar, like many others, is probably shooting a beam of electrons in our direction, at relativistic speeds. Many such objects are known and they can exhibit odd effects, including the illusion of faster-than-light movement. Early on it was suggested that such an electron beam was causing this quasar's shimmering emission.

But that can't be the whole story. The relativistic effects seen in other quasars are only about 1% of what you'd need to explain the variability of PKS 0405-385, says theoretician Dr Mark Walker of the University of Sydney.

Dr Walker, and other theoreticians such as Dr Barney Rickett of the University of California, have ruled out several explanations and now opt for 'interstellar scintillation' or Galactic twinkling.

For the 'twinkling' hypothesis to be right, the quasar still has to be very small - the smallest known, hundreds of times smaller than these objects typically are. "This [scintillation] explanation reduces the problem by at least six orders of magnitude," says Dr Rickett. But even so, "conventional emission mechanisms are still stretched too far". New ideas are needed.

An all-out observing assault has now been launched against the quasar, with X-ray, optical and more radio observations scheduled or under way.

CSIRO's Australia Telescope Compact Array observes the quasar once a week. "For this kind of work, the Australia Telescope is probably the best instrument in the world," says CSIRO's Dr Mark Weiringer, a member of the observing team.

The quasar is also being observed by the first space-based radio telescope, launched this year by Japan.

If this does turn out to be a case where we've landed ourselves a valuable new tool - one which will let them study the structure of radio sources in detail 100 times finer than they can with current techniques. **CSIRO**

CSIRO's ozone warrior wins world fight

An accelerated phase out of the last significant ozone-depleting chemical, methyl bromide, has just been agreed to by the international community - thanks largely to the efforts of CSIRO chemist Dr Jonathan Banks who has led the international campaign against the chemical for some years.

Despite methyl bromide being one of the most damaging ozone-depleting chemicals, it has proved the hardest, politically, to kill-off because it has no single chemical alternative.

It is the most used fumigant in the US horticulture and bulb flower industries, and is applied before planting to control insects, fungi, nematodes and weed seeds. It is also used as a post-harvest fumigant for stored grain.

The political drama surrounding the decision late in September to finally ban methyl bromide included a sustained attack by the chemical's manufacturers and users on Dr Banks, who is chairman of the United Nations Environmental Program's methyl bromide technical options committee.

The final battle in Montreal illustrated the difficulty that environmental scientists have when challenging the products of big industry. Dr Banks was accused by chemical industry lobbyists as having overstated the ability of food producers to find alternative pest control measures.

However, after two weeks of debate, 160 nations, including

Australia, agreed to fully phase-out methyl bromide and even speed up its removal from 2010 to 2005.

For the first time in the long-running battle between environmentalists and the US chemicals and horticultural industries, the phase out has also been extended to cover developing nations which will have until 2015 to cease its use.

Methyl bromide is 50 times more damaging to ozone than is chlorine from chlorofluorocarbons (CFCs). The US Clean Air Act lists methyl bromide among those substances "that cause such grave damage to the Earth's protective ozone layer that their costs to society (in terms of human health and environmental degradation) far outweigh any potential benefit or short-term profit".

The counter argument put by the chemical's manufacturers and sections of the US farm lobby is that methyl bromide is crucial for effective food production.

The recent talks, called to review a 1995 preliminary phase-out decision, gave the pro-methyl bromide lobby the opportunity to mount a determined bid to keep the chemical in use.

The position pushed by Dr Banks has been that the largest users of methyl bromide are strawberry, tomato and bulb flower growers - not the producers of staple foods for the world's hungry.

Dr Banks said the reason for the determined last-stand by methyl bromide's proponents was because the chemical has no commercial substitute:

"Companies happily supported the phase out of CFCs because they had a ready substitute - HCFCs (hydro-fluorocarbons). But there is no single product replacement for methyl bromide.

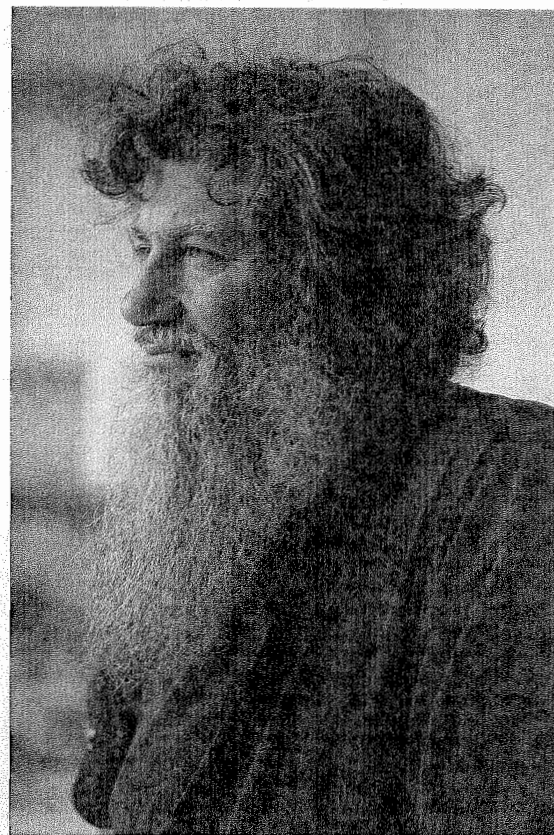
One alternative, for example, is steam fumigation. Other alternatives include changes in cultivation practices, biological control agents, plant breeding and the use of controlled atmospheres using nitrogen and carbon dioxide."

He said agriculture departments, including those in Australia, had wanted to keep methyl bromide because it is a "magic bullet".

"It is convenient, effective and low-cost, covering a range of fumigation needs and circumstances. The alternatives will be more complex, requiring integrated pest management strategies tailored to specific locations, crops and circumstances."

When 160 countries first signed the Montreal Protocol on ozone-depleting substances in the late 1980s, methyl bromide was omitted because of the question mark over alternatives. Nonetheless, many countries began phasing out the chemical anyway, including developing nations such as Colombia, a large flower exporter, and Indonesia.

The Netherlands banned methyl bromide in 1992 because of its toxicity and risk to groundwater. The European Union had already agreed to phase out methyl bromide by 2005. - Brad Collis



Ozone guru - CSIRO's Dr Jonathan Banks. Photo: Brad Collis

Winter wheat a winner for plant scientist

Dr Jim Davidson, a wheat breeder at CSIRO Plant Industry, has been awarded the prestigious Australian Medal of Agricultural Science by the Australian Institute of Science and Technology.

The award recognised Dr Davidson's contribution to Australian agriculture through the development of winter wheat varieties for Australia's high rainfall zones.

"Jim has revolutionised the geography of wheat in Australia. Before his research, wheat was

confined to the traditional low to medium rainfall regions of Australia. Now, wheat can be grown right across the high rainfall areas, some of the most fertile soils in Australia," said Dr Jim Peacock, Chief of CSIRO Plant Industry.

"This award is a just recognition of the importance of Jim's research for Australian agriculture."

The winter wheats developed by Dr Davidson, Paterson, Lawson and the new variety, Gordon, allow farmers in the high rainfall zones to

have their grain and graze it too.

Winter wheats are dual-purpose. They can be grazed in winter, when livestock feed is in short supply, and then recover after grazing to produce a high-yield grain crop. This can make a crucial difference to farmers during marginal seasons, avoiding bare fields and expensive supplemental feeding.

The winter wheat program is supported by the Australian Wheat Board, the Grains Research and Development Corporation (GRDC) and royalties from growers.



Dr Jim Davidson was awarded the Australian Medal of Agricultural Science by the Australian Institute of Science and Technology for his work developing winter wheat varieties. Photo: Visual Resources Unit, CSIRO Plant Industry.

R&D boosts the car game

by Trish Blakey, CNA

Australia is becoming a major player in the global car game with high-tech parts made from ultra-light and strong modern materials.

At the recent National Science Briefing *Wheels of Fortune*, Parliamentarians were told that vehicle parts could overtake wool, iron ore and wheat as export earners within seven years if current industry growth rates are sustained.

Automotive parts researched, designed and made in Australia are expected to earn the nation \$1 billion this year, rising to an estimated \$3 billion by 2005.

"The trend in the car industry is to let specialist parts suppliers research and design the best quality component," said CSIRO's David Lamb, Chief Executive of the Australian Automotive Technology Centre. "I don't know of any other area of such promise and with such positive implications for employment growth."

Australia's growing lead in the industry is paying off with international vehicle industry giants looking to it as a centre of R&D excellence.

Products developed and manufactured in Australia are now selling to European customers such as Mercedes, Volkswagen, Opel, Fiat and Volvo. Australia will soon produce 25 per cent of the total world demand in diodes for alternators.

Dr Kurt Leidtke, Managing Director of car parts manufacturer Robert Bosch Australia, told the Briefing its parent company in Germany, The Bosch Group, is prepared to invest more of its R&D budget in Australia.

"Australia has an edge over Eastern Europe in that it has an excellent educational base, excellent universities and excellent engineers," says Dr Leidtke.

"This competitive edge coupled with a secure political and economic environment has persuaded Bosch headquarters in Europe to transfer more of its R&D activities to Australia."

Dr Leidtke said Robert Bosch Australia planned to export \$200 million worth of components to Germany by 2000 and \$300 million worth by 2005. Its anti-lock braking systems production line at Clayton is already producing two units for export to every one unit for the Australian market.

Australia also has the technology to become a key player in the next generation of hybrid electric vehicles (HEVs). Plans for an Australian HEV will be unveiled shortly, and may include technologies such as CSIRO's revolutionary wheel motor and supercapacitor.

National Science Briefings continue their successful run in Parliament House until the end of this year. There will be a new program for 1998.

The Diners Club Overseas Travel Awards, initiated by CSIRO Chief Executive, Dr Malcolm McIntosh, assist scientists to travel to international conferences or laboratories. Two recipients report on where the Award took them.

Public support key to waste recycling success

A successful biosolids application program should be visible and accountable to the public, be based on sound research, and have comprehensive input from interested environmental groups and local land holders on a continuous basis, writes Dr Randall Falkner, a soil chemist working on the Wagga Wagga Effluent Plantation Project in CSIRO Forestry and Forest Products.

Randall received a Diners Club Overseas Travel Award to attend the 'Forest Alternative Principles and Practice' conference in July in Seattle. While there he took a close look at the US approach to reusing biosolids.

'Forest Alternative Principles and Practice' was an international symposium in Seattle and Vancouver on the use of residuals - biosolids/sludge, effluent, ash, paper pulp and so on - as soil amendments in forest ecosystems.

The conference focused on scientific aspects related to nutrient dynamics, fate of heavy metals, ecological risk assessment and the health and productivity of trees. This article concentrates on the more problematic and topical issue of community acceptance of waste application to land.

The beneficial reuse of wastes to grow trees is an accepted practice in many parts of the world including the US, Canada, New Zealand and Australia. Local residents are likely to react with NIMBY (not in my back yard), LULU (locally unacceptable land use) and BANANA (build absolutely nothing anywhere near anyone) to changes in land use in general and application of wastes in particular.

Protest groups have halted some reuse programs in Australia. Most community concerns are born of too little information, misconceptions and fears about health and environmental issues, and a wish to preserve their surroundings from change.

Protest groups often use other issues, such as city against country - "why should we take care of other people's problems?" or "let the cities take responsibility for their own wastes!"

King County, formally known as Seattle Metro, manages biosolids as a resource that is recycled through land application.

The Biosolids Program, though highly successful, has on occasions been rejected by local communities. After years of experience, King

County concluded that collaborative relationships with the users - the private sector - yields the best results.

For example, the Mountains to Sound Greenway Biosolids Forestry Program is a consortium of a private company, Weyerhaeuser, public utilities, Washington State Department of Natural Resources and King County, which has undertaken a reforestation program along the I-90 highway corridor east of Seattle.

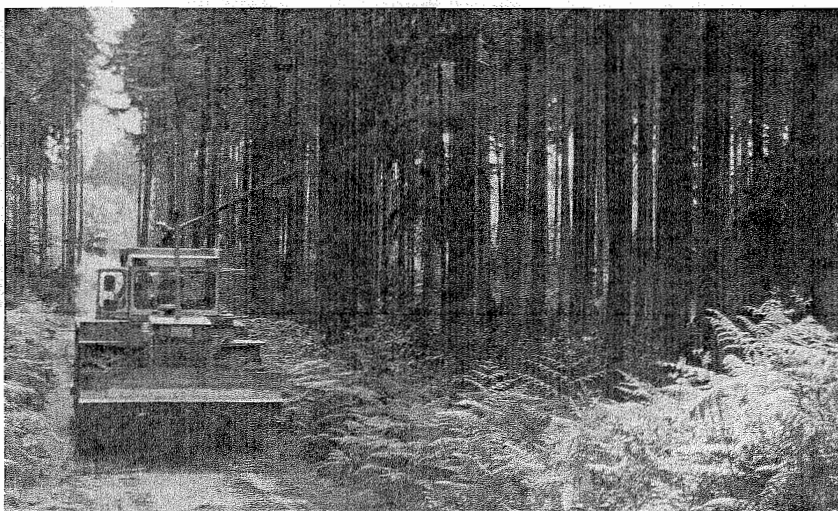
The Mountain to Sound Greenway Trust, a local non-profit conservation group, uses compost made from biosolids to restore logged-over mountain slopes, repair erosion sites and road scars. It also conducts public education and schools programs on the public health and ecological benefits of

biosolids recycling and the desirability of sustainable commercial forestry.

The reuse of wastes to grow trees is more advanced in Washington State, not because of a greater technical advantage, but because of greater public acceptance.

This has been achieved by engaging conservation groups who have provided effective public outreach programs and strong, independent third-party allies and spokespersons to engender public acceptance.

In Australia, greater public acceptance and more enthusiastic support for recycling wastes in forests and agriculture can be anticipated by applying the lessons learnt in Washington. **CSI**



Liquid biosolids application using high pressure spray nozzle at the City of Bremerton (Washington State USA). Discolouration, caused by biosolids on the trunks of trees and understorey, largely disappears within one month. Photo: Randall Falkner

Plant molecular biology towards 2000

While Singapore remained shrouded in smoke from the devastating destruction of a large section of the world's forests, over 2,000 plant scientists from around 80 countries met at the 5th International Congress of Plant Molecular Biology (ICPMB) in downtown Singapore in September.

Thanks to a Diners Club Overseas Travel Award, Dr Paul Ealing was among the scientists there. Armed with a provisional patent allowing him to present some results of his last two years of research at CSIRO Tropical Agriculture, Paul writes that he was pleased to have confirmed what he'd always believed: that if it wants, CSIRO can lead the world in genetically engineering plants for enhanced nutrient uptake. This has the potential to result in higher crop yields and perhaps improved crop quality attributes such as increased micro-nutrient levels of iron, molybdenum and zinc.

The molecular era of plant biology is well on its way. Dr Chris Somerville, Director of the Carnegie

Institute at Stanford opened the Congress with a reminder of possibly the most powerful direction in plant molecular biology today - identifying the complete sequence of an organism's genome and creating a data base which includes tagged sequences from many of its transcribed genes.

Called 'genomics', most of this work is based around model plants like *Arabidopsis thaliana*, a tiny, short-lived weed that is used because of its small genome and good genetics.

Ten per cent of *A. thaliana*'s 20,000 genes has been deciphered and scientists expect to sequence its entire genome before 2004.

One interesting finding from the *A. thaliana* genome sequencing project is that a large proportion of ORFs - open reading frames or sequences capable of encoding a protein - around 40 per cent, encode genes involved in transcribing other genes or sending and receiving signals such as those involved in the perception of day length. Other categories like disease resistance genes (5 per cent) and stress related genes (5 per cent)

seem much smaller, perhaps indicating the molecular complexity of regulatory aspects of plant biology.

The work covered by the provisional patent followed from earlier scientific successes Paul enjoyed with Dr Frank Smith in which they cloned and published the sequences of the first plant sulphate and phosphate transporter genes. These genes encode controlled gateway proteins that enable plants to take up nutrients through their roots.

Paul says the data he presented, much of it unpublished, was received with somewhat worrying interest from his competitors. He was surprised that his group was the only one represented at such a large international conference with results indicating that enhanced nutrient uptake in transgenic plants is possible.

From the many other outstanding contributions made by other Australian plant scientists, Paul says it is clear that Australia is in the forefront of many areas of plant molecular biology and that CSIRO has a central role to play in that. **CSI**

Offshore

Nairobi workshop gets a big tick

CSIRO technology has identified a major unrecognised risk of disease being spread by a tick presently confined to Sudan, but with potential to spread with cattle herds to neighbouring countries.

"When refugees in the region bordered by southern Sudan, Uganda, Ethiopia and Kenya move, they take their cattle with them," said CSIRO Entomology's Dr Bob Sutherst. "It's this movement across borders that could facilitate the spread of the tick."

Dr Sutherst ran a workshop in Nairobi in September where participants used the Division's CLIMEX program, which has been enhanced by the CRC for Tropical Pest Management (CTPM), to predict those areas where the potentially damaging tick could spread unless precautions are taken.

Dr Sutherst reports that using Entomology's T3HOST tick model, workshop participants developed tick control strategies that are more cost-effective than programs now in place, while Entomology's MATIX tick teaching model let them role play a cattle owner making decisions on how best to control ticks.

The T3HOST tick model was rewritten using the user friendly DYMEX population modelling package developed by the Division and CTPM.

Hosted by the International Centre for Insect Physiology and Ecology and supported by the Australian Centre for International Agricultural Research, the workshop allowed Dr Sutherst to test the tick models in Kenya and identify possible improvements in the software.

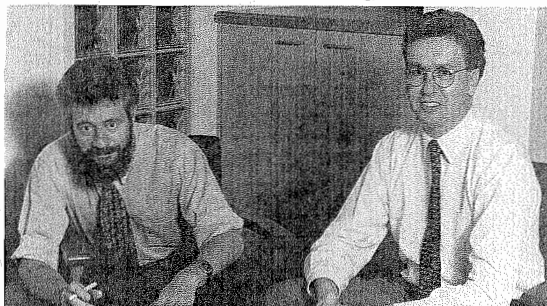
Entomology Chief seconded to DIST

Dr Paul Wellings, Chief of CSIRO Entomology, has accepted a secondment to the position of First Assistant Secretary, Science and Technology, in the Department of Industry, Science and Tourism (DIST).

In a joint message to staff, Dr Malcolm McIntosh of CSIRO and Mr Russell Higgins, Secretary of DIST, said that the secondment gives the Department direct access to the scientific community and a great deal

of expertise in policy formulation and program management. From CSIRO's point of view, it gives a very capable senior officer direct exposure to policy formulation and the ways of Governments and departments.

The secondment commenced on October 13 and is for a period of 18 months to two years. During Dr Wellings' absence, Dr Jim Cullen, currently Deputy Chief of the Division, will be Chief of CSIRO Entomology. **CSI**



Dr Jim Cullen (left) will take on the role of Chief at CSIRO Entomology while Dr Paul Wellings is on secondment to the Department of Industry, Science and Tourism. Photo: CSIRO Entomology

Research roundup

CSIRO research in the news, compiled by Nick Goldie, CNA

TOPOG: into cyberspace

TOPOG is a sophisticated computer system which predicts the movement of water through the landscape. It was developed by Dr Rob Vertessy of CSIRO Land and Water and his colleagues at the CRC for Catchment Hydrology. One of TOPOG's first tasks was to plan the disposal of sewage effluent from a forest recreation area near Canberra.

Now TOPOG, in a refined and more powerful version, has been made available to researchers around the world through the World Wide Web: <http://www.dwr.csiro.au/topog>

Siris prospect

Dr Brian Lowry of CSIRO Tropical Agriculture is enthusiastic about a tree called Siris (*Albizia lebbek*): Siris is native to northern Australia, but until now its many virtues have not been recognised. Smaller shrubby trees have been grown as fodder in drought periods, while larger trees have provided timber for craft - Siris is in fact exported from India to Europe as high value 'East Indian Walnut'. It is also a legume and enriches the soil with nitrogen, and so encourages rich growth of grass under its canopy. All this, says Dr Lowry, opens the possibility of a new agroforestry system, and he and his

colleagues are investigating a number of related Siris species.

What to do with all that salt

Nobody has yet come up with a satisfactory affordable long-term answer to the problem of storing saline groundwater. There have been some ingenious short- and medium-term ideas, even to using inland saline water to create a new (inland) prawn-farming industry. However, Dr Kumar Narayan of CSIRO Land

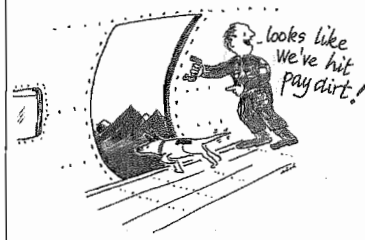
and Water has suggested a very practical solution: store the water in specially designed ponds, owned and built by groups of irrigators, and sited in areas where groundwater movement is slow and the deliberate leakage from the ponds cannot contaminate the river system. Dr Narayan estimates that more than a million tonnes of salt is diverted from reaching the River Murray each year, and the waste saline water is being stored in existing lakes or evaporation basins, some of which are already saltier than the sea.

Airborne watchdog spots underground wealth

Cerberus the dog was the keen-eyed guardian of the Underworld. Cerberus is now the name of an airborne surveying system developed by World Geoscience Corporation, the CRC for

Australian Mineral Exploration Technologies, and CSIRO Exploration and Mining.

A single survey aircraft will be able to collect information (electromagnetic, magnetic, radiometric and spectral) which would otherwise need three separate airborne surveys. The \$12 million project, due for completion in 2000, is one of the first to receive funding under the Government's START R&D development program.



Labs honour former scientists

When Environmental Mechanics and the Divisions of Soils and Water Resources merged, the new CSIRO Land & Water found itself with two of the three laboratories at its Black Mountain site in Canberra rather unceremoniously reduced to 'buildings 301 and 201'.

Seeing an opportunity to honour two of its most distinguished scientists, each laboratory was given a new name in separate ceremonies attended by the families and former colleagues of each scientist.

In honour of Dr Clifford Stuart Christian, founding Chief of the Division of Land Research and Regional Survey (1957), the former Water Resources building became the CS Christian Laboratory. Dr

Christian retired from CSIRO in 1972 after a 43 year career, part of which was spent on the Executive. He died on June 7, 1996.

The old Soils building was renamed the Bruce E Butler Laboratory after soil scientist and Officer-in-Charge of the site for 21 years, Dr Bruce Butler. Dr Butler's career with CSIRO spanned 39 years with time out to serve in the RAAF during WWII.

Dr Butler died in January 1994, and on accepting the invitation to unveil a commemorative plaque, his widow Mrs Butler remarked: "I very much doubt if he [Bruce] would ever have entertained the idea of such recognition, but I can imagine him dancing with pleasure at the reality." **CNA**

Holidays in Hell needs you!

Scientists are the sort of people who, while on holidays, take photographs of 'sciency-things' like environmental degradation instead of pictures of their family in front of the Eiffel Tower.

Some CSIRO people may be aware that the former Multi-Divisional Program for Tourism is continuing as the Tourism Research Program (TRP).

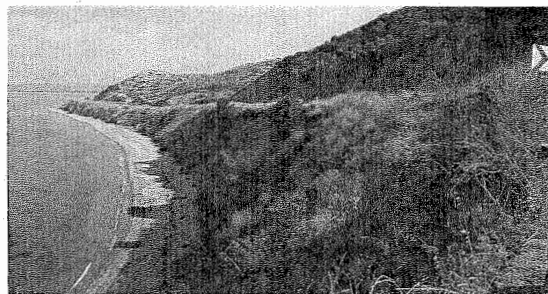
Currently worth \$60 billion in Australia, tourism is a growth industry that makes use of the environment in a major way. Unfortunately the tourism industry has little research culture and part of TRP's job is to help build one.

To this end, program coordinator Dick Braithwaite is keen to obtain photographs and stories of environmental, and also social and economic, impacts of tourism.

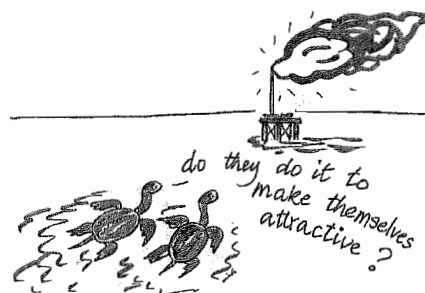
Overseas examples are keenly sought so we can argue that this is what Australia must avoid, and CSIRO has the people needed to do the research.

TRP would like you to dig out your photographs and send them to Holidays in Hell, CoResearch, PO Box 225, Dickson ACT 2602 by Friday January 9, 1998. Please also indicate whether Dick can copy and use your pics for the Program.

A prize will be awarded for the best "impacts of tourism" photograph and caption, and with around 20 shopping days 'til Christmas, TRP ought to come up with an appropriate one. Think broadly - bad planning, bad taste, bad service and other bad experiences are all eligible. A winner will be announced in the February CoResearch. **CNA**



Gallipoli, Turkey. A road has been built across the face of the slopes of Gallipoli over which the intrepid Anzacs fought in 1915. It has been built to service access to the area for tourists. The fill from excavation for the road has been deposited on the upper beach, reducing the width of the original beach. While tourists wish to visit the memorials, the original landscape has been destroyed to facilitate this. Photo: Peter Forrest



Oil flares don't turn turtles

Turtles, especially baby ones, are attracted by light - but not the orange-red flares of burning gas on oil and gas platforms along Western Australia's Northwest Shelf.

Dr Peter Hick and Ms Cindy Ong of CSIRO Exploration and Mining have found that despite the massive flares which light up the night sky, thousands of baby green and loggerhead turtles continue to navigate by the moon. The oil companies were concerned that they were providing a turtle smorgasbord for predators.

Big fish in large ponds

Zooplankton eat blue-green algae. Little fish eat zooplankton. Big fish eat little fish. Conclusion: if you anticipate a blue-green algal bloom, just add fish. Big predatory ones. Dr Vladimir Matveev and Dr Gary Jones of CSIRO Land and Water argue that algal blooms may be due in part to imbalances in the aquatic food chain. Barramundi and perch have been

introduced to restore the balance in several Queensland lakes, and so far the results have not been blooming.

Coming soon to breakfast...

Sunmuscat is a new variety of seedless grape, especially developed by CSIRO Plant Industry for the dried fruit market. According to researcher Peter Clingeffer, Sunmuscat has a distinct muscat taste, is sweeter than normal raisins, and is very suitable for products such as breakfast cereals. Australian exports of dried grape products are worth almost \$70 million annually. **CNA**

Clarification

For everyone who wondered, the very last sentence of last issue's *Research roundup* was: "Ultimately, says Dr McMurchie, people at risk of heart attack could follow a diet that builds up a store of protective substances in the heart".



Mailbox

On the sheep's back

I noticed that there is an article on the Australian Medical Sheepskin in the August edition of CoResearch. May I make the following observations:

1. The Federal Minister for Health is "The Hon. Dr Michael Wooldridge";
2. The cost of pressure ulcers to the Australian taxpayer is \$350 million PER ANNUM;
3. There is only one Australian Standard underpinning this new product and this Standard was developed as an integral part of the new technology to ensure that if a sheepskin is sold as an "Australian Medical Sheepskin" it meets certain performance criteria;
4. These Australian Medical Sheepskins undergo thermal disinfection by the mere fact that they are washed in hospital laundries (there are not separate washing and disinfection processes). These laundries wash at high temperatures (60°-80°C) as a matter of course. The Australian Medical Sheepskins have been through the hospital laundry process more than 50 times without compromising their pressure relieving properties, or the suppleness of the leather (which has been the problem in previous medical sheepskins).

Diane Beruldsen
CSIRO Leather Research Centre

JOIN DOUBLE HELIX

A Special Offer to CSIRO staff and families - \$5pa discount on Double Helix membership just \$20 a year. You can:

- join up anyone in your family
- give Double Helix membership to a relative or friend
- extend your current membership
- join or extend your membership for as many years as you wish

BE QUICK - THIS OFFER ENDS AT CHRISTMAS!

If you would like this membership as a Christmas present, we can send the December issue of *The Helix* addressed to you together with the joining kit so you have something to put under the Christmas tree, but don't delay!

We also have a colour catalogue full of great gift ideas with a range of prices - from stocking stuffers to more challenging science.

Contact Lynn Pulford on tel (02) 6276 6643, fax (02) 6276 6641 or email education-programs@helix.csiro.au

SPECIAL OFFER \$20



CSIRO around the nation

O caption, my caption!



The response to last issue's pic (above) shows that no matter what age or station in life, mud still captures the imagination and whisks it down many avenues - some of which most of us would rather not go.

Plant Industry's Robert Solomon offered: "The merger of Soils and Water was judged a complete success," and "I know that transgenic frog is in here somewhere."

Julie Penn from Atmospheric Research sent: "I think finding your contact lens is a lost cause in this lot, mate." Lynn Pulford at CSIRO Education Programs and Wolf Herrmann from Animal Production also went for the contact lens theme.

Bruce Brown, from Animal Production suggested: "High Tech Research - β alanyl histidine Mud Pack." While Graham Pearce from Wildlife and Ecology came up with: "CSIRO's latest technological breakthrough 'Siropan' is worth its weight in gold."

From Entomology's David Dall: "Are you sure it was a five cent piece?"

This truly revolting one comes from Stewart Needham at Environment Australia: "That's odd - I haven't had sweetcorn and carrot for at least a month."

Equally revolting is this entry from Telecommunications & Industrial Physics' Shaun Morley: "I thought you said the kids left GOLD nuggets in this pool."

A more decorous entry came from Tania Radziewicz of Animal Production: "Keep looking Frank. My wife will kill me if I don't find that ring."

Stephan Wellink, CSIRO Agribusiness Alliance, sent: "I told him to dive in at the deep end."

From Marlee Little of Animal Production came: Childhood fantasies taken to the limit. Tommy and Johnny seen here playing in the sandpit - "Can't wait to get my gear

off Tommy and take a dip in the wading pool behind me."

Anthony Thorley from Telecommunications & Industrial Physics was obviously concerned about the cuisine there when he wrote: "Hampered by savage cutbacks, chefs at a CSIRO canteen struggle valiantly in their efforts to continue serving edible meals to the staff."

Mal Jones, from the CRC for Landscape Evolution and Mineral Exploration: "It's getting dark ... Let's hope we find the car keys in this one."

Bill Winter at CSIRO Tropical Agriculture sent: "What do you mean - this is world class science!"

David Symington at the Collins Street office in Melbourne offered: Radcliffe to Mallett - "I'm sure Malcolm said that if we put Soils and Water together we would get an interesting outcome."

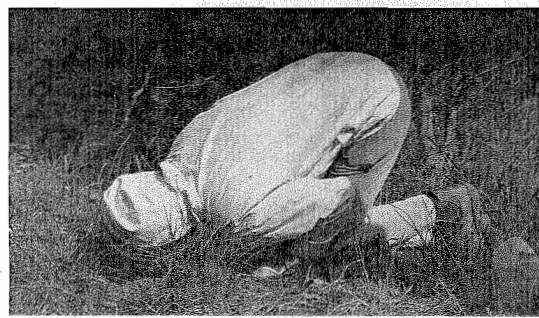
Some with a more political flavour came from Phillip Moore at the Corporate Centre in Canberra: "CSIRO prepares for policy debate," and "Mud slinging scandal: Canberra blames CSIRO."

And finally Karl Armstrong from CSIRO Enquiries sent: "Quick, let's finish this earthworm experiment before those kids demand their sandpit back!" (CSIRO earthwormer conversation overheard at Land and Water childcare centre, Urrbrae SA).

But there can only be one winner, and this time it's Bill Winter for: "There has to be some IP in here somewhere." Onya Bill! You win a magnificent prize of a CSIRO Student Research Scheme Mug.

Have a go at the pic below sent by CNA's Nick Goldie, and your nose could be shielded by a CSIRO Double Helix cap.

Keep sending photos and captions to *CoResearch* Caption Competition, PO Box 225 Dickson, ACT 2602, or email Jane.Kahler@cc.csiro.au



Awards, prizes and honours

The Australia Telescope National Facility was awarded a "High Commendation" in the Engineering Excellence Awards of the Institute of Engineers, Sydney Division in September.

ATNF's entry was the "Upgrade to the Parkes Radio Telescope", nominated in the Project Development - Infrastructure category. Partners in the project were Connell Wagner and Evans Deakin Engineering.

Dr Laurie Piper, a scientist at CSIRO Animal Production who has devoted his working life to genetics and wool technology, has been named as the first recipient of a prestigious wool industry award.

Created this year to honour a person, other than a wool grower, who has made the highest contribution to the Australian Wool Industry, the Cheilain Award of Excellence for Contribution was initiated by Korean wool buyer and processor, Cheil Industries, as a spinoff from its existing award for superfine wool production launched in 1994.

Dr Piper is the former director of the Cooperative Research Centre for Premium Quality Wool (Wool CRC). He held that position since it was established in 1993, and recently relinquished it to return to CSIRO Animal Production.

The Institute of Electrical and Electronics Engineers, which has over 300,000 members, named Dr Vincent Morgan, an Honorary Research Fellow at CSIRO Telecommunications and Industrial Physics, as the recipient of the 1998 IEEE Herman Halperin Electric Transmission and Distribution Award "For contributions to the

Obituary: Dr Elias K Chacko 27/9/41-21/8/97

Elias Chacko, Senior Principal Research Scientist and Officer-in-Charge of CSIRO Plant Industry's Horticulture Unit in Darwin, died on Thursday August 21 1997.

Elias was recruited to CSIRO from India, in October 1985, to lead the (then) Division of Horticulture's new research venture in tropical fruits for northern Australia. He came to us with an international reputation for excellence in both disciplinary and practical research in mangoes and other tropical fruit.

His infectious enthusiasm for research and strong scientific leadership rapidly gained him wide support in the Northern Territory and northern Australia from both researchers and industry. He catalysed interactions between State Departments, CSIRO and Universities, at the same time involving industry with apparent ease.

Elias' approachability, teaching skills, interest and willingness to share ideas inspired great loyalty from his staff. He also earned utmost respect for his expertise, both in practical and academic studies, from colleagues in CSIRO around

Meetings and conferences

CSIRO Molecular Science organised and hosted a "Chemical Skills in CSIRO Workshop" in September. The aims of the workshop were to showcase chemical expertise and related instrumentation available within CSIRO, share information, discuss opportunities and to network. Nearly 100 people attended from CSIRO, industry, academia and Government departments.

CSIRO Division of Human Nutrition hosted the most recent in its series of industry conferences, "Gut Health: Make it your Business" in Adelaide in September.

The conference attracted senior food industry executives and research specialists. It focused on the promotion of digestive health through better nutrition. Speakers also examined some of the business opportunities, consumer concerns and regulatory constraints associated with nutritional gut health benefits and how these are communicated to the consumer.

The conference concluded with a light-hearted session on working with CSIRO. A video segment of a Marx brothers film, "The Contract" was shown to demonstrate CSIRO's increasing customer focus.

This was followed by a quiz show "Stump the staff". Prizes were offered for the best questions on how CSIRO may work more effectively with industry.

understanding of the electrical, mechanical and thermal behaviour of electric power transmission and distribution lines."

The international application of Dr Morgan's work on the current ratings of overhead transmission and distribution line conductors has resulted in considerable economic benefits. It is estimated that the uprating of lines using his methods has resulted in the saving of hundreds of millions of dollars which new lines would have cost to construct.

Dr Peter Clingeffer from CSIRO's Plant Industry has won the inaugural SA Wine Innovation and Achievement Award. The award was for Dr Clingeffer's role in the development of innovative vineyard-management techniques.

Orange had a field day

Nearly 12,000 people came to see the CSIRO Guest Exhibit at this year's Australian National Field Days, held in Orange, NSW, 11-13 November.

Divisions taking part were Entomology, Plant Industry, Forestry and Forest Products, Wildlife and Ecology, Animal Health, Animal Production, Land and Water, Wool Technology, the Australia Telescope National Facility, CSIRO Enquiries, as well as the Double Helix Science Club and the CRC for Vertebrate Biocontrol.

CSIRO's exhibit successfully emphasised the importance of CSIRO's research to Australia's primary production industry as well as demonstrating the huge range of research across the Organisation.

A highlight was the launch of a special World Wide Web site offering clear explanations and the latest research on Greenhouse, the ozone layer, El Nino and how they might affect Australia.



Australia and, despite his apparent isolation in Darwin, was regarded by all with both affection and pride.

Among his most notable achievements were the description of photosynthetic performance and water relations in tropical trees, particularly mangoes, his introduction of the mango flowering treatment to enable reliable mango production in the Northern Territory, and the supervision of the cashew breeding program which resulted in the production of new selections with high yields which are now undergoing extensive evaluation.

He will be sorely missed as a colleague, friend and inspiration.

Our sincere and deepest sympathy to Grace, Arun and Prita Chacko in Darwin. - Angela Gackle

CoResearch is published by CSIRO National Awareness (CNA) for CSIRO staff and interested outsiders.

Editor: Jane Kahler

Assistant to Editor: Karen Robinson

Design and art production:

design ONE SOLUTIONS, Canberra

Printed by: Pine Printers, Canberra

Stories may be reproduced provided

acknowledgement is given to both

CoResearch and CSIRO.

Readers are encouraged to contribute or

offer suggestions for articles.

Send contributions to CSIRO National

Awareness, PO Box 225,

Dickson ACT 2602. Tel (02) 6276 6589.

Fax (02) 6276 6273.

Email Jane.Kahler@cc.csiro.au

or Karen.Robinson@cc.csiro.au

