308##1987/88

CoResearch

CSIRO's staff newspaper

No. 308 December '87/January '88

CSIRO scientist in at the start of work on anti-AIDS alkaloid

The first clues to the nature of a remarkable alkaloid called castanospermine, now being investigated for its potentially life-saving therapeutic properties, were deduced by an eminent UK scientist in collaboration with a CSIRO scientist.

Dr Merv Hegarty from the Division of Tropical Crops and Pastures started work on the substance with Professor Arthur Bell, director of the Royal Botanic Gardens at Kew in London, back in 1980 – long before any major importance was attached to it.

Castanospermine is derived from the seeds of the Moreton Bay chestnut, a colourful and popular tree endemic in Queensland and parts of New South Wales, as well as several Pacific Islands.

The tree is also known as Black Bean, and its seeds could form the basis of a drug to combat the two modern medical scourges – AIDS and cancer. It is a good example of 'common or garden' plants becoming extremely important to medical science.

Ironically, Professor Bell became interested in the Moreton Bay chestnut because of its reputation for toxicity – indeed it appears the tree manufactures castanospermine for this purpose. Animals eating the leaves or seeds often had very nasty reactions.

Dr Hegarty and Professor Bell collected seed in Queensland in 1980, then isolated the alkaloid and, with Dr Linda Fellows and co-workers, noted that it inhibited the enzyme glucosidase. Work by Professor Bell's student, Dr Liza Hohenschutz at King's College, London, showed that the alkaloid was water soluble – most unusual for alkaloids – and this added to its potential as a therapeutic drug.

It wasn't until 1986 that other research groups started to take a serious interest in castanospermine as an AIDS virus inhibitor.

Since then, researchers at the Fred Hutchinson Center in Seattle have been at the forefront of investigations into the alkaloid's therapeutic possibilities.

Dr Larry Rohrschneider, head of cell biology at the Center (and now temporarily based at the Walter and Eliza Hall Institute in Melbourne engaged in other work) said his initial research in 1986 confirmed its potential as an inhibitor of human immunodeficiency virus (HIV), otherwise known as the AIDS virus.

In vitro tests were run at the Center for about a year, and they showed that the alkaloid could change the virus' surface sugars, thereby preventing it both binding to a host cell or replicating itself.

Pre-clinical trials at the National Cancer Institute in Washington DC have started, and it's hoped clinical trials will start soon.

A Dutch research group recently published findings in *Nature* which clearly pointed to the need to further investigate castanospermine's powerful inhibitory properties. Their results also indicated that castanospermine interfered with the ability of HIV to initiate an infectious cycle by attaching to receptor cells – and it did this without damaging uninfected cells.

On 17 June this year seven of the researchers now working with Professor Bell on castanospermine presented their findings at a Royal Society function. Bell's group has been following the US research and contributing to it.

The results showed that the substance was a 'potent inhibitor' of the sugars on the outer coating of HIV, but had no effect on uninfected cells.

An outline of this work by Professor Bell and his colleagues was also published recently in *The Lancet*. Dr Hegarty's role has been in determining the distribution of the substance in various parts of the plant, advising on methods of isolation, and collecting the seeds from which castanospermine was isolated.

Being based in Queensland, Dr Hegarty is well-placed to obtain samples of the seed.

He is a firm believer that all efforts should be made to ensure castanospermine is commercially extracted in Australia, rather than exported raw. The market possibilities could be enormous should clinical trials confirm its effectiveness against AIDS.

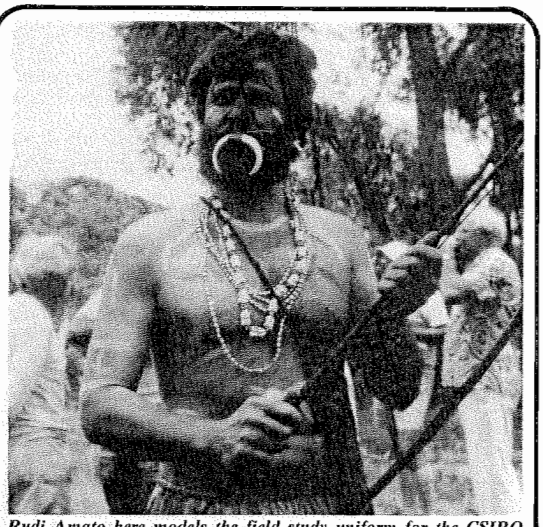
Dr Hegarty is not the only CSIRO member with connections to the castanospermine work. Seed collection has been carried out by several young people on CEP grants who were placed with the Division of Forest Research.

Mr David Cameron from the Division's tree seed centre has supervised the collection project.

The initial request for seeds came from the curator of the Brisbane Botanic Gardens, Mr Ross McKinnon, who had been approached by the Fred Hutchinson Center. One tonne of seed was required. At about the same time, a Sydney company, Phytex, contacted Mr Cameron about getting a substantial amount of seed as well.

This company has developed a process for extracting the alkaloid on a commercial scale.

These requests for seed enabled the two young people on the CEP grants – Lindy Hart and Bryn Gullen – to extend their work with the Division.



Rudi Amato here models the field study uniform for the CSIRO Papua New Guinea group. The group, headed by John McAlpine, is moving camp from the Division of Water Resources Research to Tropical Crops & Pastures in Brisbane, and a farewell BBQ was held in Canberra recently. Rudi, who is admin officer (finance) for the group, took the opportunity to lend an air of authenticity to the proceedings.

1987 McLennan awards

Flying the in face of criticism of Australia's technological and industrial performance, the judges of this year's Sir Ian McLennan Achievement for Industry Award found it so difficult to decide on one winner that they chose two.

Dr Albert Rovira from the Division of Soils and Dr Hari Sinha from the Division of Mineral Chemistry have both received the honour.

The awards, comprising commemorative medals and overseas study visits, were presented on 7 December by the eminent former CSIRO scientist Sir David Zeidler.

•Dr Albert Rovira has been recognised for the work he and his research team have done on cereal cyst nematode (CCN) – a pest which costs wheat growers in southern Australia $80 million a year.

The research, in conjunction with chemical companies and the Victoria and South Australia Departments of Agriculture, has led to a soil test for estimating CCN infestation and to subsequent chemical and soil management strategies to control the pest.

•Dr Sinha's work will result in the world's largest zircon processing plant.

He leads the CSIRO research team that, with an ICI team and marketing company Z-Tech P/L, invented and developed a new process for the

Cont. on p.8

New corporate identity gets OK

After many months of gestation, CSIRO's new corporate identity has finally been given the go-ahead by Chief Executive Dr Keith Boardman.

In a letter seeking support from chiefs and directors for the implementation program, Dr Boardman linked the new corporate symbol with the restructured CSIRO.

'It will be an outward indication to the Australian community that a new CSIRO has come into being — a CSIRO more suited to the needs of the nation, but with foundations based on traditional scientific excellence,' he said.

The corporate symbol was designed by the Melbourne consultants Cunningham and Cummings. This company has also prepared an implementation manual — to be distributed in January — containing specifications for the symbol's use on stationery, car stickers, publications and other products.

Oversight of the implementation program has been given to Dr Michael Dack of the Bureau of Information and Public Communication. The Bureau's regional information managers will be available to assist divisions at a local level through workshops and visits.

CSIRO
AUSTRALIA

Dr Dack believes the time for debating the merits of the new symbol are now over and

Cont. on p.8

From the Chief Executive

A column by Dr Keith Boardman

The year 1987 has been an eventful one for science and CSIRO with the demise of the Department of Science, the transfer of responsibility for CSIRO to the Ministry of Industry, Technology and Commerce and the restructuring of the institutes, divisions and corporate centre of CSIRO following the review of top structure by McKinsey.

The new structure comes into being on 1 January. I look forward to 1988 as a year of greater stability for the Organisation, although the full implementation of the decisions from the reviews by McKinsey and Pappas Carter Evans and Koop will take some time. The selection committees established by the Board for the institute director and corporate centre positions have completed their deliberations and their recommendations will go to the December Board meeting for decision.

A strong and well-balanced team of top managers is a vital component to the excellence of CSIRO's future performance and I am very grateful to the members of the selection committees for the time and effort they devoted to this most important task.

Australia faces a difficult but challenging economic environment, and as the major R&D performer much is expected of the Organisation in strengthening the technology base of Australian industry to improve the nation's performance in the international marketplace.

In a recent speech to the Committee of Economic Development of Australia (CEDA), I stressed that a stronger national research effort is essential to Australia's future prosperity, which will depend on developing a broader, more diverse export base with even more efficient primary industries, more local processing of primary products, more competitive manufacturing sector, more tourism and greater commercial exploitation of our scientific excellence particularly in areas such as biotechnology, new materials, micro-electronics and computer software.

I said that last month's stock-market crash will be a major test of Australian industry's commitment to increasing its R&D activities. If the rise in industry's investment in R&D – still very low by international standards – stalls, Australia will lose any chance of becoming an advanced industrial nation. The success of CSIRO is dependent on a strong R&D effort in the private sector.

There was recent publicity on the relative decline in CSIRO's effort for the rural, minerals and environment sectors. If the processing of products is included, CSIRO devotes 46 per cent of its effort to the rural sector, 16 per cent to minerals and energy and 16 per cent to environment and water.

Research for technology-based manufacturing is 12 per cent and for service industries nine per cent.

Of course, there are strong arguments for Australia to increase its research effort in all sectors, but the realities of recent Government funding for CSIRO mean that increases in one area must come at the cost of another.

Much publicity was given in the press to the complaints of the Officers Association, alleging a lack of consultation between CSIRO management and the OA. In connection with the restructuring, extensive consultation with staff resulted in substantial changes to the original McKinsey recommendations. The recommendations were, in fact, delayed in going to the CSIRO Board so that staff comment on the proposals could be aired.

Each union concerned with the current review of the corporate centre was invited to nominate a representative to interact with the consultants and project team carrying out the review.

Good management in CSIRO includes effective consultation with staff and I support a strengthening of consultation with the unions, but once this has taken place it's the responsibility of line managers to make the decisions and ensure they are implemented.

A team was established to oversee the implementation of changes from decisions on the McKinsey review, and Mr Stephens, the representative of the Consultative Council, is now a member of that team. The Council sub-committees are the logical avenue for greater interaction between management and the unions, and I will move to ensure they become more effective.

I thank staff for their patience and forbearance during the past 12 months and wish you all the best for Christmas and the New Year.

Letters to the Editor

Dear Editor,
SPQR

This year marked the 1580th anniversary of the Roman evacuation of Britain and 1510 years have passed since the formal collapse of the Roman empire in Western Europe. Before and since those epochal events, uncounted billions of people, the majority of them unable to read or write, recognised the acronym above. Even I, whose ancestry is entirely Irish, have known it since childhood, though not a single Roman aquilifer ever set foot among my parents' people. Far away to the east, and equally renowned for their ignorance, millions of Poles have readily recalled those letters, yet, like the Irish, their forebears never sighted the inscription with the legions marching behind to impose the *Pax Romana*.

Because it seemed relevant and because people in our modern advertising industry are also generally perceived to lack erudition, I polled eight acquaintances who are PR professionals. One, a Sri Lankan, didn't have a clue that the letters stand for *Senatus Populusque Romanus* (the Roman Senate and People). Another claimed that he couldn't bring them into focus on the instant, but if I bought him a drink he was sure his memory would clear. The remaining six explained the significance of the letters immediately. *None*, however, could recall the emblem that accompanied the acronym, though I have given you a sufficient hint in the first paragraph.

Now, it seems, CSIRO at awesome cost, is to have a token foist upon it – one seemingly and crudely derived from the insigne of a commercial firm which manufactures shutters whose purpose, or course, is to exclude light and curtail vision, the very antithesis of what CSIRO is all about. ('The falcon can no longer see the falconer!)

Aside from such considerations, the practical fact is that the ordained symbol defies graphic reproduction in the very situations where it could appear most often and be promulgated at least expense. Even if adjusted to resolve this problem, several other graphic difficulties remain inherent in the design.

While no-one would claim that our acronym, CSIRO, will ever be as commonly recognised as SPQR or endure as long, it is already more widely known. Thus Roman logos are not appreciated in Angola, Bangladesh, China, ..Sri Lanka.., or Zimbabwe, whereas quite significant numbers of people other than scientists now identify our inscription in those countries. Needless to say, in the USA, UK, Germany, Japan, etc, the letters CSIRO need no embellishment to win instant recognition in scientific circles and often beyond. Hazarding a guess: possibly no single scientific institution with the exception of MIT, Cambridge and a few others have a higher global profile than CSIRO. (Publication of the *Australian Journals of Scientific Research* by CSIRO partly explains this phenomenon.)

In an age where the dinkus is multiplying far faster than the AIDS virus to have become ubiquitous, it is futile to add another to the existing hordes. The on-going cost of dissemination until competitive dominance has been reached among the wilderness of signs will be enormous, not to mention the incremental costs of regular updates needed to keep abreast of fickle fashion.

Though vastly more might be said, note that the world's best recognised entities do not rely of symbols but merely their names (sometimes as acronyms) and the quality of their product: Rolls Royce, Porsche, Ford, Coca Cola, MacRobertson, spring immediately to mind.

John J Lenaghan
Editorial and Publishing Unit

Dear Editor,

Recently, I received a copy of *Technology Today and Tomorrow*, the Proceedings of the 5th ANZAAS/AIST Conference on Science Technology. These occasional conferences, the first of which was held in 1973, are designed explicitly for non-professional staff to present papers concerning advances in the technological (and other) methodologies of scientific research.

The first two or three conferences were heavily patronised by CSIRO but it is worth noting that not one of the papers in the most recent Proceedings emanate from this organisation. 'Hard times and financial restraint' is the common catchcry employed to limit the 'waste of resources' — in time and money — of allowing less senior staff to present methodological information at conferences.

One wonders how well this attitude sits with our newly recognised responsibility to communicate *all* our work — methodologies as well as results — to potential users.

G H Nicholls
Division of Forest Research

More letters on p.4

Dear Editor,

Let's congratulate ourselves! We are finally to have a corporate identity.

As an expert in the field of logos, I would like to point out a few facts. I have not yet seen the implementation manual, and so I don't know how good it is, but technically the new logo does not meet the Organisation's requirements for reproduction.

It does not tolerate reduction — at 15mm or less the white vertical bars disappear and the typeface breaks up. How will this be overcome when we try to reproduce it on business cards, letterheads, newspapers?

The fact is if you can't successfully reduce a logo to meet the needs of the Organisation then you have missed the most important element in any corporate identity program.

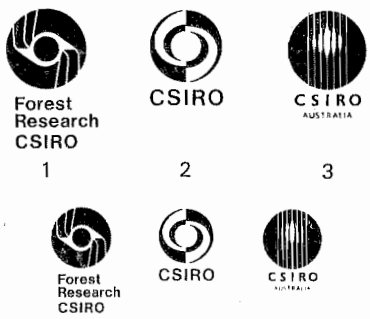
The example I've provided shows the logo's failure to reduce effectively. Alongside it I've shown the logo I designed in 1978 for the Division of Forest Research[1] as well as a CSIRO corporate logo I submitted in the same year[2].

The new symbol is in no way advanced from the design I submitted in 1978. Unlike the other two examples, it does not even stand up to standard graphic design requirements.

I think the CSIRO Divisions deserve some answers on this issue.

And finally could we have the secret meaning of the design itself.

Vlad Mosmondor
Head, graphic design
Forest Research



CSIRO team scrutineers batteries for solar race

Scientists from the Division of Mineral Chemistry played a key role in last month's World Solar Challenge — a race for solar-powered vehicles from Darwin to Adelaide along the Stuart Highway.

In each vehicle, the electricity derived from the solar panels was stored in batteries. To maintain keen competition, it was decided to allow replacement of the whole or part of each vehicle's battery pack in the event of malfunction or accident.

This presented the organisers with the major problem of how to formulate an effective and universal penalty for battery replacement.

Without such a penalty, it would have been possible for competitors to gain strategic advantage with healthy batteries, e.g., during overcast skies, head winds, hill climbs, or final stages of a day's racing. Such action would have boosted vehicle performance through, in effect, injection of fossil fuel, and not solar energy.

The problem was further exacerbated by competitors being allowed to use different battery technologies.

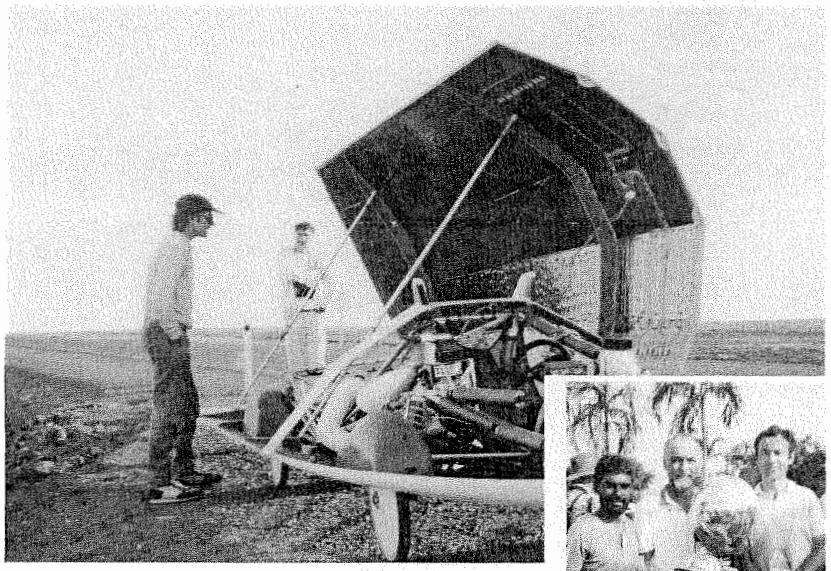
The development of a universal battery-replacement regulation that would take into account all these factors was a monumental task. Nevertheless, Dr David Rand (manager, energy storage section) devised a regulation that was considered to be a comprehensive solution that neutralised all of the perceived opportunities for gamesmanship.

The regulation demanded that vehicles be held by the roadside for a set period in the event of battery failure. Thus, the organisers' objective of running the World Solar Challenge as a solar race, and not as a battery race, was achieved.

Dr Rand, assisted by his colleagues Warren Baldsing and John Hamilton, conducted pre-race scrutineering of the vehicles' battery packs and calculated the respective time penalties based on battery energy density and the number of whole (or part) replacements effected. The performance of exotic batteries was determined using the Division of Mineral Chemistry's battery testing facility.

The CSIRO team followed the vehicles down the track and were on hand to adjudicate in times of crisis. The race was comfortably won by the General Motors 'Sunraycer' vehicle that covered the 3004 km course in 44 hours 54 minutes (66.92 km/h). The outstanding performance of this vehicle will be celebrated by a Presidential reception at the White House.

A full report of the race details will shortly be available from Dr Rand on (03) 647 0211.



Above, early morning charging of Sunraycer solar panels, Woomera. Inset, the CSIRO team 'minds' the World Solar Cup (donated by The Broken Hill Associated Smelters Pty Ltd). Left to right, Warren Baldsing, David Rand and John Hamilton.

How a calculator, pencil and paper made sense of Viking data

Two days' work by a CSIRO scientist with a hand-held calculator and a pencil and paper has put data from the NASA Viking probes on Mars in a new light.

After examining data on CO_2 in the Martian atmosphere, Dr John Philip, Chief of the Division of Environmental Mechanics, has come up with results which have changed the way scientists view the meteorology of Mars.

'[The work] has made the first real sense of data that cost billions of dollars,' said Dr Philip.

The saga of his involvement with the project goes back to 1976, when NASA was planning the Viking mission. Dr Philip was invited to contribute to a symposium on water on Mars.

'NASA wanted experts on how water behaved on Earth to examine aspects of how it might behave on Mars,' said Dr Philip. 'I contributed to their 1976 meeting and to a second one in 1978. Then I heard nothing until last year, when they invited me to a meeting concerned with analysing the results from the Viking mission.'

CO_2 entered the story at the second meeting, when Dr Philip realised it was more interesting in terms of its role in the Martian atmosphere than water.

Mars' atmosphere is more than 95 per cent CO_2, compared with Earth where the percentage is around 0.03.

Under the Martian atmospheric pressure (about 170th that of Earth), CO_2 condenses into dry ice at -123°C. Towards the poles, Martian winter surface temperatures fall below this level, but go well above it in summer.

'Because of this, enormous quantities of CO_2 condense out of the atmosphere at high latitudes each winter and evaporate each summer,' he said. 'When I say "enormous", I really mean "enormous" – there is a twice yearly fluctuation of the total CO_2 in the atmosphere of ±14 per cent.'

This constant condensation and evaporation locks up and releases huge amounts of energy, and the meteorology of Mars is dominated by this bi-annual cycle.

There is a strong asymmetry in this process, with much more CO_2 involved in the southern hemisphere than the northern. It is very important to know the quantities in each polar cap – and the first real data on this was information on the bi-annual cycle of total atmospheric mass which was in from the Viking landers in 1979.

'When, after eight years of working on terrestrial things, I was asked by NASA to take part in the 1986 meeting, my first job was to check the scientific literature on what had been made of the Viking data.

'I found that scientists working under contract to NASA had simply published the data on the bi-annual cycle and had then estimated the quantities of CO_2 at each polar cap on the assumption that each pole operated in isolation,' said Dr Philip.

'Quite frankly, I was amazed that so little had been done with data that cost so many billions of dollars to get.'

Dr Philip reasoned that what was happening at each polar cap should follow the same pattern in time as what happened at the other one half a year earlier.

'This very reasonable assumption showed that the CO_2 turnover rate at the two polar caps was more than twice the NASA estimate, which didn't take account of the fact that evaporation at one pole and condensation at the other took place together.

'This new result radically changed the picture of the atmospheric heat engine which drives the meteorology of Mars,' he said.

Dr Philip's work on the Viking data has had plenty of benefits for his Division. NASA supported his visits to America, and during these he was able to make side visits to about 20 laboratories working on soil physics and micrometeorology closely related to the Division's more Earthbound research – at virtually no cost to CSIRO.

This story is based on an interview with Dr Philip aired on ABC radio station 2CN in Canberra last month.

The CSIRO Melbourne Show display has won an award for the best exhibition in Victoria this year.

Awarded annually by the Australian Display Manufacturers Association, entries for the award are judged not only on their design factors, such as innovative use of materials, colour and graphics, but also on the ability to achieve objectives.

A plaque was presented to CSIRO at a special ceremony early this month.

DIT re-engineering diagnostic system

The Division of Information Technology has started a collaborative project with the Garvan Institute of Medical Research in Sydney to re-engineer the knowledge for its thyroid assay expert system.

The aim is to redesign the system using what has been learned from the SIRATAC cotton management system also being reworked by the Division (see *CoResearch* 302, May '87). The Garvan system has become increasingly complex as more and more elements are added to it, and has therefore become difficult to maintain.

Initially, the project is focusing on the existing thyroid assay system which examines blood samples to determine thyroid disorders. However, the leader of the re-engineering group, Mr Paul Compton of the Garvan Institute, said it was intended that the system would eventually be able to interpret other hormone disorders, and would also be made available to other hospitals.

The project will continue the work on 'data dictionaries' begun with the SIRATAC project, to discover whether or not the knowledge documentation facilities of a dictionary are suitable to enable endocrinologists (hormone specialists) to maintain the knowledge base in the system without having to know all about the system, eg. artificial intelligence languages.

About 10 000 interpretations per year are now done on the three year old system, and there is an error rate of approximately three per thousand. Every time an incorrect result is discovered, the 'rules' in the system are changed to take account of the variation. This means that the system is being changed continually, to the point where it has become difficult to manage.

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Torres Strait discovery

Two new bats for the belfry

After 200 years of European settlement and natural history research in this country, it is amazing that animals new to science are still being discovered, especially those that are large and obvious. Recent field work on Torres Strait islands has revealed two new bats — a small insect eating species and a larger flying fox.

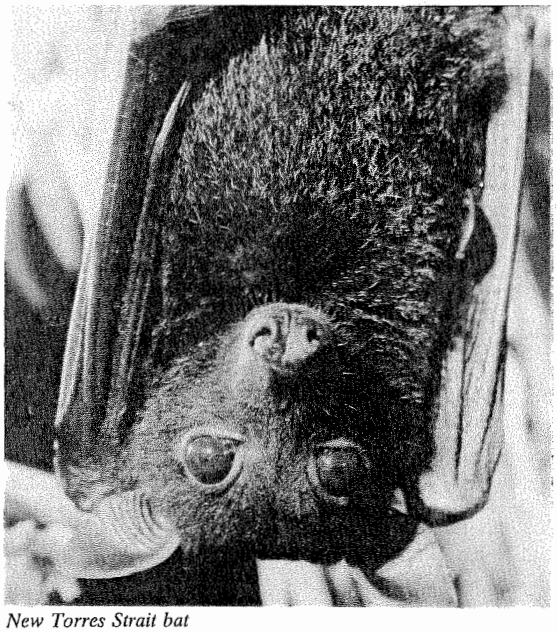
Both of these creatures have never been scientifically described or named. The insect eater appears to be related to species in Indonesia and is a tiny animal — only about 12–15 grams in weight and with a wingspan of about 30cm. The flying fox, a fruit eater, is perhaps even more exciting and important because it is so unlike the bat fauna found in the Pacific and Australia.

Mr Greg Richards, a senior technical officer from the Division of Wildlife and Rangelands Research in Canberra, and Mr Les Hall, formerly with the Division but now with the University of Queensland, have undertaken two visits to Torres Strait during the past few years.

Their work involves basic studies on bat distribution, providing baseline information for the quarantine of screw-worm fly and rabies. It is well known that this region is a buffer zone against many diseases, but little attention has been given to the possible role of a highly mobile bat fauna assisting these diseases to cross the buffer.

It isn't yet known whether the flying foxes have made or could make the 60km flight across the Torres Strait to the Australian mainland, maybe carrying screw-worm fly or rabies. Rabies is not a problem in the region, although one case was reported recently in Irian Jaya.

While working on Moa Island and based at St Pauls Mission, Greg and Les caught several of many flying foxes that were feeding in native almond trees, devouring hundreds of these large and fibrous fruits. Their excitement at finding a new animal added to the bewilderment of the local population, who were already quite vexed by the huge mist nets strategically set around their village.



New Torres Strait bat

The villagers were well used to the existence of these 'sapural' (as they called them), and they featured in several of their myths and legends. These stories relate to the appearance of the bats signalling the start of a new fruit season, as the animals feed on mangoes and other tropical fruits in the region.

The flying foxes are a staple food in many islands in the region. In fact, capture of the animals for food has led to populations declining on some islands in Micronesia.

Greg eventually got up the courage to sample fried flying fox, and reported it had rather a 'gamey' taste, not unlike rabbit.

Four species of flying foxes were previously known in Australia, all of which had been described by the mid 18th century. One can expect that in a region such as Torres Strait there may be many small creatures still undiscovered, and quite likely to be close relatives of Papua New Guinean animals, but it seems the new flying fox may in fact be related to the South East Asian fauna.

It is quite different to the Pacific flying fox, as revealed by DNA sequences in tissues processed in West Germany, by ectoparasite species, and by neuroanatomical characters.

The flying fox discovered by Greg and Les is about three-quarters the size of other flying foxes found in Australia.

Greg and Les are now involved in the long process of taxonomic description of their new bats, and will return to Torres Strait next year to survey the bats on more islands.

Dr Thomas to go to Bond Uni

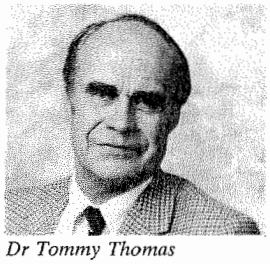
Foundation Chief of the Division of Information Technology, Dr Tommy Thomas, is to play an integral part in the establishment of Australia's first private university.

Dr Thomas has been appointed Professor of Computing Science at Bond University on the Gold Coast and will take up his position next year. His initial task will be a broad one – to engage in academic planning of computer science, communication engineering and information engineering as well as the development of the Research Park.

Once Dr Thomas' planning role phases out and the (as yet unbuilt) University starts enrolling students, he will maintain responsibility for the Research Park and its links with industry, the University, other Universities and the governments.

The Research Park, to be built on a 20 hectare site adjacent to the University, will encompass academic study, research, consultancy and marketing.

Dr Richard Tweedie, first managing director of the AMDEL/CSIRO owned consultancy SIROMATH has been appointed Professor of Information Science at Bond University. SIROMATH was set up as Australia's largest high level mathematical and statistical management organisation and software distribution group.



Dr Tommy Thomas

Letters

Cont. from p.2

Dear Editor,

CSIRO currently owns some $600 million worth of 'bricks-and-mortar' real estate. The very buildings upon which the Organisation's research depends. Within these buildings a further $50 million worth of mechanical plant operates to control conditions.

In all, some $650 million worth of assets that no-one wants to know about!

The ultimate responsibility for maintaining these invaluable assets must lie with the CSIRO Board, yet, whether by accident or design, the Board has abrogated this responsibility.

I refer to the "devolution" of all repairs and maintenance matters to Divisions.

Confronted, for many reasons, with an increasingly desperate situation in maintaining the Organisation's assets Headquarters have, without any external consultation such as has been sought in all other reorganisational matters, passed the 'Repairs and Maintenance' problem to Divisions.

Their desire to be rid of the problem is such that private enterprise groups interested in maintaining the Organisation's assets have been told to speak separately to the 40 or more Divisional Chiefs and not to the corporate body.

While some Divisions have officers who have some management function relating to repairs and maintenance, many have not.

Even for those who have such staff it is an all but impossible task to document each and every building plus every single item of plant within every building, design maintenance schedules for both buildings and plant, draw up comprehensive specifications to cover this maintenance, call tenders for this work, then vet and let the tenders, *all by June 1988*. The work must then be supervised to ensure it is performed according to the specifications. All this over and above the normal Divisional duties for the staff concerned.

How are the Divisions and Stations without these officers going to manage? Headquarters can offer very little assistance.

In future years when the Organisation's assets begin to fail (as they are already) who is to accept responsibility?

It is clear that the Divisions will be blamed — blamed for not doing a job they were never set up to do; blamed for not looking after $650 million worth of Organisational assets which the Board did not want to know about.

If ever we needed leadership we need it now, Mr Wran — to save the Organisation's infrastructure from ultimate decay and collapse and enormously expensive replacement costs.

Murray S Upton
Manager, engineering services and buildings
Division of Entomology

Dear Editor,

I support the letter of F A Blakey, *CoResearch* 307, where he suggested that for CSIRO to earn a large part of its funds from industry constitutes a form of 'hidden privatisation'.

Exploitation of a resource is a business system; the resource itself is not. A national research organisation supported from appropriation funds is a logical choice for the study of national resources.

At Irrigation and Freshwater Research we serve the industry of irrigated agriculture, but we are also interested in inland freshwater as a national resource. Fisheries and forestry are other examples of national resources that need study of the resource itself as well as techniques for exploitation.

David Erskine
Centre for Irrigation and Freshwater Research

Dear Editor,

The decision to have a total ban on smoking in CSIRO premises is an excellent one. Leaving aside the obvious damage to the health of smokers, and to those unfortunate enough to be near them, there are other important aspects. Smoke, cigarettes and discarded tobacco stink. Ash and butts scarcely enhance the appearance of tables, desks and the like. Smokers themselves are very unpleasant to smell and taste, except I suppose to other smokers. And let us not forget the words of Red Ingle and his Natural Seven (c1940) (and slightly smoothed), *viz:*

"Cigarettes are a blot in the whole human race,
A man is a monkey with one in his face.
Here's my definition, believe me dear brother:
A fire on one end and a fool on the other."

I W Smith
Division of Fossil Fuels

— Clarification —

During a report on Mr Wran's address to Chiefs on page 1 of the November issue,* CoResearch *stated as one of the major requirements of the Government was that a goal of 30 per cent outside funding was to be achieved in a maximum of three years. Although Mr Wran emphasised to chiefs that there was a very strong expectation that this target was to be reached,* CoResearch *wishes to clarify that it is not a formal Government requirement (i.e. not the subject of a Cabinet decision) but is an informal goal being set in a co-operative spirit with the Department of Finance. Mr Wran emphasised that the timescale for achieving 30 per cent external funding was still to be established.

308-1987/88

More diversity for northern cattle industry through import plan

In a cattle-improvement project on a scale never before undertaken in Australia, the Division of Tropical Animal Science plans to bring two African cattle breeds into Australia to help boost productivity and fertility for our northern cattle industry. The plan is being implemented by the Division's Tropical Cattle Research Centre at Rockhampton.

The move, foreshadowed by *CoResearch* in March 1986 (see issue No. 289), will be a delicate and costly operation involving the implantation of Boran and Tuli embryos, collected from fully health tested cows in Zambia and Zimbabwe, into recipient cows from Australia on the Cocos Islands and shipping the resulting health checked calves into Australia.

This project has only become possible now because of the removal of certain restrictions and the development of advanced technology. Previously there was an embargo on the export of cattle embryos from Africa, and prohibitive quarantine restrictions in Australia. Now that the Department of Primary Industry has established a quarantine station on the Cocos Islands, the way has been cleared for the operation.

Development of embryo transfer technology and the identification of desirable genetic material by DTAS scientists completes the picture.

A prospectus has been prepared by Sirotech to seek industry involvement and funding. Interest has already been expressed by a number of commercial parties. (See separate story).

Project leader Dr John Frisch is in Africa now supervising the health checks on donor cows and the collection of embryos.

Dr John Vercoe, OIC of the Centre, said Boran and Tuli cattle are particularly useful because of their resistance to environmental stresses through both natural and man-directed selection which has led to high fertility. The Boran is considered most useful in harsher tropical conditions, while the Tuli should find its greatest use in the sub-tropics and more benign areas of the tropics.

Both breeds, and particularly the Boran, show good tick resistance – an essential characteristic for economic viability.

Dr Vercoe's hope for the project is that it will give northern cattle breeders a greater variety of management options and lift the level of productivity.

The health testing procedures for bringing the new cattle into Australia could hardly be more stringent.

Once the donor cows are selected by the relevant breeding societies on the basis of certain strict criteria, they are placed into separate paddocks, and blood samples are taken and tested for seven strains of foot and mouth disease and the viral disease (not found in Australia) called lumpy skin, as well as several other serious diseases.

Health tests

Those animals tested negative are moved to a quarantine area, where they are closely watched. After three weeks, the one week old embryos are collected from the cows, then two weeks after collections are completed the cows have more blood taken for further health tests.

At collection the embryos are washed eight times to ensure they are free of surface viruses. The Division is flying in 600 litres of triple-distilled 'embryo grade' water for this purpose.

Once the all-clear is given, the frozen embryos are to be shipped to the Cocos Islands (in the Indian Ocean to the northwest of Australia). There they will be implanted into cows brought in from Australia specially to gestate the embryos.

Three months after birth the calves will undergo rigorous testing, with blood samples being sent to AAHL and the UK. If they are clean the calves will then be imported to Australia.

When they arrive, the next step will depend on how the project is commercialised. Stock multiplication may take place on the properties of participating graziers or on a property bought for the purpose.

The project is in three stages: the actual import of the calves, expected to be completed by October 1989; building up of the herd to 600-1000 animals, to be undertaken between October 1989 and October 1995; and the start of the fully commercial Boran and Tuli stud from October 1995 onwards.

Stage two of the project will involve use of the Division's multiple ovulation and embryo transfer technology (MOET), which has been developed at the Division over the past three years and will enable more rapid multiplication of the herd through embryo splitting and implantation.

It is expected that should the project come to fruition, the cost in 1987 dollars to CSIRO and commercial partners will be about $8 million. Revenue from the new breeds will not start until 1992/93, when it's estimated income will be $600 000 from sale of semen and some embryos, rising to $4-$7 million in 1995/6 when the stud should be fully operational.

Dr Alan Donald, right, acting director of the Institute of Animal and Food Sciences, inspects posters on the importation of African cattle at the Tropical Cattle Research Centre in Rockhampton with Richard Wilson, chairman of the Division of Tropical Animal Science advisory committee.

Commercialising the Boran and Tuli project has so far involved the preparation of a comprehensive prospectus in conjunction with Sirotech, and placement of newspaper advertisements calling for expressions of interest.

People responding to the ads were sent copies of the prospectus. In addition, prominent graziers, venture capitalists and others who could be interested in the project also received the document. About 40 have been distributed.

The prospectus contains a project summary, an outline of various characteristics of the breeds (like fertility and growth rates) relative to Brahmans and 'synthetics' based on all three breeds, cost and revenue estimates, outlines of possible commercial arrangements such as joint ventures and collaborative agreements, information about R&D tax incentives, and other details needed to get the attention of a prospective business partner.

There has been considerable interest, although no-one has yet laid any money on the table.

In collaboration with divisions, Sirotech has developed a number of similar prospectuses as an effective means of promoting business opportunities to potential industry partners.

Sirotech gives high priority to promoting those businesses with substantial market potential – with sales of at least $1 million per year and preferably $5 million or greater.

Dr David Wilson, who is overseeing the commercialisation of the cattle project, said he is interested in hearing from companies who may be attracted to the project and other such opportunities.

He also said Sirotech was willing to talk to researchers who believed they had projects with a good chance of commercialisation and potentially substantial returns.

Chairman of the Division's advisory committee and well known central Queensland grazier, Mr Richard Wilson, said the committee fully supported the proposal to import the cattle and saw it as a good example of CSIRO helping industry and at the same time getting a return on its investment.

'Crossbreeding to exploit hybrid vigour is one of the more attractive and practical ways for graziers to obtain a quick increase in beef production,' said Mr Wilson.

'The investigations to date suggest that the Boran and Tuli have the potential to improve the productivity of the predominantly Brahman-based cattle herds in northern Australia.

'However, we will only know for sure how they will perform in Australia by importing them and CSIRO should be congratulated for its initiative in putting up this proposal.

'I see CSIRO's role as establishing the project in a joint venture with industry and then for CSIRO to withdraw when scientific aspects of the venture have been adequately researched.

'I believe it is essential for industry to be involved in the project right from the start and I am pleased with the amount of consultation that has already taken place between the Division and industry,' said Mr Wilson.

Members of the CSIRO Board took time out from their meeting in Sydney on 24 November to share a BBQ lunch with staff at the Division of Animal Health's McMaster Laboratory. Above, Chairman Mr Wran, urged on by Mr Graham Spurling, wonders how much to tip the chef, Dr Keith Boardman thinks he sees something unpleasant on Mr Spurling's shoulder, and Professor Sir Gustav Nossal calculates the calorific value of the salad. Photo: Maria Basaglia, Applied Physics.

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Allergy research

Promising work runs out of funds

The following article is about a research project in jeopardy. It is not unique in CSIRO. Many projects are facing severe cutbacks or even termination because of a drop in appropriation funds and difficulties in securing sufficient (or any) outside funds. This project, at the Division of Tropical Animal Science, did get outside funding, but it illustrates the problems faced when this money cannot be guaranteed for the life of the project. Much has been achieved already, but taking the research further into even more useful and potentially profitable areas looks like being impossible, simply because the money will soon run out.

Experimental scientist at the Division of Tropical Animal Science, Maryann Gauci, is 'snowed under' by a mountain of paperwork. She is undertaking the laborious task of writing up the results of phase one of an investigation into the allergic reactions suffered by humans in contact with Australian paralysis (or 'scrub') ticks. She is also completing a PhD thesis based on her work.

The project is one of only two in CSIRO to have current funding from the National Health and Medical Research Council, although this money runs out early next year and will not be renewed, at least in the short term.

Ms Gauci has been under the supervision of chief investigator for the project, Dr Bernard Stone, who is a senior principal research scientist at the Division's Long Pocket Laboratories in Brisbane. Dr Stone has done considerable work himself on the Australian paralysis tick, concentrating on its effects on animals, principally domestic pets and livestock. He is very enthusiastic about the high standard of work carried out by Ms Gauci.

Ms Maryann Gauci

The research has been done in conjunction with a clinical immunologist and a paediatrician from the Child Health Department at the University of Queensland (both of whom are based at Brisbane's Mater Hospital and supported by a grant to the University from the Mayne Bequest Fund). They are Professor Y H Thong, professor of immunology (Ms Gauci's University PhD supervisor) and Dr Richard Loh. The project has been running just over two years.

A wide variety of unpleasant symptoms have long been reported from people exposed to the Australian paralysis tick, which is found mainly along the east coast. Until this project started, however, nothing had been done to research the cause of the reactions, to study the components of tick saliva that induced the allergy, to assay serum IgE specific for the paralysis tick salivary components, or to research the possibility of producing a desensitising preparation to aid highly allergic people.

Like bee stings, paralysis ticks occasionally induce anaphylactic shock in humans – a potentially fatal systemic reaction which usually needs to be treated with adrenalin to prevent death. People who know they may have an anaphylactic reaction to bee stings often carry their own adrenalin kit (containing items such as a prepacked adrenalin syringe or an isoprenaline asthma 'medihaler') in case the worst happens.

Those who have dangerous reactions to bee stings may not necessarily have the same reaction to ticks — and *vice versa*. How do people know whether they will have such a reaction if a tick attaches to them? In case of anaphylactic shock it is essential that adrenalin or isoprenalin be administered as quickly as possible, so obviously it would help if the victim could understand the cause of his/her illness so treatment could be immediately forthcoming.

Diagnostic assay

The work done by Ms Gauci and her colleagues has resulted in the development of a diagnostic assay to determine whether or not humans are allergic.

The assay detects a specific antibody — tick-induced IgE. It seems that people with raised IgE antibodies in their blood are allergic to the ticks.

The assay is particularly useful when undertaken in conjunction with a skin prick test based on crude whole body extract which has recently been improved by using a purer source of allergens, or components of tick salivary glands which cause the allergic reaction.

The project started with a questionnaire distributed to a pool of volunteers available partly through Dr Stone's contact with people involved in bushwalking and other outdoor activities such as members of the Scout movement. Volunteers also came forward through the co-operation of a pathology company which made the forms available to its patients and collected all the blood samples.

Blood from about 60 people was collected and analysed to determine the level of IgE antibodies and their relationship to degrees of allergic reaction.

The preliminary results showed the following approximate breakdown:

Potentially life-threatening reaction:	*17%*
Generalised allergic reaction:	*12%*
Large local reaction:	*36%*
Unusual (delayed) reaction:	*12%*
No allergic reaction:	*23%*

It is not fully understood why people have such different allergic reactions to the same irritant. To complicate things further, there are a number of unpleasant reactions which are not allergic in nature.

The small local non-allergic reactions manifest as a painful, itchy swelling at the site. The large reactions may be found in both allergic and non-allergic individuals.

Neuromuscular paralysis which may occur after a tick has fed for several days on animals or humans is caused by the toxin, not by the allergens.

The assay developed during the project helps differentiate between the truly allergic individual and the non-reactive person.

Miss Gauci has done some valuable basic research on the mechanisms responsible for tick allergy and according to Dr Stone has had some 'excellent' results. She has been able to separate out from the tick saliva glands the specific proteins causing the reactions, and has found that there are relatively few.

This is interesting and important because it leaves the way open to develop a purified desensitising agent. When there are a number of allergy-causing proteins to be dealt with, the necessarily broader-spectrum desensitising agent could cause unforeseen and unpleasant side-effects.

Development of a desensitising agent could take some time because of the stringent requirements of the Commonwealth Department of Health on clinical trials. Once a preparation is ready for testing it must be stored for one year for assessment of potency after storage before trials can commence.

But...it now seems unlikely that this phase of the work will even start, although the groundwork has been successfully completed. Of course it is a great disappointment to Ms Gauci and Dr Stone, but it is also to a certain extent a waste of some first class research, and a missed opportunity.

A desensitising agent for paralysis tick bite may not save a large number of lives but it could prevent a great deal of suffering among the many thousands of people exposed to the tick on the highly populous east coast of Australia. It also could be a profitable little development for some pharmaceutical company. Now, although a very useful assay has been developed, the full potential of the research seems unlikely to be realised.

How many other researchers are facing up to this painful outcome to their meticulous and time-consuming work?

New insights into dietary fibre

A major collaborative research project now underway between the divisions of Human Nutrition and Food Research, with industry partners, is looking at dietary fibre and its possible role in preventing heart disease and bowel cancer.

The project was one of the topics discussed at an interdivisional workshop on dietary fibre held at Food Research's North Ryde Laboratory last month.

This project could have important ramifications in the study of nutrition, and perhaps eventually in helping to improve the health and quality of life in Australia as well as assisting the food industry to use up many plant by-products that are essentially waste materials.

The upsurge of interest in dietary fibre among researchers is partly because of new knowledge which has led to our understanding of fibre undergoing major revision in recent years.

New research has now changed the view that wheat bran is the best form of dietary fibre. Other fibre such as that found in oats, rice, barley and legumes (e.g. soya beans) has greater benefits because of its apparent ability to lower plasma cholesterol as well as being fermented by the bowel flora.

The fibre project mentioned above is one of several collaborations between the two divisions.

The other projects are: researching the possible effects of dietary fibre on the availability and absorption of vitamins, minerals and other nutrients; and the investigation of new sources of fibre in the diet. This will include modifying existing types of fibre to improve their acceptability and value.

Other novel sources of food fibre, such as lupins and the residue from fruit and vegetable juice extraction, may be available in the future, and these were discussed at the workshop.

The workshop involved 31 participants, including the Director of the Institute of Animal and Food Science Dr Alan Donald, who, according to Human Nutrition scientist Dr David Topping, is 'very supportive' of the dietary fibre work being done at the two divisions.

A task force was established to identify, within six months, the most appropriate procedures for chemical analysis of dietary fibre in foods.

This group comprises Dr David Oakenfull (Food Research), Dr David Topping, Dr Dai Suter from NB Love Industries, Professor Bruce Stone from Monash University and Dr Norman Cheetham from the University of New South Wales.

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Old days and changing times theme at launch of CSIR book

The official launch of Professor Boris Schedvin's history of CSIR in Canberra last month was an opportunity for a number of old CSIRO hands to get together.

Among the guests were three ex-Chairmen of CSIRO — Sir Frederick White (Chairman 1959–1970), Sir Robert Price (1970–1977) and Dr Paul Wild (1978–1985).

A number of retired CSIRO employees, including the oldest living CSIR appointee, Jack Cummins, and other identities including Sir Otto Frankel, Gratton Wilson, Ken Ferguson, Jack Coombe and Ken Prowse also attended.

The focus of the occasion — Professor Schedvin's book *Shaping Science and Industry: A History of Australia's Council for Scientific and Industrial Research 1926–1949* — is the first comprehensive book about CSIRO's predecessor.

Science and Small Business Minister Barry Jones addressed the gathering, praising Professor Schedvin's book as 'a free and critical account of one of Australia's greatest institutions'.

He said the history was interesting for a number of reasons, not least because it enabled readers to gain a sense of perspective about the work of CSIR and identify the Organisation's past strengths and weaknesses.

He said CSIR epitomised the efforts to harness science to meet national needs, and likened the aims of the current reorganisation to the original structure and role of CSIR.

Professor Schedvin was commissioned to write the history of CSIR/CSIRO by the then-Chairman Sir Robert Price in 1976.

He said he took on the project rather 'naively', never imagining it would take 11 years for the first volume to be published (the second, covering the birth of CSIRO in 1949 and following its development through to the 1970s, probably will be completed in the summer of 1987/88 and released in 1990).

It was originally intended that the work would take about four years, but two years into the project Schedvin was appointed to the Chair of Economic History at the University of Melbourne, and this necessarily put heavy demands on his time.

Also, the sheer volume of records to sort through was a massive and time consuming task.

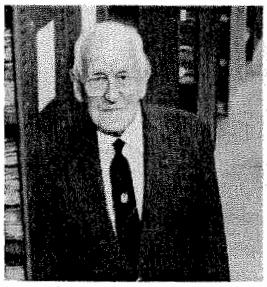
In his address at the launch, Professor Schedvin singled out CSIRO archivist Mr Colin Smith for particular praise, saying that his assistance (and that of his staff) had been invaluable. He said Mr Smith, virtually singlehandedly and in the face of considerable odds, had established and built up the CSIRO archives into a valuable resource for historians, and had ensured the preservation of vital and irreplaceable records of science in CSIRO.

Professor Schedvin drew heavily on CSIRO's archival records, as well as information provided by a number of past employees such as Sir Frederick White, in preparing the book.

His major objective in writing the history, he said, was to explain the way CSIRO acquired such a distinctive structure and ethos.

In doing this he has examined the personalities (such as Julius, Rivett and Richardson) and the times which shaped the organisation.

At the launch, Professor Schedvin also had some observations to make about our current period of change.



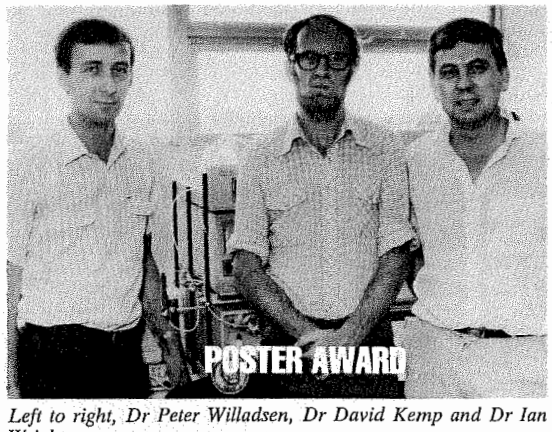
Mr Jack Cummins, the oldest living CSIR appointee, came to Canberra for the launch of Professor Schedvin's book. He took the opportunity to visit the CSIRO archives at Fyshwick to do some research of his own. He is pictured here with some of the rows of records.

'My historical sense tells me that CSIRO is again being reshaped under the pressure of national economic need, and that the future may have more in common with the experience of CSIR than with the comparatively tranquil 1950s and 1960s,' he said.

'History also suggests that a publicly-funded national research organisation will continue to be essential in the future of this country.'

Professor Schedvin's book is available at a discounted price to CSIRO staff from the CSIRO Bookshop. Orders should be directed to the Bookshop at 314 Albert Street, East Melbourne, VIC 3002. The recommended retail price is $29.95, less the 25 per cent staff discount.

Professor Schedvin



Left to right, Dr Peter Willadsen, Dr David Kemp and Dr Ian Wright.

Three scientists from the Division of Tropical Animal Science were recently awarded the Laveran Medal for the best poster on babesiosis displayed at the 3rd International Conference on Malaria and Babesiosis held in Annecy, France from 7–11 September.

The medal is named in honour of Dr Alphonse Laveran, a French military surgeon who was first to identify the malarial parasite in preparations of human blood.

The scientists, Dr David Kemp, Dr Peter Willadsen and Dr Ian Wright all work at the Division's Long Pocket Laboratories in Brisbane on vaccines against cattle ticks and tick-borne diseases. The prize-winning poster depicted the effect a vaccine against cattle ticks would have on the incidence of the protozoan disease, babesiosis, which is spread by the cattle tick.

Oceanography research to hit the airwaves

The Division of Oceanography's climate research will be shown to a huge international audience when an $8 million American-produced television series goes to air.

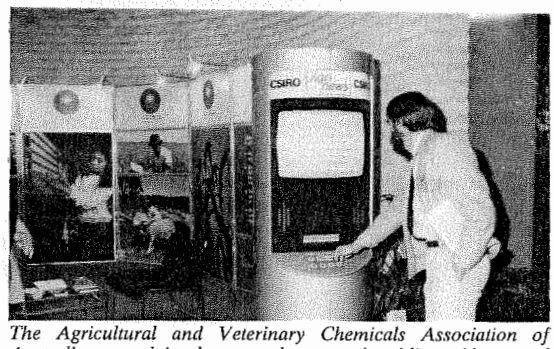
The Division's work is outlined as part of *The Blue Revolution*, a nine-part series being produced by the US Mare Nostrum Foundation. It has taken seven years to research the program, which is due for release in the USA, Japan and Australia in 1989.

Three film crews are working around the world gathering material for the program, which is about man's relationship with the ocean.

Written by marine biologist Dr Luc Cuyvers, *The Blue Revolution* will be seen by about 15 million television viewers during its first broadcast, in prime time, on the US Public Broadcasting Service.

The promised feature on gallium arsenide has been held over until the next issue of* CoResearch, *to be published in early February 1988.
Incidentally, that issue will look rather different, with a redesigned masthead incorporating CSIRO's new corporate identity. This means the red goes and blue will become our featured colour.

CSIRO at the AVCA convention



The Agricultural and Veterinary Chemicals Association of Australia opened its doors to the general public at it's annual convention in Sydney 8-10 November. The keynote address was given by the Chairman of CSIRO, Mr Wran, and the CSIRO exhibit was a major attraction in the public information and education display. The Film & Video Unit's Agri-News *video-disk production (pictured above), which featured 21 news stories on CSIRO's agricultural research, was particularly popular.*

Division markets consulting skills direct to diplomats

The Division of Wildlife and Rangelands Research isn't waiting for the proposed new environmental consulting venture to be set up (see *CoResearch* 307, November 1987). It has taken its own steps to boost consulting work by inviting a number of foreign diplomats to view its work in Canberra and pushing the message that the Division is available for international consulting.

Its 'Exposition of CSIRO Expertise and Consulting Capability in Wildlife Conservation and Land Management' was held in late October and attracted representatives from 15 embassies or high commissions based in Canberra.

Participants were from: Bangladesh, China, Egypt, India, Indonesia, Iran, Jordan, Malaysia, Mexico, Nigeria, Pakistan, the Philippines, Saudi Arabia, Sri Lanka and Zambia. In addition, there were representatives from ACIAR, ADAB, Austrade, the Department of Arts and the Environment, the Australian National Commission to UNESCO, the consulting company Hassall & Associates, and CIRC.

The program focused on four facets of the Division's work – vertebrate pest control, wildlife conservation and sustained yield harvesting, land use planning and rangeland management.

The Division said 'we believe our scientists are the best in the business and our expertise is a resource which should be available to business, industry and government. The Division is available for consulting work at all levels.'

Organiser Dr Rhondda Dickson said while it was too early to tell whether any work would be generated for the Division as a result of the exercise, the immediate response from the diplomats to the presentation had been very favourable, with at least one specific project being developed further.

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New AATSE Fellows

The following CSIRO scientists were admitted as Fellows to the Australian Academy of Technological Sciences and Engineering at its last annual general meeting:

Dr George Alexander

Dr Alexander, chief research scientist at the Division of Animal Production, is internationally recognised for his contributions to the understanding of reproduction in sheep and the survival of neonatal lambs. The results of his studies of cold and heat stress and maternal behaviour have been applied widely in sheep husbandry. Dr Alexander recently marked his 40th anniversary with CSIRO (see *CoResearch* 299, February 1987).

Dr Elizabeth Dennis

Dr Dennis is a principal research scientist with the Division of Plant Industry. She is a leading plant molecular biologist with high international standing in the study of transposable elements and the control of genes in maize and *Tripsacum*, particularly the gene for alcohol dehydrogenase. Her work has led to the establishment of a commercial collaboration with the Agrigenetics Corporation. Dr Dennis did some post-doctoral work with the Division in 1972-1974 before going to the University of Papua New Guinea to lecture in biochemistry. She returned to Plant Industry in 1976, where she has worked ever since.

Dr Neville Fletcher

Dr Fletcher is currently Director of the Institute of Physical Sciences. He is a Fellow of the Academy of Science, the Institute of Physics, London, the Australian Institute of Physics, the Acoustical Society of America and the Australian Acoustical Society. Until joining CSIRO in 1983 as Institute Director, he was Professor of Physics (personal chair) at the University of New England. He has a distinguished record of research in solid-state physics, atmospheric physics and acoustics, and has published two books — *The Physics of Rainclouds* and *The Chemical Physics of Ice*.

Dr John Vercoe

Dr Vercoe is assistant Chief of the Division of Tropical Animal Science and OIC of the Tropical Cattle Research Centre at Rockhampton. He started his career with CSIRO in 1964, studying the reasons for differences in productivity between zebu breeds imported to Australia in the 1950s and the predominant British breeds. His work in this area, with colleague Dr John Frisch, now forms the basis for new and less empirical approaches to the selection and crossbreeding of cattle for improved productivity of cattle in the tropics. Dr Vercoe had two stints with the International Atomic Energy Agency in Vienna where he was head of the animal production and health section in the joint FAO/IAEA division.

SIROCREDIT

A CHRISTMAS BONUS

It's not in the Terms and Conditions but....

In the season of goodwill and cheer SIROCREDIT is happy to announce its limited Term Investment Offer available until 4.00 pm on Christmas Eve. The investment offer represents an opportunity for CSIRO staff and their families to secure an above market return for their deposits guaranteed for a period of your choice. Loan rates have also been reduced. A bonus for all members to enjoy. But act now!

Details of the offer are as follows:

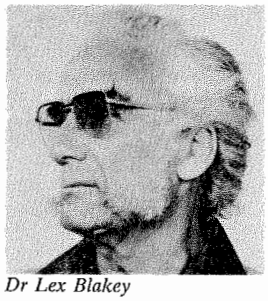
Minimum Deposit:	$1000
Term of Investment:	Your choice up to 24 months
Interest Rate:	Guaranteed for Term:
	3 mths: 11.5%
	6 mths: 11.75%
	12 mths: 12%
	13-24 mths: 12.25%

As we are all aware, financial matters have not been off the front pages since the stock market collapse, and increasingly it has become apparent that investors are now seeking a secure form of investment for a guaranteed return. This demand for fixed interest accounts is the basis behind SIROCREDIT's Christmas bonus offer and our normal policy of providing 'top of the market returns' whenever possible.

The board and staff of SIROCREDIT would like to wish all our members throughout CSIRO a very safe and happy Christmas and New Year.

Lex Blakey retires

One of the most widely known figures in the Australian building and construction industry, Dr Lex Blakey, Chief of the Division of Building Research, has retired after 36 years with CSIRO.



Dr Lex Blakey

Dr Blakey graduated in engineering at the University of Western Australia, and obtained his PhD at Cambridge in England.

Most of his working life has been spent with the Division. He joined the Organisation in 1949 as head of the structures and concrete technology group, and in 1968 was appointed assistant Chief. In 1974 he was seconded to the Department of Housing and Construction for two years as first assistant secretary — building technology and sociology.

In 1978, two years after his return to the Division, he was appointed Chief.

His belief in the need for strong communication between scientists and industry saw him on many committees and a regular speaker at hundreds of industry meetings in Australia and overseas.

High on the list of his many vital contributions to the Australian building and construction industry would be his fostering of many Australian standards through participation in a number of Standards Association of Australia committees, and the establishment of the Australian Building Systems Appraisal Council (ABSAC).

This latter achievement has enabled many significant building innovations to receive ready acceptance by building authorities and industry.

Scientist gives his time for the community

CSIRO scientist Trevor Gilbert has a very proud wife. Mrs Angela Gilbert wrote to *CoResearch* recently to draw attention to her husband's work with the NSW State Emergency Service.

She said although scientists may not be 'shouting from the rooftops' about their work, they were certainly not the wimps described by Barry Jones. Mrs Gilbert said her husband was a 'quiet achiever' in both his scientific and rescue work.

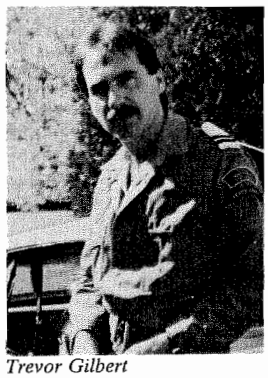
Mr Gilbert is an organic geochemist with the Division of Mineral Physics and Mineralogy (involved with oil exploration research), and is also a volunteer with the SES.

'In recognition for his service to the community during times of floods, and during rescues and bush searches, he has been promoted to the position of executive officer of the Sydney Northern Division, in charge of operations and intelligence, said Mrs Gilbert.

'This division co-ordinates locally based rescue squads for over one million residents in the northern districts of Sydney, during disasters and storms. It's all voluntary and often means all-night work.'

Mr Gilbert is also a member of the Botany Bay SES committee and the toxic and hazardous chemicals committee of the Total Environment Centre. He lectures at a number of universities in organic geochemistry and environmental science, and has also published some 40 scientific papers in the past eight years.

CoResearch would be interested to hear more about staff activities, whether related to or outside work. Please write to the editor (the address is on this page).



Trevor Gilbert

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

The CSIRO women's netball team has won the grand final in blue division of the South Canberra Netball Association's summer competition.

This is the first year that the team has played together in competition and many of the women haven't played netball since primary school.

The team included: Leanne Newton, Linda Jackson, Katrina McQuillan (personnel HQ), Sari McGee (Institute of Physical Sciences), Christine Jones (RAO Canberra), Tess Mathews (Wildlife & Rangelands Research), Tonia Barnes (finance & admin HQ), Louise Raisin (Dept of Social Services) and Robyn Ronai (media group HQ).

The team was presented with trophies and they plan to play in the same competition next year.

McLennan awards

Cont. from p.1

production of high-purity ceramic grade zirconia powders and zirconium chemicals from zircon, derived from Australian beach sand.

The McLennan award seeks to stimulate, encourage and recognise outstanding contributions by CSIRO scientists to Australian industry. It was established by the former CSIRO Advisory Council under its Chairman, Sir Peter Derham.

It is named in honour of Sir Ian McLennan, a member of the Advisory Council from 1979 to 1981, recognising his contributions to the application of science and technology in Australia's industrial development.

Corporate identity

from p.1

the success of the symbol depends on a speedy implementation.

'You can argue for ever over a piece of artwork,' he said.

'Some people will love it; some will hate it. But most of us will accept it for what it is — a graphic device which acts as a unifying symbol for a diverse organisation.'

'The sooner the symbol is presented to the outside world in as many ways as possible, the sooner we will reap the benefits.'

Certain products are to be prepared immediately — letterhead paper, compliments slips, business cards — and will be processed by the Bureau and printed by the CSIRO printing centre. Divisions and institutes have already been asked to indicate their requirements.

The appearance of the corporate symbol on signs, cars, forms and published material will be gradually phased in over the next year. Bromides of the artwork will be made available to divisions with the implementation manual.

308-1987/88

309##1988

CoResearch

No. 309 February 1988 CSIRO's staff newspaper

12 page New Year Issue

CSIRO AUSTRALIA

Plan to examine OHS aspects of new research projects

A proposal to assess the occupational health and safety aspects of all new research projects in CSIRO is now being appraised by divisions and institutes.

According to OHS manager Mr Gary Knobel the proposal, which arose from the 1983 Craig Review of OHS, is now in draft policy form and all comments are being requested by 18 March.

The aim of the proposal is to assess any potential OHS issues in new experimental work or in novel equipment being put into use. Strategies would then be developed in advance to alleviate possible risks.

Advantages would include: less occupational injury and disease in CSIRO, a reduction in legal claims, an ability to respond adequately should legal claims arise and less wastage of personnel and material resources.

It is proposed that this assessment would be made as early as possible in the planning stage, so all financial implications could be identified – such as the need for protective clothing or services like medical and safety monitoring.

Examples of hazards to be considered include: emission of ionising radiation, use of mutagenic or carcinogenic chemicals, generation of dust, vapour or gasses and electrical hazards.

In addition, it is proposed that an appraisal of existing equipment be made within three years, with priority being given to equipment with the greatest evident risk.

The new policy will apply to all jointly-funded or jointly-staffed projects in which CSIRO is involved.

Devolving responsibilities

Corporate centre review causes some divisional disquiet

The review of CSIRO's corporate centre has wide ramifications throughout the Organisation – and divisional administration staff are becoming uneasy about what it will mean for their work.

Following extensive review procedures conducted by the consultants Pappas, Carter, Evans & Koop (with a CSIRO group) and a period of staff consultation, recommendations are being presented to the Board on 16 February.

It is likely about 250 positions will be lost from the corporate centre and functions will be devolved to place them closer to the users of the services – i.e. divisions and institutes.

The aim is to give divisions and institutes more responsibility for many administrative activities, leaving the corporate centre as a focus for policy and broader development of CSIRO.

This is in the wake of the McKinsey review of CSIRO's research administration, which has resulted in the establishment of six new institutes comprising regrouped and reorganised divisions.

There is now some disquiet among divisions about the implications in terms of workload and further skills development to deal with certain devolved responsibilities.

Three separate meetings of divisional secretaries and senior administrative staff, including regional administrative officers, were held in Sydney, Melbourne and Canberra on 11, 12 and 20 January respectively, to discuss the recommendations of the review. The meetings did not have the benefit of the consultants' report, which was still unavailable at the time.

The meetings identified a number of activities where the proposed 'service levels' to be provided by the corporate centre gave rise to their concern, and others where the documentation was inadequate to form judgements.

Consequently, the Sydney and Melbourne groups combined to present a submission to the review group, while Canberra forwarded a separate submission.

At their meetings, the Sydney and Melbourne groups focused on three issues of concern. Many of these concerns were echoed at the later Canberra meeting.

Firstly, employee/employer relations. It was thought this should be a centralised function as many divisions did not have the capability to deal with this, and it was inappropriate for *ad hoc* agreements to be made by individual divisions.

Secondly, internal auditing. Headquarters' internal audit group was one of those recommended to operate at a substantially reduced level of service. This would mean the elimination of all End of Financial Year auditing and work with divisions would only be on 'significant budget line items' – e.g. accounts payable, accounts receivable, supply and assets.

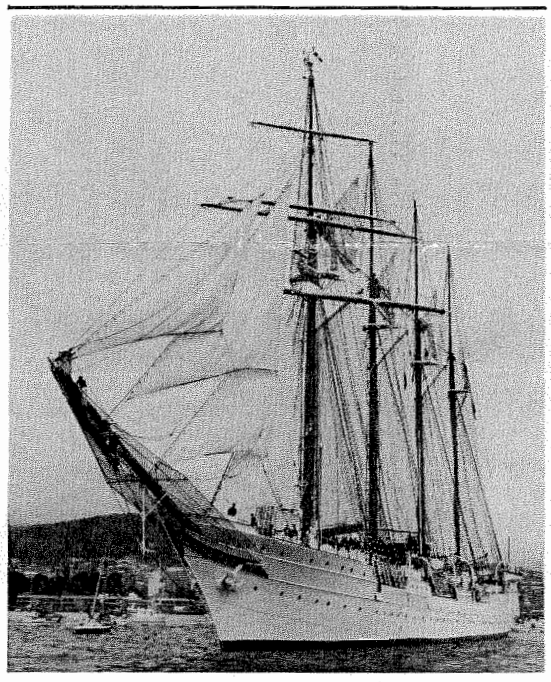
It was also thought that as a result of devolution, new functions and responsibilities undertaken by divisional staff needed to be backed up by a regional audit presence to maintain the high standard and credibility of CSIRO's administrative work.

The Canberra meeting recommended that the level of service provided by internal audit perhaps be reviewed in one or two years' time.

Thirdly, the devolution of the cheque production function from RAOs to divisions was seen as undesirable.

At all meetings, a major point to emerge was that there was no guarantee of extra resources to cope with the vastly increased activities. Already this had become a problem with the wind-down of RAO functions (a separate decision now being implemented).

It was generally agreed that there was a lack of expertise in many divisions to deal with very specialised areas which have until now been handled by HQ. The question of training to replace this expertise was discussed, but it was unclear what training would be implemented.



One of the majestic tall ships in Australia for the Bicentenary, Juan Sebastian de Elcano, *sails past the CSIRO Marine Laboratories (lower left). Photo: Thor Carter*

The review examined the work of some 680 people in the areas of: finance and administration, personnel, internal audit, the Centre for International Research Co-operation (CIRC) and the Bureau of Information and Public Communication.

In its terms of reference, PCEK stated 'that operational support tasks should be performed only if there are demonstrable advantages'.

Further, they stated 'that while duplication must be minimised, a monitoring and oversight role must be maintained in all administrative matters to ensure adherence to all government policies and to facilitate the establishment of (and access to) a management information base sufficient to ensure efficient management and effective interaction between CSIRO and outside bodies...'

Section leaders were required to provide extensive information which resulted in the formulation of three 'service levels' for the activities in their areas. Service level one would show the minimum service needed to meet the defined need (or possibly the termination of that activity); two would probably amount to refocusing and re-adjustment of the current level; and three would probably mean an increase in activity. Broadly, of the 47 service areas defined, 27 were allocated service level one in the recommendations - i.e. a sharp decrease in activity.

CSIRO Bookshop surges ahead

On 29 January the CSIRO Bookshop/Publications Sales Office reported some extremely encouraging results.

Its sales revenue for journals and books, seven months into this financial year, now almost equals the total for the whole of the previous financial year.

Revenue at 29 January was $1 051 721, compared with the total for the previous year of $1 064 000.

With five months' trading still to go, Bookshop manager Mr Jeff Prentice is confident the $1.5 million goal is achievable.

'The corporate centre review recommendation that the Bookshop be "eliminated" has no credibility on these results', said Mr Prentice.

Mr Prentice attributed the result to intensive marketing efforts with divisional publications and an aggressive campaign to increase subscriptions to all CSIRO scierntific journals.

Mr Prentice said a feasibility study on opening a CSIRO Bookshop in Sydney is now underway.

From the Chief Executive

A column by Dr Keith Boardman

During my recent visit to London to attend the bicentennial conference at the Royal Institution on Anglo-Australian science over two centuries, I took the opportunity to have discussions with Mr Robert Jackson, parliamentary under-secretary of science and education, Sir George Porter, President of the Royal Society, and the House of Lords select committee on science and technology.

I had hoped to see Lord Shackleton, chairman of the House of Lords committee, but he was away in the Falkland Islands. However I met the secretary to the committee, who outlined the work of the committee and the outcome of its report on civil R&D in the UK. Members of the select committee who visited Japan were impressed by the work of the Japan Council of Science and Technology, and although the committee appreciated the marked cultural differences between Japan and the UK, it recommended, and the government accepted, the establishment of an Advisory Council of Science and Technology (ACOST) in the UK.

While reporting to the Prime Minister, ACOST is chaired by the Chairman of Rolls Royce, Sir Francis Tombs, but it is intended that the Prime Minister will chair the meetings on occasion.

Sir George Porter, who is a member of ACOST, intimated that ACOST would not produce reports for dissemination but its advice would be confidential to the Prime Minister.

The House of Lords Committee was satisfied with the government response to its report, but had hoped that extra funds would have been made available to support its recommendations. The committee recommended that strategic research (i.e. the type of research conducted by CSIRO) should be expanded, and the customer-contractor research more far-sighted.

I was told that many industrialists in the UK have not yet accepted that they must make their way in a more competitive world and invest more of their resources in R&D. In several of my discussions I was informed that there is a need for industrial firms to greatly increase their R&D if Britain is to take advantage of the country's outstanding basic research effort.

The President of the Royal Society considers that basic research is done best in the universities and applied work in industry. Academics should not be expected to be entrepreneurs, as this type of activity is better left to industry, which is in contact with the market and consumer needs.

Mr Jackson (who is a Member of the European Parliament) and his wife have accepted an invitation to attend the opening of the Australia Telescope. Mr Jackson, who has the responsibility for an education reform bill in the UK, is interested in gaining some knowledge of the Australian education scene, particularly higher education. His visit is timely in view of the green paper on higher education recently circulated by Mr Dawkins for comment.

I was pleased that I could meet with Sir Martin Wood, Chairman and founder of a highly successful high technology company, Oxford Instruments. Sir Martin, who also intends visiting Australia later this year, is a member of the Council for the Exploitation of Science and Technology (CEST), which is funded primarily from the private sector, but with contributions from government. The main role of CEST is to establish research centres for the exploitation of new technologies. For example, £5 million is to be provided over five years to a research centre on superconductivity, representing 50 per cent of the running costs. The centre was awarded to Cambridge University after an evaluation by CEST of seven applications.

The problems facing Britain in exploiting the results of its research efforts are more acute in Australia with our even lower level of private sector R&D and greater distance from markets.

I sincerely hope that the completion of the review of the corporate centre and corporate services will be the last of major reviews for several years. The Organisation needs a period of stability to allow the new team of managers and the staff to get on with the job of providing outstanding research results so vital to the future competitiveness of Australia.

A Keith Boardman

Letters to the Editor

Dear Editor,
THE MAGIC POKER MACHINE

William Calvin, writing in *Nature* 5 November 1987, took the darwinian formula of random variation followed by selection and extended it to fields other than biology.

'Technology treats noise as an unwanted impediment, darwinism as a means of exploring new avenues'. 'Technology' could as easily read 'research management'. Noise or random variation can be a cornucopia of new and unexpected ideas and possibilities. Each research project is not random in its execution, but is strongly random in its long term significance.

The goal of research management should be not to reduce noise but to reduce the cost of producing it. Researchers aim for excellence, administration aims for efficiency, the organisation as a whole aims at producing a cavalcade of new knowledge. Excellence and efficiency are only means to an end.

Randomness cuts through squabbles over research priorities like a knife through butter. Suppose 10 per cent of all research projects in CSIRO were approved by picking a number from a hat. The long term significance of such projects can be compared with the long term significance of other projects approved by thought and deliberation. This puts research managers in the same position as investment managers who hope they can do better than someone picking stocks by throwing a dart at a newspaper stock exchange list.

Whatever organisational structure CSIRO develops, it should never lose sight of the primaeval chaos that new ideas come from. Such a structure will not necessarily look neat and tidy.

David Erskine
Irrigation and Freshwater Research

Dear Editor,

The Austrian philosopher Rudolf Steiner propounded the thesis of the 'threefold commonwealth', wherein *(a)* the economic, *(b)* the political/legal, and *(c)* the cultural were to be carefully distinguished. Confounding of any with the others would lead to trouble, he predicted.

No greater corroboration of this proposal has emerged than recent events in CSIRO, where the principles of the market place (category *a*) are being imposed on what should mainly be the free, creative activity of scientific research (category *c*).

Further, and ironically, the failure to comprehend, or even recognise, the ramifications of David Ricardo's law of economic rent bedevils all the sophisticated cost/benefit analyses at present prevalent. In other words, all advances in the arts, technology, and – in particular – scientific research, inevitably generate enhanced land values. Failure to grasp this is what George Bernard Shaw once referred to as the *pons asinorum* of the politicians.

Admittedly, the fiscal appropriation of this natural fund for CSIRO is probably a matter for the politicians. However, as long as the financial managers/advisors of our scientific enterprise neglect this inescapable fact of economic life and focus primarily on hatchet operations, the current malaise and confusion in CSIRO will continue.

Clarification of the foregoing can be found in *The Financing of Developmental Works* by one of Australia's leading engineers, Sir Ronald East, published by the Melbourne University Press in association with Oxford University Press, back in 1944.

Geoff Forster
Editorial & Publishing Unit

Dear Editor,

In reply to John Lenaghan's letter entitled SPQR in the December/January issue of *CoResearch*, a more plausible significance of the acronym may be Senatus Populusque *Quorum* Romanus, but my personally preferred version, especially in this age of numerous militant societies for protection of this and that, is *S*ociety for *P*revention of *Q*uelty to *R*omans.

Dr Andrew Foldes
Division of Animal Production

***The following letter was sent to the Director of Information and Public Communication, Mr Peter Dunstan, with a copy to* CoResearch.**

Dear Mr Dunstan,

Is there any chance that the new logo proposed for CSIRO can be killed off, even though it appears to have backing from on high? It must surely be appropriate to argue that staff should have been given an opportunity to choose between a short list of alternatives. I believe it to have been a very poor example of the consultative process to have the present (to me) meaningless symbol thrust upon us.

I have never yet seen the logo in its intended colours nor have I had the symbolism explained to me. Much intra-CSIRO ridicule is being heaped upon the device as you are probably aware, and the lead taken by this prestigious Organisation in making our beautiful language ugly, through the 'corporate message', is deplorable.

In the absence of any other explanation, I have concluded that the symbol indicates an Organisation having seven major arteries – presumably the six institutes plus HQ. Five arteries, unfortunately, have aneurysms and at least one seems about to blow. God help us all!

D J Walker
Chief
Division of Food Research

***The following letter was sent to Dr Michael Dack, with a copy to* Co-Research.**

Dear Dr Dack,

It's interesting that the first time I, and my colleagues, saw the new CSIRO logo (*CoResearch* No. 308 Dec.'87/Jan.'88) the decision had been made and you felt the debate should be closed. I read with interest the letters in the same issue and agree with John Lenaghan that the acronym alone would probably suffice but would have added to the list in Australia ABC, BHP, CRA, CSR and internationally IBM, RCA, ITT and AT&T. Speaking of AT&T (American Telephone and Telegraph; better known for Bell Telephone and the Bell Laboratories) I enclose an interesting comparison. It would appear that the design consultants have been influenced by AT&T's new logo which has been in use for a few years. In the AT&T logo one can see global electronic communication, but the story or symbolism in the new CSIRO logo is a mystery to me. What do the seven vertical lines and the five swellings symbolise? If they are the six institutes someone can't count. One is central and fatter than others; two are very lean. I hope that's mine in the middle.

Peter C Rothlisberg
Marine Laboratories

Dear Editor,

Over the years, I have followed with interest the correspondence in *CoResearch* regarding possible logos for CSIRO. Indeed, I still have my favourite, from Socrates Paschalidis of Computing Research, displayed on the side of my filing cabinet. Given this established forum, I was shocked to find that we had been inflicted with a logo, without notice, from an external consultant. And amused to find that it is simply that of another organisation, rotated 90°. (See below)

Alister K Sharp
Division of Food Research

Letters cont. on p.4

309-1988

1987 CSIRO Medals

Diverse scientific endeavour honoured

The diversity of Australia's scientific research is reflected in the latest CSIRO Medal awards. The awards were made on 14 December, for CSIRO research in wood technology, banknote technology and marsupial reproductive physiology, and for non-CSIRO research in computerised music.

The Medals have been awarded for three years. This year, for the first time, a non-CSIRO research team has also been honoured.

The recipients were:

•**Mr John Coleman** from the Division of Chemical and Wood Technology, for his invention of the remarkable reconstituted wood product, Scrimber.

This invention has led to the world's first process to obtain structural quality beams from trees 8-10 years old. This has a number of benefits, including alleviating the problem of the shortage of quality mature timber for construction beams and reducing the inherent cost of production.

Small diameter logs – including plantation thinnings – can be used. The natural orientation of the wood fibres is maintained, giving the strength often lacking in other reconstituted wood products.

Mr Coleman carried out the early work in the laboratory and demonstrated that a uniform product could be produced in a series of unit operations, some of which involved modification of technology available ffom a range of industrial processes.

After a period of collaborative development with Repco Pty Ltd, the process was licensed to SATCO (the South Australian Timber Corporation). A pilot plant operated by Repco in Victoria proved the viability of the process, and now a prototype production plant is being constructed by SATCO in Mt Gambier.

•**Dr David Solomon** and **Mr Don Addison** (and their teams), received a Medal for the joint invention of highly secure banknotes.

Dr Solomon, Chief of the (then) Division of Applied Organic Chemistry (which is now part of the new Division of Chemicals and Polymers), led a team which co-operated with Mr Addison's team at the Note Printing Branch of the Reserve Bank of Australia to develop the new $10 note.

The 19-year project was prompted in 1967 when reasonable forgeries of the $10 note were discovered.

The Bank approached the Division for help and a five year collaborative project started in June 1968. This came up with a revolutionary approach to banknote technology – the use of optically variable devices in conjunction with novel plastic laminates.

As each part of the research succeeded it was incorporated into the development of a substantial pilot scale production line at Fishermens Bend. This line was transferred to the Reserve Bank where Mr Addison's team developed it, with CSIRO help, into the current production line.

Dr David Solomon, one of the CSIRO Medal winners, receives his award from CSIRO Chairman Mr Neville Wran. Photo: Helen Niblett.

The success of this work led to the Bank's decision to proceed with manufacture of the new banknotes. They will be released sometime this year.

This project was notable for many things:

It was conducted in secret in CSIRO, and it involved a wide range of activities, from fundamental physical optics, through polymer chemistry to machine design and creative metal working.

Dr Solomon's team, ranging in rank from CRS to workshop apprentice, were all harmoniously and totally involved. Among them were: Dr Sefton Hamann, Dr Geoffrey Hawthorne, Dr Jonathon Hodgkin, Dr Bob Lee, Mrs Jean Swift, Mr Bryan Loft, Dr Mario Girolamo, Mr Graham Quint, Dr John Loder, Dr Tom Spurling, Mr Bob Brett, Mr Ian Thomas, Mr Laurie Julius, Mr Ian Marwick, Mr Alf Desira, Mr Jim Wardrop, Mr Alan Chapman, Mr Geoff Rolstone, Mr Max Linton, Mr Bob Eibel, and Mr Jack Ross and Mr Alan Wilson (both now deceased).

•**Dr Hugh Tyndale-Biscoe** of the Division of Wildlife and Ecology received his Medal in recognition of his work as the world's foremost researcher into the reproductive physiology of marsupials.

His studies of the hormonal control of reproductive cycles and lactation had led to greater understanding of the relationships between the hypothalamus, pituitary, ovary and mammary glands, as well as the development of young in the pouch.

His more recent research on the role of the pineal gland in the control of seasonal breeding in tamar wallabies has led to advances in understanding how animals measure time and respond to its passing.

Further studies this year in collaboration with Dr Lydia Mayner (funded by a 12 month CSIRO/ANU grant) are expected to shed further light on circadian rhythms in tamar wallabies. This data ultimately could have implications for airline crews, shift workers and others who are out of step with the natural day/night rhythm.

It has emerged that the tamar wallaby is very useful in studying circadian rhythms because of its rapid and precise response to changes in light and dark, and therefore useful in understanding a phenomenon common to all mammals including humans.

•The external award went to **Mr Kim Ryrie** from Fairlight Instruments and **Mr Peter Vogel** from Creative Strategies Pty Ltd for their development of a sophisticated computer music instrument.

The application of electronics and computer technology to the production of musical sounds is a late 20th century development which has had a major impact on the entertainment industry. The Australian Fairlight CMI (computer music instrument) holds premier position on the world music scene. It is based on a computer designed by Tony Furse and subsequently developed into a musical instrument by Kim Ryrie and Peter Vogel.

The synthesiser's ability to sample and manipulate natural sounds, as well as create entirely new sounds, is unmatched.

Fairlight Instruments Pty Ltd manufactures the CMI, and exports most of the products.

'Marsupial' indicates innovative engineering skills in CSIRO

One of the most successful entries in the recent solar car race across Australia was entered by a team which included several CSIRO employees.

Graham Allen of the Division of Applied Physics was team manager of the Australian Geographic Team Marsupial entry. The team also included his sister, Michelle Storey of the Division of Radiophysics, Horrie Kinnersley, recently retired from Applied Physics and Antony Schinckel, formerly with Radiophysics at Parkes.

The Pentax World Solar Challenge, in which the car competed, was the first long-distance race for solar powered cars ever held. Starting in Darwin on 1 November, the race went down the Stuart Highway to finish in Adelaide, a distance of about 3000km.

Designed by Graham Allen and Professor John Storey of the University of New South Wales School of Physics, the Australian Geographic Team Marsupial car was built in Graham's garage by a small but dedicated team of enthusiasts on weekends and evenings over 12 months. Major funding for the project came from the Australian Geographic Society's scientific research and expedition fund, and the team of four drivers included adventurer Dick Smith.

The car was powered by Australian-made solar cells, specially fabricated by BP Solar Australia at its Brookvale plant. Each cell was cut square to allow the highest possible packing density, then laminated onto 1.3mm thick chemically toughened glass. This produced a strong, lightweight module with an excellent surface finish, essential for low aerodynamic drag. With an individual cell efficiency of close to 14 per cent, the eight square metre solar array could produce almost exactly 1 kW in bright sunshine. The vehicle was the first to finish the race using Austrlian-made cells.

To make the best use of this power, highly efficient drive electronics and motors were required. The motors were a permanent-magnet type, using the rare earth compound samarium cobalt. The electronics were adapted from units designed for solar powered water pumps by the Brisbane firm Australian Energy Research Laboratories.

The most crucial part of the car's design, though, lay in achieving a rugged, lightweight vehicle with excellent aerodynamics. A chrome-molybdenum steel spaceframe was used, surrounded by a smooth body shell of Kevlar/foam sandwich. Four mountain bike wheels, inflated to a pressure of 100psi, carried the car.

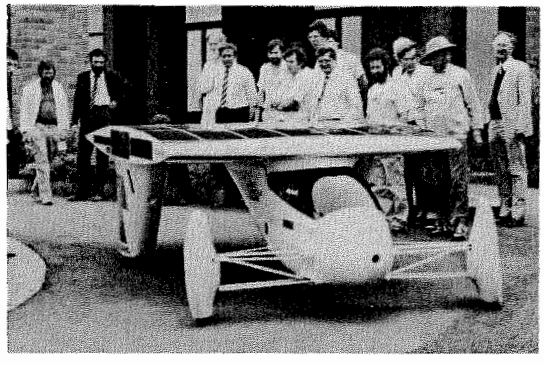
In pre-race trials, the car reached 85km/h placing it third on the starting grid behind the US General Motors multi-million dollar entry and the radical Hawaiian 'Mana La'. In fourth position were Ford Australia, with the Swiss 'Spirit of Biel' behind them.

The Solar Challenge itself was easily won by General Motors, with Team Marsupial coming in fourth behind Ford and Biel. Unseasonal rain and heavily overcast skies had drastically slowed all the cars except for General Motors, whose early lead placed them ahead of the clouds. Eventually, six of the original 23 starters were to finish the race within the officially allowed time. The remainder retired due to breakdowns or lack of time. Fourteen solar cars eventually finished the race.

The Australian Geographic Team Marsupial car was one of the lowest budget entries in the race, costing around one per cent of the cost of the GM car. It demonstrated that a viable solar car could be built for the cost of a moderately upmarket road car.

Sound but innovative engineering is essential to Australia's economic recovery; the success of this vehicle shows that the necessary skills are flourishing within CSIRO and the universities.

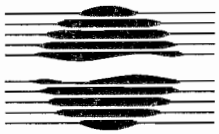
Graham Allen gave a colloquium and demonstration of the solar powered car at Applied Physics on 10 December. It is shown here doing a demonstration lap of the perimeter road, watched by Applied Physics staff.



Letters to the Editor
Cont. from p.2

Dear Editor,
I realise Dr Dack believes that the time for debating the merits of the corporate symbol are now over, but upon reading the Dec/Jan issue of *CoResearch* I kept having this niggling idea that I had seen something very similar to our proposed logo elsewhere. After getting the short straw yet again to empty the garbage it jumped out at me (actually fell out) as to where I had seen our proposed log before – DIET PEPSI – (see below). Maybe in our quest for external funding we are either trying to obtain Pepsi funds or alternatively are contracting out for a bit of sly advertising – nothing like a little injection of corporate funds into CSIRO – maybe we can get discounted field packs of Pepsi as a trade off. The idea of a corporate logo is excellent – it's a shame we can't have an original one.

A W Whitelaw
Division of Fisheries Research



Dear Editor,
I am a humble disciple of the ultimate answer – corporate identity! It wounds me deeply to read letters in your publication which try to weaken the cause. However, if we are to have a successful logo it seems that it should have a meaning. Perhaps it would have been a good idea for the logo promoters to explain the design to CSIRO employees so that we are better able to pass on the message to the ever-enquiring public. Luckily, I have invented a meaning which is quite simple to remember and is, undoubtedly, much simpler than the true meaning.

The dark circle (or black hole) represents CSIRO. The seven vertical lines stand for time (or the seven days of the week – the first and last lines representing Sunday and Saturday respectively). The white ellipses indicate the intensity of work carried out. Accordingly, if you want anything done at CSIRO try on a Wednesday. By the way, the length of the vertical lines does not equal 100 per cent (or does it?). Have some fun!

Vincent Cafarella
Division of Food Research

Editor's note: The following letter was sent to* CoResearch *by Dr Art Raiche in response to an article in* Forum, *the newsletter of the CSIRO Communication Task Force.

Dear Editor,
Whilst I'm flattered that Robin Batterham (*Forum* No.9, 19 Dec. 1987) thinks my article deserves careful analysis, I'm disappointed that none was presented. His article seems to have very little to do with the points that were raised. Indeed, it is indicative of the superficiality which seems to have pervaded much of the McKinsey review of CSIRO.

Let's apply some analysis to the problem of our shrinking budget. Since government expenditure has not shrunk, our budget, as well as those of the universities and the ABC, has been sacrificed to other areas. Governments like to spend money on things such as Parliament buildings, casinos, sporting complexes, Bicentential fantasies, etc.; in short, those areas which allow for the expression of 'imperial grandeur', political egos and where possible, entertainment for the masses. Those who do not wish to 'forget the past' are tempted to draw parallels to certain Mediterranean empires of past eras.

Dr Batterham has suggested that we 'forget the past', in other words, ignore history. He is a very brave man to do this, perhaps the ideal person for the Brave New World. Others of us would prefer to study the past and learn from its examples. This procedure should be confused with that of ignoring the present and dwelling in the past.

One strategy for dwelling in the present is to assume that we owe unquestioning obedience to our bureaucrats and political masters, and that we should dedicate ourselves to find projects which might titillate them. For example we could design an elaborate, scaled-up electronic games park around the new Parliament House complete with monorail transport. Once we learn how to formulate projects which appeal to the three-year ballot box mentality, government revenues should flow freely. Those familiar with cargo cult practices will notice certain similarities.

On the other hand, those of us who occasionally do contemplate the past will realise that CSIRO, as a whole, has done a remarkable and valuable job over the years. This has been recognised by our scientific peers both in Australia and overseas, in the agricultural sector and certain overseas industries. Thus, if we have confidence in ourselves, a more satisfying strategy is to make government and local industry change their perceptions about us and our role. The government really doesn't know what to do about science. It should be the duty of our management to educate government. By this I do not mean the promulgation of a new generation of pamphlets. I mean a strategy of going for the political jugular.

As an example, suppose that 32 chiefs could stop bickering over the few remaining crumbs long enough to agree on a few priorities and actions for CSIRO as well as reasonable cost estimates. Imagine then, 32 chiefs, united in purpose, accompanied by the media, walking into ministerial offices and presenting their case in a forceful manner. The point is that we need a more courageous CSIRO management, adept in the skills of fighting upward. Our management must unlearn the role of lackeys whose main job appears to be the downward transmission of bad news.

The problem of local industry is more disturbing. It has almost become a cliche that overseas companies have done much more than local companies to develop our research into products. Let us recognise that the problem does not lie so much with CSIRO as it does with the lack of management skills in Australian industry, a fact well recogised by the Australian Institute of Management. I do not believe that the best solution is to pander to the desires of current managerial lack of vision. A better solution is for CSIRO to form a group to help management schools incorporate units on technological innovation into their course structure. Such units can also foster direct contact between current and future managers and CSIRO. Since many companies make a practice of sending their executives on training courses, this idea provides a solution not restricted to the long term.

Returning to the simplistic analysis that provoked this letter, I can only stand in awe of the apparent ability of Robin Batterham to choose lines of research which WILL succeed as opposed to those which only MAY succeed. Outside the Star Wars establishment, I know of no-one else in the world with such confidence. Those of us with lesser ability think of science as a search into that which is not yet known. *The freedom to fail is an essential requirement for progress in science and engineering development.*

Limiting the scope of research and development to 'sure things' is not R&D; it is robotics. Compare the R&D successes of the West with those of Eastern Europe.

Few would argue against the concept of a well-managed mix of long, medium and short term projects ranging from the intensely practical to the 'far out'. In a healthy organisation, the composition of the mix will be the subject of ongoing debate. What is crucial is to recognise that the history of science (there I go again, bringing up the past. Sorry, Robin) has been dominated by serendipitous discoveries made by good scientists working on well-defined projects.

What is crucial to the health of CSIRO is to retain the flexibility to shift resources from previously defined projects to take advantage of such serendipitous discoveries – even if there is the possibility that the new line of research may not come to fruition.

Military history furnishes a useful metaphor for this. Small countries, with guerilla warfare skills, have often inflicted defeats upon larger countries which were committed to tactics of massive assault. I know of no examples where a small country, committed to tactics of fixed principles of massive assault, has defeated a large country using flexible tactics. Australia is a small country.

The two main points are these. It is better to use the past than to forget it. It is better to fight upwards with pride and courage than to look downwards with shame.

Art Raiche
Division of Exploration Geoscience

Advanced materials experience

CSIRO is working with the Victorian Government's vacation scholarship program, for the second year, to promote advanced materials and create an awareness of them in students and graduates.

Of the 11 scholarship winners employed by the Department of Industry, Technology and Resources, three are working on research projects in CSIRO laboratories.

Mr Hung Chau, who will start the fourth year of his mechanical engineering course at the Footscray Institute of Technology this year, is working under Dr Rod Esdaile at the Division of Manufacturing Technology in Preston.

He is investigating liquid metal attacks on plasma sprayed ceramic coatings. The project examines the resistance of various coatings to immersion in molten aluminium, and investigates thermal shock and heat transfer characteristics.

At the Division of Materials Science and Technology in Clayton, Mr Tejpavan Gandhok is working with Dr Ron Garvie on the development of a new advanced refractory. Magnesia chromide is mixed with zirconia to increase thermal shock resistance and produce a mechanically stronger refractory. Tejpavan also is going into the fourth year of his course this year – chemical engineering at Melbourne University.

Also at Clayton, Ms Swee Lam, a graduate of Monash University's materials engineering course, is working on magnesium partially stabilised zirconia (Mg-PSZ) with Dr Mike Swain. She is testing whether PSZ is suitable for prosthetic implants – specifically hip implants.

Swee, Tejpavan and Hung all said they enjoyed working at CSIRO but it was not without problems.

'It's a bit awe-inspiring to see the scale on which they work,' said Pavan. 'There's a lot of sensitive and expensive machinery I've had to familiarise myself with.'

Swee said working at CSIRO made her feel more like a scientist than an engineer, but it did depend on the project.

All agreed there was so much more they wanted to do than there was time available. The scholarship program is 12 weeks long, finishing on 12 February.

The students were selected from several different tertiary institutions: Monash University, Melbourne University, the Royal Melbourne Institute of Technology and the Footscray Institute of Technology. The courses they study include materials engineering, applied physics, mechanical engineering, chemical engineering and journalism.

The program gives students the opportunity to experience working research environments and has helped to 'spread the good word' about advanced materials. The students also have been able to do some useful and necessary work for their supervisors.

***How far do you have to go these days to get money? Dr Kath Bowmer cleans Federal Minister Peter Morris' shoes before he announces a grant of $112 000 to the Griffith Lab of the Division of Water Resources. Kath was successful in a grant application for work on management systems to control Alligatorweed, a noxious aquatic weed. Photo courtesy of* The Newcastle Herald.**

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'The magic is working'

When the CSIRO Office of Space Science and Applications (COSSA) was established it was something of an experiment. That experiment is now paying off handsomely.

COSSA, which was set up three years ago, represented a new way of doing things in CSIRO. The aim was to act as a focus for all the Organisation's space-related research, to co-ordinate multi-Divisional projects, provide project management for CSIRO space activities, allocate funds for space research and development and to co-ordinate CSIRO/industry and international interactions.

COSSA does not carry out its own research, but rather acts as a broker for the broad range of CSIRO space-based research. Providing or facilitating specialist support services for space research and identifying new opportunities for collaboration is also an important function.

At the time COSSA was mooted, about 40 per cent of CSIRO laboratories were involved in some aspect of space work. This was not just in the obvious areas of radiophysics, but in remote sensing for a wide range of agricultural, mining, oceanography and other applications. As COSSA Director Dr Ken McCracken points out, COSSA would not exist without input from the Divisions (see separate story on the divisional resource).

Committing resources to the stimulation of an Australian space-based industry was rather a long shot back in December 1984 when COSSA was set up.

'The decision was taken at a time when space was very unfashionable to talk about in Australia. In 1983-84 space had two faces – America's Strategic Defence Initiative (SDI) and AUSSAT, which was known in the media at the time as "the opera house in the sky",' said Dr McCracken.

'The Organisation believed, however, that CSIRO had a role in space and that space industries were important to Australia's future development. But it was clearly understood that if industry didn't begin to develop an interest in space, there wasn't any point in CSIRO co-ordinating its effort to target industrial stimulus and we should get out.'

The Australian Government also made a commitment to space development in 1986 by adopting a space policy and establishing the Australian Space Board. However, in the last Federal Budget funding for these initiatives dropped substantially, despite good progress. Dr McCracken, a member of the Space Board, said the Board was an important mechanism for bringing together the various forces and he 'laments the fact that its resources for industrial stimulus have gone down'.

COSSA was given an initial lifespan of two and a half years. This was seen as sufficient time to gauge whether industry was interested and to achieve certain specific goals, such as marshalling CSIRO research to assist Australian industry break into the second generation of AUSSAT.

'The feeling was that if after two and a half years the magic wasn't working, the time would be right to get out,' said Dr McCracken.

'After that time the magic WAS working.'

'Industry had picked up a lot of our technologies, we were stimulating the market and beginning to develop technologies for the 1990s. It was clear the job we had started had demonstrated the usefulness of a co-ordinated function.

In mid-1987 CSIRO decided to extend the life of COSSA for another five years, until June 1992. COSSA's objectives were also further developed during 1987, in the light of its successes, and the complementary role of the since-formed Australian Space Board. As part of the new Institute of Information and Communications Technologies in CSIRO, COSSA's specific goals involve development or maintenance of an appropriate space-related science, technology and applications base in CSIRO; development of knowledge of Australian expertise in space-related technologies; assistance to Australian industry to achieve a high level of participation in provision and utilisation of space-related technologies; and enhancement of Australian participation in international space-related activities, on the basis of CSIRO expertise.

McCracken: 'It is a matter of history that a substantial amount of CSIRO space technology is now in the marketplace. Major earth station systems, meteorological data reception systems, high resolution satellite pictures of the earth, remote sensing scanners, ocean buoys tracked by satellite, image interpretation systems and so on. A substantially greater number of products is on its way to market.' This feature will look briefly at some of the achievements and future projects of the CSIRO space program.

Dr McCracken said CSIRO had long been involved in space related research before the advent of COSSA, but much of this was not seen in that light – it was regarded separately as remote sensing or radio astronomy or antenna design.

'These were technologies of great relevance to Australia but were not recognised as such,' he said. 'We did not always involve industry and industry did not perceive the broader benefits of being involved.'

'In the 1970s we were certainly working with the user industries with our remote sensing, but we were not effectively stimulating the manufacturing industries.

'We tried, but we didn't find the key.'

'Dr Bob Frater, Chief of the Division of Radiophysics, and now Director of the Institute of Information and Communications Technologies, was the first to really effectively do it when he took the decision that the contracts for the Australia Telescope would be let to Australian industry – in fact an 80 per cent Australian industry component was stipulated.

'That was a very important decision, and other decisions have followed from that,' he said.

'If we are looking for singular events that make things happen, that was a major one.'

COSSA has a prime task in ensuring the technology available to industry is appropriate and timely.

'When a new technology comes off the drawing boards the market is sometimes not fully developed.

'We recognise that in order for our divisions to be able to commercialise their space technology we have to help generate the market. To do this we have established consortia in which CSIRO has a stake, which have then brought money in from other sources.

'This is important because it means we are committed. It's no longer a matter of scientists handing the technology over to a company and saying "it's all yours" then moving onto the next project,' he said.

Dr McCracken cites the current plans to commercialise the Division of Radiophysics' gallium arsenide technology (see story this issue) as a good example of appropriate technology being delivered at the right time.

'It's a very natural evolution and the sort of thing CSIRO will be doing more and more in the future,' he said.

CSIRO works closely with a number of private organisations, ranging from large multinationals to the smaller local companies.

These companies are all relative newcomers to space-based industry. All have high tech competence and were looking for ways to better use it.

Getting into the business of building components for satellites requires considerable foresight, and much experience is needed before the big contracts start coming in.

'Unless companies have built equipment for space they will not get contracts to build equipment for commercial will not get contracts to build equipment for commercial space projects,' he said.

'Countries get their companies in a position to compete in this area by funding R&D satellites and insisting that the work is done by indigenous companies.

'With that experience, companies can go out and compete internationally.

'Our companies have never before had a commitment from any source in government which would permit them to become space qualified. That is new.

'The first real step, other than what Bob Frater has done, was a project called Starlab which originated at Mount Stromlo and was funded by the Australian Government. This started to develop Australian industrial competence in space technology in 1982,' said Dr McCracken.

'COSSA is an important part, but not the only part, of this national change now taking place.'

Dr Ken McCracken

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This feature is designed to present a cross-section of activities at COSSA and is not intended as a directory to all its work and services. For more information contact Ms Lyndal Thorburn at the above address.

McCracken and space

Dr Ken McCracken was one of the scientists involved in the heady early years of the United States space program.

He worked with NASA between 1959 and 1970, and initiated and ran a group which built nine instruments for various spacecraft launched during that time. The computer codes he developed in 1959 are still used today to predict the radiation hazards that will be encountered by high-flying aircraft and spacecraft.

He was on a number of NASA committees, including one charged with determining the radiation protection codes for the astronauts on the moon, and another which selected experiments to be flown on satellites.

During his time with NASA he made some interesting observations about the relationship between science and industry.

'In the US scientists work with industry day in, day out – everything we did was through industry,' he said.

'Back then I learnt very quickly and clearly why science is important to the US, and to developed countries in general.

'The knowledge is important, but it was all aimed at getting industry involved in new technology,' he said.

For example, a satellite instrument which he designed in 1961 had to fulfil its function of measuring cosmic radiation, but had to be no more than four and a half pounds in weight.

'I had an engineer who used to work at Texas Instruments, who said "why don't you use integrated circuits?" I said "integrated whats?" Eventually we were the first ever to fly integrated circuits into space. The circuits were put together by a company.

'So the project I had justified as a science goal also had a hidden justification – i.e. getting American industry competent to use this new technology in space.

'That was a very important lesson on doing good science, with a major industrial impact,' he said.

Dr McCracken, who is a great believer in the desirability of scientists changing their fields of work at least once during their careers, changed his in 1970 when he switched to minerals science. Then in 1984 he switched again to being COSSA Director.

MOS-1 one of many international collaborations

COSSA assists in co-ordinating CSIRO's involvement in a wide range of international space-related activities. Among these are: liaison with the French Space Agency (CNES) and resultant contracts from French industry to build a nose cone similar to the instrument now used on the CSIRO research F27; an agreement with India enabling scientific co-operation in civilian space R&D; an agreement with the Science and Engineering Research Council of the UK for design and development of the Along Track Scanning Radiometer to fly on ESA's Remote Sensing Satellite ERS-1; a variety of agreements with NASA for airborne experimental work covering a number of CSIRO divisional and external groups; and the establishment of a Polar Platform Study Group to co-ordinate advanced planning in anticipation of the polar orbiting space station planned for launch late next decade.

Among recent and significant overseas collaborations is the following – to gather data from Japan's MOS-1.

Australia is to benefit in a number of ways from Japan's first remote sensing satellite, through an agreement signed in mid-1987 between CSIRO and Japan's Science and Technology Agency (STA), and the National Space Development Agency of Japan (NASDA).

The space research and development agreement, signed on 4 June 1987, is intended to boost Australia's expertise in remote sensing and other space technologies, and to give Australia access to important Japanese remote sensing activities.

Japan's Marine Observation Satellite (MOS-1) was launched from Tanegashima on 19 February 1987.

It is in some ways similar to Landsat, and carries sensors enabling collection of data on earth resources and environment monitoring, especially over the oceans.

Because there is no on-board storage of data on MOS-1, coverage of the Australasian region will only be possible through direct reception of data in Australia.

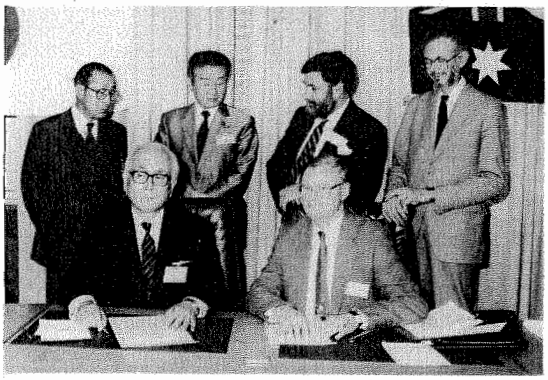
Data will therefore be received at Alice Springs, following modifications to the Australian Centre for Remote Sensing's Data Acquisition Facility there, under an agreement between CSIRO and the former Department of Resources and Energy (now Administrative Services). Modifications will be carried out by Australian industry, tertiary education institutions and CSIRO – giving Australians valuable experience in satellite ground station design and engineering.

This modification work is under the control of the MOS-1 technical team led by Dr Andy Green from the Division of Exploration Geoscience. Contracts have been let to Australian industry for the modification and Dr Green's Division as well as the Division of Radiophysics are providing vital design input.

COSSA has established a science team for MOS-1, led by Drs Carl Nilsson and Graham Harris from the Marine Laboratories in Hobart. They will co-ordinate data requirements from around Australia, and formulate an experimental program for acquisition of data from particular instruments at particular times. Reception should commence in the second quarter of this year, and the Project Scientist Team, led by Dr Harris and Dr Nilsson, will develop an experimental program of data acquisition and interpretation.

COSSA's role is in co-ordinating participants in both the modification of reception facilities and in the experiments connected with the MOS-1 data.

MOS-1 is expected to establish fundamental technologies for earth-observing satellites, primarily by observing marine phenomena like ocean colour and temperature.



The signing of the space R&D agreement between Australia and Japan. Seated, President, NASDA, Mr Hiroyuki and CSIRO Chief Executive Dr Keith Boardman; standing l. to r. former Japanese Ambassador to Australia His Excellency Toshijiro Nakajima, Japanese Vice Minister Tetsuro Shimura, Federal Minister for Science Mr Barry Jones and COSSA Director Dr Ken McCracken.

Unique range of talent in COSSA staff

In early 1986, COSSA's workload reached a critical stage at which it became impossible to continue performing its designated functions efficiently with its small staff.

CSIRO management agreed to increase staffing to maintain flexibility and provide a professional response to change.

Thus, COSSA staff are a unique blend of CSIRO officers, professionals on secondment from the public service, people with special skills appointed for fixed terms, and consultants appointed on a regular contractual basis.

Ms Lyndal Thorburn who has responsibility for public and international affairs activities was appointed in May 1986 on secondment from the Department of Transport. She became a CSIRO employee in September last year.

Her background and qualifications in science and experience in the public service enabled her to contribute to COSSA's considerable liaison, national and internationally.

In November 1986 **Mr Jeff Kingwell** arrived from the Bureau of Meteorology, to have responsibility for science and applications activities.

His background, particularly in remote sensing and meteorology, has benefited COSSA's co-ordination function across the broader scientific community. He has helped extend CSIRO's contacts in space-related activities with universities and other agencies around Australia.

Administrative officer **Mr Ralph Southwell**, who was previously with the HQ contracts group, started early in 1987. He has been involved in dealing with the increasing number of contracts and memoranda of understanding being drawn up by COSSA with agencies and companies in Australia and overseas. **Mr Brian Marsh**, recently transferred from HQ, provides administrative support.

In November 1987 COSSA finally secured the services of an engineer after demonstrating that engineering and project management skills were essential functions, despite COSSA's not having laboratories to support.

Mr Chris Graham, previously with the Department of Industry, Technology and Commerce, is expected to boost COSSA's activities by assisting CSIRO divisions, assessing their engineering feasibil-

Cont. on p.8

F27 crucial for space instrument testing

Australia's only dedicated R&D aircraft is managed by COSSA as a facility available to CSIRO researchers as well as any outside group wanting to use its unique capabilities in Australia and its near neighbours.

The Research Aircraft Facility's Mr David Parkin said at present about 30 per cent of the aircraft's assignments were to non-CSIRO groups.

The Facility not only provided a specially-configured F27 for space-related and other applicable technology development but advised on all stages of planning and assembly, including the provision of fuel, airport clearance, charts and navigation data, and arrangements for accommodation and ground transport.

The F27 is piloted by Captain John McCracken (no relation to Dr Ken McCracken), Chief Pilot, General Aviation, for East-West Airlines, and is supported by a first officer and engineer in the field. East-West also holds the aircraft's maintenance contract.

Researchers who utilise the Facility have the support of a field manager who deals with navigation, safety and scheduling. For large-scale field operations, the Facility can provide additional ground support, logistics and technical personnel. At any given time in its more usual role of research and technology development, the F27 could be anywhere in Australia undertaking a wide variety of activities, from remote sensing of minerals, to oceanography, forest research and atmospheric research.

To date the aircraft has contributed to a number of important international projects. These substantially boost Australia's standing in the international arena and demonstrate our capabilities over a number of research disciplines.

During the latter part of 1985 the aircraft flew with the NASA C-130 aircraft during an international remote sensing project involving sites in most Australian States. Instruments on board both aircraft were used to map salinity, monitor irrigation, assess the condition of rangelands, detect soil erosion and identify and map potential mineral resources. This project involved a consortium of researchers from industry, universities and government agencies.

In the Equatorial Mesoscale Experiment (EMEX) co-ordinated by the Bureau of Meteorology and held over Northern Australia in the 1986/87 summer, the F27 worked with the L-188 Electra of the National Centre for Atmospheric Research (Colorado USA), the NASA ER-2, the WP-3D of the National Oceanic Atmospheric Administration (Washington DC) and a Chinese research ship to measure basic parameters in stratospheric cloud and so contribute to the understanding of world weather.

The aircraft also is equipped for search and rescue, and it carries life rafts, and marine store containers with food, water and survival equipment. Facility members have been trained in aerial search, supply and dropping techniques and are on standby for search and rescue missions. The aircraft's latest such mission was in mid-1987.

COSSA believes the scientific and industrial community in Australia and overseas can use the aircraft far more and has been encouraging researchers to consider it as a testing ground for instruments as well as a data gathering device.

Current activity centres on the testing of an ocean colour scanner being modified and developed by the Division of Oceanography for flight mid-year; and a project involving deployment of the Ericsson side looking airborne radar, managed by the Division of Fisheries. The Facility also is co-ordinating Australian remote sensing experiments planned for NASA's ER-2 aircraft in May 1988.

The Research Aircraft Facility is a key player in the CSIRO space program and will go on providing expert operational and technical assistance supporting Australian researchers and industry in the field of space science and technology.

Mr Jeff Kingwell

Ms Lyndal Thorburn

Remote sensing: revealing the scope of a big country

Research and development in remote sensing is one of the major thrusts in CSIRO's space program, in line with the Government response to the recommendations of the Madigan Report on Australian space policy. This Report, released in June 1985, provided the basis for the enunciation of the Australian space policy by Government in 1986.

Much research had already been done before COSSA entered the picture, but since 1984 COSSA has enhanced, co-ordinated and extended CSIRO's remote sensing effort.

According to Dr McCracken, Australia's sparse population has meant we have been 'particularly dependent on [the] marriage of the camera and the aircraft, and it was inevitable that we would welcome the global perspective of our continent...gained when cameras were installed on Earth-orbiting satellites'.

NASA's first Landsat was launched in 1972, followed by sister spacecraft in 1975 and 1978. Australia was quick to see the potential value of Landsat images to the management of the continent's vast resources. From the start, Australians were innovative and active users of the Landsat data.

However, without our own receiving station, we were only able to receive rather poor quality images based on tape recordings which were processed in the US. Initially, this put into doubt the usefulness of Landsat data for minerals exploration.

Experiments in 1974 by Dr Andy Green from Mineral Physics and Mineralogy (now the Division of Exploration Geoscience) showed that much valuable data from Landsat was not reaching Australia because of a loss of contrast in the images.

Using computers, Dr Green and his co-workers produced greatly improved images for Australian users by manipulating the data.

This was the start of really useful remote sensing images being available in Australia.

It was later decided to establish a receiving station for Landsat at Alice Springs, and this was achieved in 1979.

Work in CSIRO since the early 1970s on remote sensing has accelerated, and now we are not only improving the use of remote sensing data, we are also contributing to remote sensing instrumentation and helping to build Australian industry's expertise in increasingly sophisticated ground station design and construction, as well as image enhancement hardware and software. While still behind geographically and demographically comparable countries such as Canada in this area, we are catching up.

Ground sector data reception and processing is a particularly broad and profitable sector for Australia. Products now available include an AVHRR (Advanced Very High Resolution Radiometer) reception system (called SAT-TRAC) being sold throughout Australia and South-East Asia by PCM Electronics. This arose through work of Dr Garth Paltridge and his colleagues in the Division of Atmospheric Research.

Other products being commercialised arose from a signal processing experiment involving the experimental modification of the Department of Resources and Energy (now Administrative Services) facility at Alice Springs. This satellite reception station was modified to receive data from the Landsat Thematic Mapper, a new instrument introduced in 1985 but not accessible utilising the original Landsat reception system. COSSA believes the products which arose from this experiment – including CPU system – have the potential to increase throughput in existing Landsat reception equipment around the world.

The modification of the receiving station to receive MOS-1 data (see separate story) is a similar story of collaboration with the government operational facilities to provide experimental opportunities to generate marketable products, valuable system engineering experience, and last but not least, access to the latest satellite data available.

Remote sensing software development in progress includes work on the Arlunya system for meteorological satellite data manipulation, and the personal computer based microBRIAN system for handling data from a range of earth observation platforms.

COSSA is working to ensure a co-ordinated approach to the necessary software development. According to COSSA manager Ms Christine Astley-Boden, the objective is a 'modular approach' to applications software, packaging systems to make them attractive to export markets.

In the space sector, COSSA and the CSIRO Division of Atmospheric Research are involved with the UK in co-designing and developing an Along Track Scanning Radiometer (ATSR) for the European Space Agency's first remote sensing satellite ERS-1, due for launch in 1990.

The divisional resource makes COSSA tick

COSSA matches CSIRO space related research and expertise with agencies and companies best able to use it – and therefore its relations with divisions and individual researchers are crucial.

A number of CSIRO scientists deal extensively with COSSA, and here three of them offer some comments about these links.

Dr Carl Nilsson from the Division of Oceanography: 'The Division started building an L/S band satellite receiver and image processing facility before COSSA came into existence. However, since the advent of COSSA we have been kept very conscious of how our efforts and expertise need to fit into a national context.

'Further, COSSA has supported specific new areas of R&D, such as ocean colour scanning and search and rescue with positions and funds to the mutual advantage (we hope) of our research, CSIRO and Australian industry.

'COSSA continues to provide very necessary encouragement to our role in space research.

Dr Dean Graetz from the Division of Wildlife and Ecology: 'COSSA has played two roles very well within and without CSIRO. The first is the obvious co-ordinating role of giving small research (or development) groups in CSIRO an extra-divisional focus. That has been remarkably effective and useful.

'COSSA has assumed the role of focus for R&D in applications of remote sensing. The carrot has been dollars and it has, in my opinion, been very effectively used.

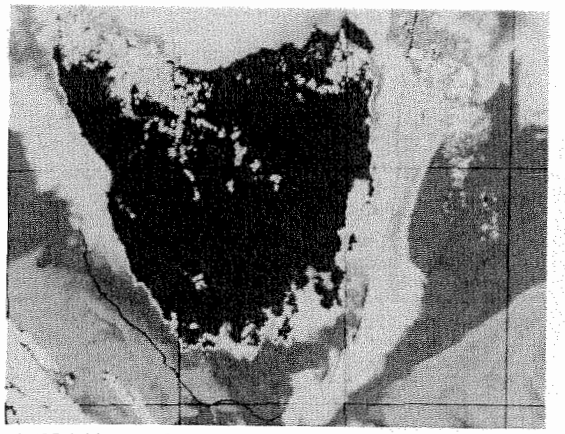
'Flowing from this is the catalytic role of COSSA. Again using the lever of dollars, positions or other means of facilitation, it has 'encouraged' developments that are unlikely to have flowered without their intervention.

'My personal involvement with COSSA has all been positive and beneficial. I persuaded COSSA to fund $50 000 over two years to enter into a co-operative agreeement with NASA. A part of the co-operation will be the supply of processed archival satellite data for 1981-86 for the whole of the continent. To buy this data separately would cost about $US250 000.

'The data will be a national resource available to all who want to use it for many types of research project.'

Dr David Jupp, Division of Water Resources: 'COSSA has played a significant role in the support and promotion of the microBRIAN development in the Division, which has had considerable success in the Australian image processing market in the past year.

'The very difficult stage of following through an R&D task to complete commercial success is not one for which CSIRO is well suited. COSSA has been the only CSIRO area to recognise the importance of support during this period and has invested in the continuing development of microBRIAN to maintain its market edge and support its commercialisation while overseas networks are established.'



A NOAA/AVHRR view of the Eastern Australian current.

OTHER CSIRO REMOTE SENSING HIGHLIGHTS:

**Remote sensing is helping Australian fishermen find the big catches. CSIRO has pioneered the use of NOAA (US meteorological satellite) sea-surface temperature imagery by the fishing industry to cost-effectively locate fish stocks. The Division of Water Resources has assisted in the development of a system for sending processed imagery to the western waters bluefin fishing fleet via telephone. In the east, Atmospheric Research also has a contract to provide daily NOAA imagery of south-eastern Australian waters to the fleet in that area. The Division of Fisheries uses NOAA sea-surface temperature data to study relationships between the distribution of fish and ocean temperature. The Division collaborates with Tasmanian fishermen to direct satellite data to the fleet, showing the likely areas for catching jack mackerel. In Perth, satellites are used for research into the lucrative Western Rock Lobster fishery.*

A major and crucial application of remote sensing in Australia is bushfire risk assessment. Satellite image processing looks set to become a routine tool for calculating risk in Victoria. A week-by-week vegetation index of Victoria during the bushfire season is now compiled using satellite images.

**The Division of Radiophysics has conducted research into image compression and reconstruction, for transmission of video information over low capacity communication links.*

****The Division of Information Technology's centre for spatial information systems has produced image processing software called DISIMP (Device Independent Software for Image Processing). This provides facilities for processing digital images from many sources. DISIMP may be installed in a range of interactive image display systems, and be used for analysing multispectral images from Landsat, SPOT and NOAA satellites, and for integrating these images with data relating to topographic, geophysical and cultural characteristics. DISIMP is being extended with a special database package developed at the centre to provide an image-based geographic information system.***

**Feasibility studies into the possibility of Antarctic reception of remote sensing data were conducted in 1986. Reception in Antarctica would enable the study of atmospheric, oceanographic and ice conditions at high southern latitudes, and provide Australian industry with several unique opportunities to develop and commercialise the most up-to-date reception and image processing technologies.*

****The (former) Division of Mineral Physics and Mineralogy has developed tough remote data acquisition platforms that use the French ARGOS system onboard the NOAA satellites to retrieve the data. Seven are in use in remote locations throughout Australia, operating under harsh conditions, and can function unattended for over six months, have low power requirements and are adaptable to a range of both analog and digital sensor systems.***

**The Division of Animal Production is developing ways of using data from satellites such as Landsat and SPOT to identify areas of improved pasture most in need of fertiliser. This research, supported by the Australian Wool Corporation, will enable agricultural extension officers to be provided with colour-coded images showing the fertiliser status of farms. Officers could then advise farmers on the parts of their properties to fertilise for best results.*

****CSIRO has sponsored regional remote sensing consortia in Western Australia and Queensland. The WA Satellite Technology and Applications Consortium (WASTAC) officially commissioned its SAT-TRAC data receiving and processing facility last July, and is now making NOAA data available to customers in industry and government. The Divisions of Atmospheric Research and Geomechanics are involved in a group based in Townsville called the Northeast Australian Satellite Information System (NASIS). This group has bought Australian ground station equipment from PCM Electronics and the Dindima Group.***

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More power to radio telescopes

Radio emissions reaching Earth from stars, galaxies and quasars are minute. To gather as many radio waves as possible, the rule is: the bigger the radio telescope the better. Telescopes such as the CSIRO-run facility at Parkes are most useful when examining the broad sweep of the skies.

By linking other distant Earth-based telescopes to produce a Very Long Baseline Interferometry (VLBI) system, finer detail can be discerned. Such synthesis telescopes span intercontinental distances and can create 'apertures' equalling many thousands of kilometres across. They therefore can 'see' the finest detail in the most distant objects in the Universe.

The Division of Radiophysics and COSSA are contributing to two international projects which should see orbiting radio telescopes launched into space during the 1990s.

When used jointly with Earth-based radio telescopes, these orbiting instruments will extend the principle of VLBI equivalent to apertures greater than the diameter of the Earth – vastly boosting the power of the telescopes to discern fine detail in distant objects. Should the instruments be successful, current knowledge of our Universe could be greatly increased.

The Space Research Institute of the USSR Academy of Sciences has proposed the Radioastron project as a spaceborne radio telescope to extend VLBI techniques.

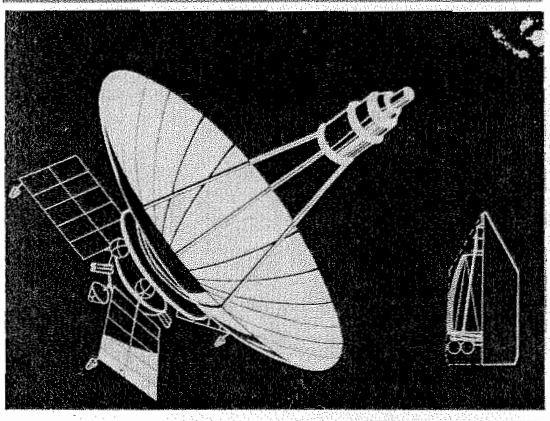
Working on behalf of the Division of Radiophysics, COSSA has negotiated a Memorandum of Understanding with the Academy to enable Australian scientists and industry to provide a subassembly for incorporating on the Radioastron spacecraft. This will be the first activity under the new Soviet-Australian Agreement for Co-operation in Space Science signed by the Minister for Foreign Affairs and Trade, Mr Hayden, in December 1987.

The Radioastron spacecraft's highly elliptical orbit will, together with Earth-based telescopes, permit synthesis of a radio telescope with a diameter of 77 000km (nearly a quarter of the distance between Earth and the moon).

This exploratory mission will attempt to discern fine detail in objects such as quasars and the nucleus of our Galaxy ('The Milky Way'). It is planned for launch in 1992, and one of its objectives is to examine the active radio galaxy Centaurus A (15 million light years from Earth), which is best observed from the Southern Hemisphere.

Radioastron may give insights into the likelihood of the existence of a supermassive black hole in the nucleus of Centaurus A.

Australian industry, in conjunction with the Division of Radiophysics, will provide a 1.6 Giga Hertz (GHz) low-noise amplifier for the spacecraft. Other amplifiers, operating at 0.327GHz and 22GHz are being provided by other international partners.



Above: an artist's impression of the proposed orbiting radio telescope, Radioastron.

Industrial benefits for Australia will include relevant experience for the mobile, satellite-based two-way radios being developed for the next generation of AUSSAT. These radios eventually will be available for use in cars, boats, trains and aircraft.

Australian involvement in Radioastron also is intended to pave the way for Australian input into Quasat (QUAsar SATellite).

Quasat is a European Space Agency project similar to Radioastron, but it will focus on high quality imaging rather than extreme resolution. It is currently planned for launch in 1994/95.

There is potential for Australia to provide a 1.6GHz receiver for Quasat – building on the expertise developed during work on the amplifier for Radioastron. The Australia Telescope, which begins operating later this year, will have a vital role as part of the Earth-based telescope array for both missions.

The benefits of Australian participation in both Radioastron and Quasat will not only be the availability of new and improved data for radio astronomers, but also in giving Australian industry experience in the design and manufacture of space system components in an area directly relevant to telecommunications technologies.

EXPLANATION OF TERM:

VLBI: Very Long Baseline Interferometer – a 'synthesis telescope' formed by linking two or more widely separated antennas.

Communication 'flagship' widely read

A major element in COSSA's communication activity is its newsletter Space Industry News (SpIN).

This is compiled by Mr Ed Highley, a consultant who works closely with COSSA on the publication. SpIN is seen by COSSA as its space technology communication 'flagship'.

It is circulated free each month to about 2500 people in Australia and overseas. Its readership list includes Australian industry and government representatives, scientists, media and overseas government authorities.

Columns, feature articles, guest editorials and company and R&D profiles are published in SpIN to promote awareness of developments in space science and provide stimulus for interaction among the various sectors.

Staff

Cont. from p.6

ity studies and aiding interaction with industry.

Mr Mike Clarke joined COSSA in May 1987 from CSIRONET and industry. His particular expertise is in computing and he provides skilled scientific services support.

Mr John Prytz was previously with the Commonwealth Parliamentary Library before starting a year-long secondment to COSSA in July 1987 to develop library and information functions.

Dr McCracken's personal assistant is **Ms Bev Rose. Ms Robyn Goodwin** provides clerical assistant support to the Office, and **Ms Kath Dowling** is in charge of filing, mail and similar support services.

In addition, the Research Aircraft Facility has four staff. They are experimental scientist **David Parkin**, and technical staff **Ross Gibson, Cecil Maher** and **Jan Smith. Mr Dafydd Llewellyn**, former leader of the group, is now retained as a consultant for engineering design.

Biochemistry to publishing to space...

Christine Astley-Boden has had, in her own words, 'a very broadly based career'. Her path to becoming COSSA manager has covered a lot of diverse ground.

London-born Ms Astley-Boden started her career in science with an honours degree in biochemistry and molecular genetics at Leicester University in the UK.

Although at that time (early 70's) it was an exciting period for the now dubbed 'biotechnology', she decided not to accept the offer of a PhD place in order to broaden her interests in industry. After a short period of industrial research, she developed a new career path in publishing, working in Holland, the UK and Australia. She had a range of challenging positions, in management, contacts production, editorial and commissioning. But it began to lose its interest and its challenges, and Ms Astley-Boden wanted to return to the stimulus of the research environment. She was now too long away from the very rapidly advanced research in biotechnology, and had therefore to accept that her career lay in some support or administrative function. She was bored with publishing, which no longer held any challenge for her, so in 1980 she joined CSIRO and, she says, 'hasn't been bored since'.

Initially she worked at North Ryde for the Divisions of Fossil Fuels and Mineral Physics and Mineralogy as information officer. It was here that she had her first professional contact with space science and technology.

She and Ken McCracken jointly edited a book on remote sensing called *Satellite Images of Australia*. 'Before then I didn't know what remote sensing was; how satellites functioned; who was in the business apart from NASA.

I've learnt a great deal since, and had a lot of fun.' In mid-1983 she became scientific

Ms Astley-Boden

assistant to the Chief of Mineral Physics – Ken McCracken.

'I was only in that job four months when suddenly he phoned me from Melbourne saying he had this concept concerning a role for CSIRO in space technology and was thinking of writing to [the then Chairman] Paul Wild about setting up a study group.'

That letter was sent in February 1984, 'and we haven't stopped since.'

The study group was established and a fact-finding mission arranged, on which she and Ken McCracken were accompanied by a member of the National Study Group on Space Policy. They visited no less than nine countries, and were able to gain a unique snapshot of the global 'technopolitics' of space. Before long COSSA was a reality.

Ms Astley-Boden formally left the Division in March 1985, but had in fact been acting as 'pre-COSSA' manager since September 1984. COSSA was officially launched in December 1984. She was transferred to Canberra in April 1985.

While her career had been developing, Ms Astley-Boden had married and produced three daughters.

'You need to be well organised and happy at home and at work to cope with the demands of a career and a young family,' she said.

In CSIRO, she believes she has found her niche, with the job combining as it does a broad range of interesting science and technology with administration and a great deal of industrial contact.

'COSSA is very much a broker, bringing together science and industry and spotting opportunities in their early stages,' she said.

'We hustle for business inside and outside CSIRO, and about 80 per cent of our hustling is successful. We have a very good profile with industry, and extremely stimulating interactions with the scientists in the divisions.

She has some strong views on those who claim CSIRO scientists don't have close industry ties.

'COSSA has assisted in the interaction between scientists and industry, but there has been no reluctance on either side. CSIRO is now being told it is not sufficiently industrially relevant, and needs to increase its business focus. But I have never seen it not relevant: the scientists are quite rightly providing the technological base for industry with a view to the longer term needs to compete. They are vital to Australia's technological future, and CSIRO has a responsibility to maintain an appropriate scientific base to draw from in future years. Economic theorists might deal with the here and now – of making profits from more tactical research. But a scientific and technological base will provide the 'here and now' of future years.

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Meet the Directors: Part 1

On 1 January, six new CSIRO Institutes came into being. This was in line with the recommendations of the McKinsey review conducted in the latter half of last year, which led to a major restructuring of CSIRO's divisions and institutes. In this feature, CoResearch introduces three of the six new Directors. In the March issue we will continue the series with the other three Directors – Dr Colin Adam, Dr Ted Henzell and Dr Alan Reid.

DR ROY GREEN: DIRECTOR, INSTITUTE OF NATURAL RESOURCES AND ENVIRONMENT (BASED AT HEADQUARTERS IN CANBERRA)

Dr Green is a newcomer to CSIRO. His most recent post was executive adviser at the Department of Industry, Technology and Commerce, where he had special responsibility for the Patents and Space offices, and liaison with CSIRO, ANSTO and AIMS.

Before this he had been Deputy Secretary at the Department of Science from 1982 until July 1987, and had moved to DITAC in the Government's rationalisation of departments.

Dr Green has had broad experience, first as a researcher and, since 1972, as a scientific administrator.

Hailing from Derbyshire in the UK, Dr Green completed his BSc Hons in physics at Liverpool University. After this, he went to Canada as a trainee engineer for one year.

He then obtained his MSc and PhD degrees from Toronto University between 1957 and 1961. His research covered gamma ray spectrometry of extended sources, with particular emphasis on radioactive fallout and its route through the food chain into the human body.

At the completion of his degree he came to the Australian Atomic Energy Commission at Lucas Heights in Sydney, where he established the 'whole body counter', a system for measuring extremely low levels of radioactivity in humans and animals.

His research included metabolic studies and other medical applications, and materials studies associated with the HIFAR reactor.

After three years at Lucas Heights, he returned to Canada to become Laboratory Director and Director of Research Program Development at the RCA Laboratories in Montreal.

He spent more than seven years at this lab, and said it was 'very exciting work' which, among other things, involved negotiations for big contracts with NASA, the US Department of Defence and other agencies. Seventy per cent of the lab's support was from external contracts.

In late 1971 Dr Green returned to Australia, this time to Western Australia where he became the first general manager and director of WAITAID. He was responsible for industrial liaison and technology transfer between the WA Institute of Technology (WAIT) and its clients.

Dr Roy Green

He held this position for three years before coming to Canberra to become assistant director at the Bureau of Environmental Studies.

In 1976 he became ASTEC secretary, and then in 1982 moved to the Department of Science.

His first impressions on becoming a CSIRO Institute Director have all been 'positive', he said.

One of the tasks facing him is assisting divisions to boost their external funding. Many divisions in his Institute may have limited access to major industrial contracts because of the nature of the work they do.

He sees scope for input to international agencies seeking experts for research studies and consulting work. The high level of expertise in CSIRO's environmental and natural resources divisions could be very attractive on the world market if effectively sold (see *CoResearch* 307, November 1987 for a story on proposals for CSIRO to capture more international consulting).

Another avenue Dr Green plans to investigate involves Australia's multi-billion dollar tourist industry.

He said there was considerable pressure on areas of scenic beauty in Australia, including national parks, islands and other areas of importance to the tourist industry.

CSIRO could assist that industry by providing expert scientific studies and advice to optimise the availability of these areas to visitors through sound environmental management.

Overall, he said, it was important to demonstrate to all Australians the importance of CSIRO's work and how it was contributing to economic and community interests.

DR BOB FRATER, DIRECTOR OF THE INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGIES (BASED AT NORTH RYDE CSIRO SITE IN SYDNEY)

Dr Frater has been Chief of the Division of Radiophysics since 1981.

He began his career as an engineer in 1960, working for OTC and private industry.

From 1961-67 he was a research assistant and a Nuffield Research Fellow at the University of Sydney. In 1967 he obtained his PhD in engineering from Sydney University for his work on instrumentation for radio telescopes.

Dr Bob Frater

By 1974 he had progressed through lecturer and senior lecturer at the univerity's School of Electrical Engineering before being appointed Associate Professor of Electrical Engineering, a position he held until 1980. In 1982 he was awarded a DSc. Eng by Sydney University.

Dr Frater is credited with being responsible for the successful promotion of the Australia Telescope. As Chairman of the Australia Telescope Advisory Committee he has responsibility for the overall direction of the project. The AT will operate as a national facility hosted by the Division of Radiophysics.

According to Dr Frater the new Institute's role will be 'to provide a research base to underpin the very considerable needs of Australia in the information and communications sector as we come into the 1990s.

'This sector is growing at a phenomenal rate. It will have a profound effect on the economy unless Australia takes up the challenge.

'We must do what we can to ensure appropriate growth in local industries through our research.'

Funding for the Institute's programs will be sought from industry, particularly the telecommunications sector.

Dr Alan Donald

'In Australia this sector has major government instrumentalities and we'll be seeking to work closely with them as well as the information technology and communications industries in Australia,' Dr Frater said.

Initially two staff positions will be filled, those of managers in research planning and finance and personnel. Consideration of other positions will depend on the wider use of resources within the Institute.

DR ALAN DONALD, DIRECTOR OF THE INSTITUTE OF ANIMAL PRODUCTION AND PROCESSING (BASED AT THE NORTH RYDE CSIRO SITE IN SYDNEY)

Dr Donald began his research career with CSIRO in 1961 as an experimental officer in the Division of Animal Health's McMaster Laboratory.

In 1966, he gained a PhD from Bristol University in the UK for work on nematode parasites of sheep and for the next 20 years he worked on the population biology of helminth parasites and the control of parasitic disease and production loss in sheep and cattle.

In 1981 he was made officer-in-charge of the McMaster Laboratory and a member of the Divisional Management Committee, before being made Chief of the Division of Animal Health in 1983.

1986 saw his appointment as Acting Director of the Institute of Animal and Food Sciences.

And the aim of the new Institute?

'We will be emphasising longer-term strategic research for the benefit of the livestock industry and will focus on developing new technology for the improvement of farming productivity,' he said.

'We must also work at improving the 'off farm' processing of livestock products – lowering costs, making it more efficient – and developing value adding processes for livestock commodities produced in Australia.'

Dr Donald said while final Institute staffing had yet to be decided he would be following the McKinsey recommendations.

He anticipated there would be four and a half key positions:

* Manager, policy planning and performance analysis;
* Manager, finance and human resources;
* Manager, communications;
* A person responsible for commercialisation activities. This would be an institute policy position together with a service component to divisions within the Institute;
* Manager, market development and technology transfer (a half position and possibly shared with the Institute of Plant Production and Processing).

Details of other support staff are yet to be finalised and may involve the sharing of staff between the three Sydney-based divisions.

Outside funding will be sought from many sources including all R&D councils supporting research for the livestock industries, as well as companies with whom collaborative work may be done. International bodies such as ADAB and ACIAR may also be a source.

Two devices offer practical help on the farm

The ingenuity of a senior laboratory craftsman at the Division of Animal Production in Armidale has resulted in two useful devices for handling farm animalss.

Mr Bryce Roan has invented a portable sheep loading ramp (which may soon be manufactured) and a lightweight calf/sheep weighing device.

The ramp can be attached to most vehicles with a flat tray. It allows for one-person operation of loading and unloading sheep in the paddock.

It is made of aluminium and can be folded or unfolded in less than 30 seconds. It would be especially useful for the farmer (or the researcher) who wants to move a few sheep on the back of a utility. Sheep may have to be moved from far-flung paddocks which don't have loading ramps. Using this device, the farmer carries his loading ramp with him.

The materials used in its manufacture cost about $800.

Since featuring in an issue of *Industrial Research News* last year, several companies have shown an interest. One – Macquarie Manufacturing – took the equipment to a recent Gunnedah Agquip exhibition where it attracted considerable interest. The Division is hopeful the company will proceed with manufacture.

Mr Roan's latest invention, the portable calf/sheep weighing device, is particularly useful because of its light weight.

The equipment eliminates the need for manual lifting.

Like the ramp, it is completely portable and has been built to withstand the rigours of paddock use. This device is very new, and no manufacturers have yet been approached.

Apart from their convenience, both these devices save wear and tear on backs and may be useful for other CSIRO staff who work with animals. For more information contact Dr Hutchinson, assistant Chief, Division of Animal Production Pastoral Research Laboratory, Private Mail Bag PO, Armidale NSW 2350.

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New senior management

Among the many changes now being implemented in CSIRO is the appointment of three new senior managers to assist in administering the slimmed-down and redirected corporate centre. As all three appointees are new to CSIRO, this issue of *CoResearch* outlines their backgrounds and the directions they plan to take.

CSIRO's new Director of Corporate Services, Mr Peter Langhorne, is now engaged in the task of developing and setting in place the new structure for the corporate centre and regional administrative activities.

This is in the wake of recommendations by Pappas, Carter, Evans and Koop resulting from a review carried out late last year.

These recommendations, along with staff submissions, were to be considered and decided upon at the Board meeting on 16 February.

Mr Langhorne joined CSIRO on 8 February from the Department of Primary Industries and Energy where he was Director of the Australian Quarantine and Inspection Service (AQIS).

Mr Peter Langhorne

The job of establishing the new structure may take at least another month, but Mr Langhorne said he was anxious to alleviate the current uncertainty among corporate services staff as soon as possible. He was involved in discussions on this for some weeks prior to his official start.

From the divisional point of view, Mr Langhorne said it was important to make it clear that the newly-devolved administrative functions would not in any way detract from the research effort. That, he said, would be defeating the purpose of the exercise.

He has undertaken to ensure that staff receive regular advice on the progress of implementation activities.

Mr Langhorne has been Director of AQIS since early 1984. Before this (between 1975 and 1983) he held senior management positions in personnel, finance and general administration in the Departments of Primary Industry, Defence and Minerals and Energy.

From the mid-1960s to the early 70s he was a geodetic surveyor on the geodetic survey of Australia. Associated with this was work on satellite and lunar laser ranging programs, plus a stint in Papua New Guinea. He also worked in the Planning Statutes Tribunal of the Melbourne Metropolitan Board of Works.

He has completed postgraduate studies in business administration and has tertiary qualifications in surveying science from the Royal Melbourne Institute of Technology (1963) and is a registered professional surveyor.

In his new job he will face many of the same challenges that he experienced in his previous position with AQIS.

Over the past four years he has seen the Service through a major reorganisation process not unlike the one CSIRO is now embarking upon – with similar problems of uncertainty and resistance. Of course, the AQIS changes were prompted by different circumstances.

In 1981, a Royal Commission was held to examine allegations of malpractice in Australian inspection activities. This came about through the so-called 'meat substitution scandal' in which incidences of kangaroo meat being exported as beef were detected.

'The Royal Commission was the catalyst for major change in inspection and quarantine services,' said Mr Langhorne. 'Until then, AQIS had been run from central office in Canberra. There were regional offices in each State but there was no devolution of authority. There was insufficient training and a poor administrative infrastructure.'

'Service staff were demoralised. Statements emerged from the Royal Commission along the lines that the Service was inefficient and poorly managed. Until then staff believed they were really assisting industry, but the Royal Commission turned it all around. The Service was seen by many staff to be something of a scapegoat.'

(AQIS has a staff of more than 3000, spread all around Australia. Fifty per cent of its $150 million budget comes from industry.)

So three new management principles were adopted to put the Service back on its feet.

Firstly a five year corporate plan was formulated, in collaboration with staff where possible. Secondly, a program of decentralisation and devolvement was implemented, and managers at the Service's 350 locations around Australia were given more responsibility and autonomy, within broad guidelines. Thirdly, training became a priority.

'The other thing we had to do was to ensure the moves to change the Service were also being followed through in the other area of the Department we were directly linked to – the corporate services and co-ordination division,' he said.

Many functions and staff were devolved to the Service. Internal and external communication was greatly boosted through the introduction of a staff newsletter, the establishment of a media unit, the use of modern communication technology like electronic mail and a regular series of seminars for staff.

'The philosophy has been to give the authority for the operation to the people out there doing the job. Central office is involved with policy and facilitation,' he said.

Mr Langhorne sees the current reorganisation of CSIRO as somewhat more complex than that faced by AQIS, with both the range and diversity of science being performed, and the requirement to change the emphasis of how it is to be performed.

He said it was inevitable that the administrative structure would have to change in line with other major upheavals in the Organisation.

The role of Corporate Services, he said, was a critical one as a facilitator for the key activity of the Organisation – research.

Senior management level development of CSIRO's external relations is one of the major tasks assigned to the new Principal Secretary Dr Beth Heyde.

She will be responsible for providing the Chief Executive with high level advice and assistance on issues relating to CSIRO's external relations, and on submissions to the Minister and external bodies.

Another major responsibility is the efficient functioning of the Office of the Chief Executive.

Her role in external relations covers developing strategies for enhancing the scope and effectiveness of these relations, particularly those with government departments and agencies including ASTEC and State science and technology councils, as well as members of Parliament, industry, the community, tertiary institutions and international scientific bodies.

Dr Heyde has extensive experience in dealing with government departments as well as a number of science and technology bodies.

She was with ASTEC from 1981, initially as a project officer with the Technological Change Committee where she contributed to a broad project examining the effect of technological change on a range of issues such as employment, growth in different sectors of the economy, industry policy, education and industrial relations.

For the past three years she has had a briefing function at ASTEC, dealing with a wide range of issues coming before the government, and providing advice from ASTEC's point of view.

In this she had contact with all government portfolios which had anything to do with science and technology. She and her colleagues monitored issues to keep up to date with trends, to enable ASTEC to be in a position to contribute to debate and policy formation.

Dr Heyde is a biochemist who obtained her BSc Hons at the University of Queensland, then her PhD at the John Curtin School of Medical Research at the ANU. Her work throughout her research career focused on the mechanism of enzyme action.

After completing her PhD in 1965, she went to the UK to do postdoctoral research at the University of Sheffield. She returned to Australia in the late 1960s, worked part time for a few years at the John Curtin School while her children were small and was made a Research Fellow at the School.

'I left there in 1980, having made up my mind that although I enjoyed doing science, I had a contribution to make in science and technology policy and administration,' said Dr Heyde.

After a short time with the Department of Health, she joined ASTEC in December 1981.

In her new job at CSIRO, she will be dealing with broad and long term aspects of the role of science and technology in boosting Australia's economic performance.

'I need to develop a very good understanding of what CSIRO is doing and its potential to contribute in various areas. This will involve understanding the perceived needs of government and industry, and ensuring that opportunities for CSIRO to contribute are known in the appropriate places. Also, I would like to ensure that CSIRO is recognised for the contributions it is making,' she said.

'I see my role as looking at the issues very broadly and then facilitating interaction with people throughout the Organisation.'

Communication with institute directors and secretaries, division chiefs, scientists and members of the corporate centre will be vital, she said.

Where possible she will be meeting people face to face, and also encouraging people to contact her direct if they want to discuss issues.

She definitely does not see herself as a 'bureaucrat', rather as 'someone who has an intrinsic interest in the very broad range of science and technology,' she said.

Her years as a biochemist would stand her in good stead, she said. Because her work was on the physical side of biochemistry, she had an understanding of and rapport with the whole range of science and technology including physics and information technology.

Dr Don MacRae comes to CSIRO following a varied career to date which has encompassed mathematics and computer programming, research planning for BHP, lecturing, and a wide range of involvements in environmental policy and issues through his work in the Public Service.

Scottish-born Dr MacRae, who was most recently Assistant Secretary of the Research, Information and Legal Branch in the Department of the Arts, Sport, the Environment, Tourism and Territories, is now CSIRO Corporate Planner – a new position established to provide broad guidelines for the formulation of CSIRO's corporate plans for strategic research.

He spent eight years with BHP and was responsible for many research and analysis projects concerning techniques for corporate planning in support of the steel, raw materials and shipbuilding divisions.

He has considerable experience in corporate planning – in fact, while with BHP he completed his PhD part-time at Newcastle University in the subject.

He has only just started his job with CSIRO, and stresses the following comments reflect the sorts of things he would like to do.

'There are a couple of fundamental issues that I think a corporate planner can assist in. One is to provide a more objective information base for the complex judgements and assessments on the allocation of research funds,' he said.

He said at present extensive information was available on the costs side, but insufficient on the benefits side. He wants to assess systematically the spectrum of benefits accrued through research by the divisions.

'Given that projects quite often take 10-15 years to come to fruition, I will aim to do historical analyses of benefits generated from projects started 10-15 years ago,' he said.

This and other aspects of his work will require detailed information from divisions about the success and performance of their activities.

He will also be available to assist divisions and institutes in their own planning activities.

Dr MacRae said a vital aspect of his work will be the involvement of scientists and other staff. He will establish firm principles of internal communication to ensure staff input into matters of planning.

'We have to be able to spell out the management dilemmas and issues faced by the Board and top management – including where increases are occurring and why decreases have to occur,' he said. 'I will be inviting the contributions of staff on these issues before making recommendations.'

One means of doing this is via electronic mail 'bulletin boards'. Where possible, Dr MacRae wants to greatly expand the use of bulletin boards as a way of boosting the flow of internal information.

'It's crucial to the success of what I'm doing to get the involvement of scientists, and I've got to use technology to do that,' he said.

'Everyone who logs on the system also will be able to communicate with others on the system, and any groups wanting to discuss issues will be able to do so. There is a mindboggling number of possible interactions,' he said.

This system may help alleviate the problem of slow (or non-existent) responses from HQ to letters from divisional staff.

'An electronic mail system behoves the corporate centre to respond. If it's on the bulletin board everyone will see it, and management is obliged to deal with the issue.'

Through this system, Dr MacRae will have constant contact with staff, and he also hopes to visit divisions to get to know people face to face.

Dr Don MacRae

Of course, many CSIRO people already will know Dr MacRae through his extensive work on a range of environmental projects.

These have included the formulation of a major data base of ecological and environmental regions in Australia. CSIRO has been involved since the mid-1970s in this survey work, when the Organisation was commissioned to undertake work on biophysical attributes of a number of areas of Australia.

Dr MacRae was involved through work on an environmental statistics project in the Department to come up with a listing of environmental regions in Australia.

Dr MacRae worked extensively on this with Dr Dick Millington (now retired), Dr Peter Laut and other CSIRO scientists.

Another association has been through an international project on dryland management, with a specific focus on determining the role that 'economic realities' may have in arresting desertification in susceptible countries, including Australia and a number of African countries.

In this, he has had dealings with Mr Ray Perry (now retired) and Dr Brian Walker (Chief of the Division of Wildlife and Ecology) in co-ordination of an international project on the economics of dry-

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Big market possible for proposed gallium arsenide venture

A valuable slice of the huge current and future world telecommunications market...an opportunity for rejuvenation of Australia's telecommunication industry...a favourable impact on Australia's deficit in the next decade...

The list of potential benefits goes on. The successful establishment of an Australian company based on the Division of Radiophysics' gallium arsenide (GaAs) technology would be a major achievement for CSIRO.

A business plan is now being developed which will contain detailed forecasts of both potential profit and the input needed to achieve that profit. That will provide a solid basis for launching the commercialisation.

Right from the start the Division has directed its GaAs research towards eventual commercialisation – in fact the project is a good example of strategic planning.

When Dr Bob Frater (now Director of the Institute of Information and Communications Technology) took up his position as Division Chief in 1981, he and assistant Chief Dr Dennis Cooper began conferring on ways of further assisting Australian industry.

There was some pressure to shift the orientation of the Division towards more applied pursuits in addition to its radio astronomy and associated research. A review carried out in 1979 pointed to the need to boost commercially directed activities – on the understanding that the work would continue to be underpinned by radio astronomy.

'I certainly came in with a strong desire that, by the end of my term as Chief, around half the Division's activities would be in areas of benefit to industry,' said Dr Frater.

On 1 January, Dr Frater was appointed Institute Director, and although his aim of half industry-oriented research hasn't quite been achieved, much progress has been made towards that goal.

Dr Frater and Dr Cooper were both fully aware of developments in GaAs technology in the early 1980s, and in fact many journals around that time frequently referred to its future in microwave electronics.

GaAs technology is part of an information and communications industry which is of enormous significance on a world scale. The total market of this sector in the early 1990s is forecast to exceed a thousand BILLION dollars.

The world market for GaAs analog integrated circuits and modules is likely to exceed $3 billion.

Of this, it's believed the proposed company could have access to around $100 million in five years.

Radiophysics had an extensive background in microwave electronics, and in 1981 Dr Frater had to decide whether to continue work in this field.

'The argument in favour of continuing was that the work was going to be important for certain aspects of telecommunications, particularly satellite and various short haul radio communications. It was clear the whole telecommunications market was expanding at a significant rate, so we would hopefully be involved in an activity with central importance for the Australian microwave industry. We put all that together and found there were good arguments for being involved,' he said.

A small group was established in 1981, with Dr Cooper having responsibility for setting up the infrastructure for the processing of devices. This provided the groundwork before Dr Frater called on the talents of a widely experienced engineer in the millimetre wavelength field, Dr John Archer, who arrived to head the expanding group in 1984.

The process of bringing the technology up to speed has proceeded rapidly since then.

In May this year it was thought the time was right to actively seek commercialisation and as a start, a business seminar outlining the potential of the proposal was held in October with a California-based consultant, Mr Ken Taylor from Henderson Ventures as the keynote speaker.

Henderson Ventures has been involved in the start-up of major US commercial ventures in GaAs semi-conductor technology worth more than $US100 million.

In America, GaAs technology in the digital area is well covered by a number of companies, but analog work is not. Most analog work is done 'in-house' by major companies strongly oriented to the military market.

Very little effort has been made there to take the technology to the merchant market. A niche exists for a fast-moving and innovative Australian analog company.

'We're hoping to sell the products on the open market in the communications field where we see a potential in satellite and ground communications, radar and air navigation,' said Dr Archer.

The European market, while not as big as the market in the US, will also be important.

'We have to see this company set up and manufacturing goods by early 1989. It is important that the Division produce quality engineering samples of the products the company would make and that those preparing the business plan carry out a thorough market survey by April. We hope that when it all comes together we will seek funding for the company sometime in the second quarter of 1988,' said Dr Archer.

Dr Peter Donaldson, previously assistant to Chief Executive Dr Keith Boardman, has been appointed manager, gallium arsenide commercialisation. He works with the Division's business development manager Dr Ian Albrey.

His task, with Dr Albrey plus the Division's strategy team, Mr Taylor, Telecom and external consultants, is to put together a first draft business plan containing a well developed treatment of market research and strategies for marketing.

Funding for the plan has been supported by the Chairman and Chief Executive and approved by the CSIRO Board.

'The business plan is intended to define the opportunity and potential revenue, over a number of years – and, importantly, to look at the cost of achieving that revenue,' said Dr Donaldson.

Part of the plan will examine the potential to secure overseas markets, and a number of options including 'strategic alliances' with existing companies are to be considered.

'There are no preconceived ideas for this – we will be developing a range of business options and then concentrating on those which will result in a viable company,' said Dr Donaldson.

Mr Allan Foster from Sirotech is participating in planning for the commercialisation, and Dr Donaldson said he saw Sirotech's role as particularly important at the negotiating phase with potential joint venturers. Sirotech is also providing an intellectual property study and offsets advice.

The proposed company will have three product 'levels'. Firstly, discrete devices. These are not seen as producing a great profit, but will be a means of establishing the company as a respected supplier of good quality products.

Secondly, monolithic microwave circuits. The initial product in this level will be a low noise amplifier. This value added item is expected to find a substantial market.

Thirdly, 'modules'. These will include complete assemblies, receivers or the backends of antennas, with considerably more value added.

One of the major benefits to Australia from the establishment of this company will be the ready availability of these products to Australian companies.

Instead of having to import equipment, these state of the art devices, amplifiers and modules will be available here. Dr Frater believes that not only will this help rejuvenate Australia's telecommunications industry by allowing companies to add value to their own range of products, it also will prevent a potential major burden on Australia's balance of payments which would occur if companies were forced to import these components.

And of course, the project will materially benefit CSIRO.

CSIRO Chairman Mr Wran publicly stated recently that the 'Board has pulled out all stops to ensure that the technology will have a clear economic benefit to Australia'.

A major participant in the development of a business plan for the GaAs project is Radiophysics' business development manager Dr Ian Albrey. But his brief in commercialising the Division's work is much broader, as outlined here:

Dr Albrey was employed to handle the commercial aspects of the Division's numerous projects directed at industry. He certainly found tremendous business activity when he started last March.

'Things have stabilised somewhat now, but there was then a considerable backlog of work in terms of licensing agreements and contractual matters,' he said.

His grounding in microwave engineering and later radio, satellite and optical fibre communications puts him in a good position to appreciate the work of the Division.

He has found in many cases the researchers involved are aware of what should be done in terms of contractual arrangements or the protection of intellectual property, but are unsure how to handle the details or lack the confidence necessary to ensure the best possible deal for themselves and CSIRO.

'I'm trying to have some of them be a bit more assertive in dealing with industry,' he said. His work is paying off – 'I believe there is increased confidence and we are working well as a multi-skilled team.'

A project he has recently dealt with was the Division's first international contract, for the US-based Hughes Aircraft Company. This involved design work for their AUSSAT B tender – an antenna on the spacecraft itself.

The work will be a significant reference for the Division when it bids for the multiple access antenna design contracts from Intelsat – work for which the Division now has considerable expertise.

In many cases Dr Albrey and other senior staff act as filters, redirecting a number of outside engineering oriented requests to industry where they are more appropriately handled. However, the Division still does take on some *ad hoc* work in addition to the major contracts.

Dr Albrey sees himself as a bridge between the researchers and industry, and between researchers and Sirotech.

'That bridge involves the protection of intellectual property, negotiating appropriate conditions and rates of return for people's efforts, and in many ways simply being able to spot an issue such as the need for a patent or for legal advice.

'In some cases I can look after these, but in other cases I will seek some specialist help, probably from Sirotech, at least in the first instance,'

GaAs group 'sound ethos'

The group is headed by Dr John Archer. Dr Archer spent eight years in the United States before being appointed to the GaAs project.

His first two years in the US were mainly spent working on the National Radio Astronomy Observatory's Very Large Array. He then moved to Charlottesville, Virginia, to the central development laboratories, working in the millimetre wave area for the NRAO's telescope in Tucson.

He then was heavily involved in GaAs applications research, in association with Dr Sandy Weinreb, a recognised expert on GaAs field effect transistors (FETs).

When Dr Archer and materials expert Dr Grant Griffiths joined the group in 1984 the work on GaAs technology really started to gel.

The first priority was obtaining a facility to 'grow' GaAs crystals. This is done using a molecular beam epitaxy (MBE) system. A commercial instrument was brought in from the UK for $1 million.

The arrival of the MBE was the real turning point for the group. More and more people joined, and there are now about 18 working on the project.

Most came from redeployments from within the Division.

'That is one of the real strengths of the group – its breadth of expertise,' said Dr Archer.

'In the one close knit group we've got microwave engineers, crystal growers, device fabricators, materials experts, etc.'

Dr Archer is proud of the strong sense of purpose in the group. Communication is emphasised, and Dr Archer believes a sound 'group ethos' exists.

He said he believed all participants felt comfortable with the idea of commercialisation of their work, although it was unlikely the researchers would want to join the company when it was set up. Certainly Dr Archer wants to stay in the Division as a researcher. It was likely, he said, that staff for the company would be sought elsewhere.

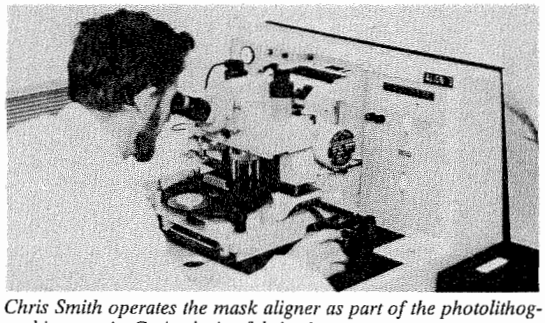
However, Dr Archer saw the potential for a strong two-way flow between the group members and the company, with secondments in both directions.

THE GaAs TEAM

PROFESSIONAL STAFF
John Archer (leader): microwave engineer
Bob Batchelor: microwave engineer
Warren King: electron beam lithography and solid state physics
Grant Griffiths: MBE crystals
Mike Goonan: microwave engineer
Zain Kachwalla: materials evaluation
Oya Sevimli: microwave engineer
Bill Ling: electron beam lithography
Stephen Guigni (post grad.): MBE crystals
Cynthia Leung: solid state physics

TECHNICAL STAFF
Chris Smith: microfabrication
John Griffiths: E-beam system
Albert Szelagowicz: microassembly
Dom Delvecchio: machinist
John Wiggins (seconded from NSW Institute of Technology)

LABORATORY CRAFTSMAN
Paul Humbert: electrical fitter



Chris Smith operates the mask aligner as part of the photolithographic stage in GaAs device fabrication.

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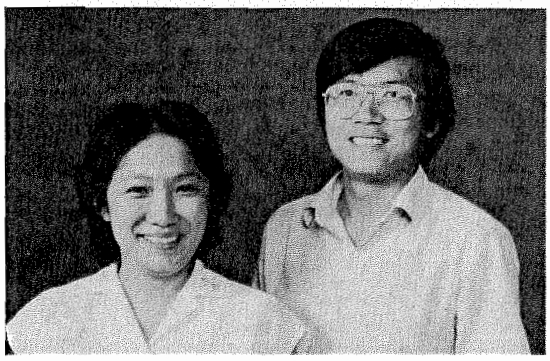
Paper wins research award



Ms Pinky Udaja and Dr Nguyen Dung

Two scientists from the Division of Fuel Technology, based at the Lucas Heights Research Laboratories, have been awarded the 1987 Southern Pacific Petroleum–Central Pacific Minerals Research Award for a scientific paper on the processing characteristics of Australian oil shales.

The annual SPP–CPM Research Award was presented to Dr Nguyen Dung and Ms Pinky Udaja at the Fourth Australian Workshop on Oil Shale, held recently in Brisbane. It was judged on the basis of quality, originality and relevance to the advancement of oil shale science and technology. Dr Dung also won the award in 1986.

Australia's oil shale deposits contain the equivalent of more than 10 times our currently known petroleum reserves.

Scientists in the Division are working in collaboration with industry on the development of an indigenous oil shale industry. Dr Peter Alfredson, Chief of the Division, said such an industry would help Australia to maintain its present level of oil self-sufficiency in the 1990s when production of oil in Bass Strait will have declined.

Award for Dr Potter

Chief research scientist from the Division of Fossil Fuels, Dr Edmund Potter, has been given the prestigious Award of Merit of the Japanese Institute of Electrostatics. The award was presented to Dr Potter at the Institute's Annual Conference in Fukui last year in recognition of his work on electrostatic precipitation as a means of cleaning up emissions from power station chimneys.

Leading a team of scientists at Fossil Fuels for nearly 20 years, Dr Potter has achieved significant improvements both in understanding electrostatic precipitators and their performance. Dr Potter's most recent achievement has been to deduce (with Mr Colin Paulson of the same Division) a simple formula for estimating the precise size of precipitator required for a full-size coal-fired power station using only the routine chemical analysis of the coal as the input.

Bearing in mind that precipitator sizing mistakes can, and have, cost millions of dollars to correct, the new formula offers a low-cost method of avoiding such errors in the future.

McMaster Fellowships

The Sir Frederick McMaster Fellowships, which bring eminent scientists to Australia to further their work in conjunction with CSIRO divisions, have been awarded for this year to scientists from the USA, England and Scotland.

The recipients are: Professor Larry Beuchat of the University of Georgia College of Agriculture, Dr Victor Eastop from the British Museum (Natural History) and Dr John Slee from the Institute of Animal Physiology and Genetics Research, Edinburgh.

These senior researchers will be attached, respectively, to the divisions of Food Research, Entomology and Animals Production.

cont. from p. 10

land management (the Drylands Project). Dr Walker has had a leading role in co-ordinating UNESCO's international project on the Decade of the Tropics Savannah Land Management Project.

Because Dr MacRae's work has concentrated on the economic aspects (this being the language of policy makers), cross-fertilisation with the ecological expertise of Dr Walker and colleagues should lead to increased balance in these two international projects being co-ordinated from Australia.

By taking the economic approach, Dr MacRae said the message was being formulated in a way digestible by policy makers.

'It's been going well and I would like to continue my involvement with it in years to come,' he said.

While acknowledging the difficulty in obtaining funding for CSIRO projects in environmental matters, he said there could be a novel way of getting the required funds.

'Australia's billionaires could put their names to a foundation which will be remembered for generations to come. This type of funding has been provided in the United States for several generations. Examples are the Rockefeller, MacArthur and Ford Foundations.

Retirement of John Calaby

Dr John Calaby, assistant Chief of the Division of Wildlife & Rangelands Research, retired on 16 October after 42 years in CSIRO.

He joined in 1945 as a technical officer in the Division of Entomology.

In 1950 Francis Ratcliffe appointed him as a research officer in the newly established Wildlife Survey Section. This was the beginning of a long association with studies of mammals in Australia.

It began with work on the biological control of rabbits, followed by studies of marsupials. Later, Dr Calaby became involved in surveys of the distribution and abundance of fauna in a wide range of environments. This work provided much of the foundation material for the Australian National Wildlife Collection maintained by the Division of Wildlife & Rangelands Research.

Apart from his special interest in marsupials, Dr Calaby's work and detailed interests covered a wide range of disciplines: entomology, ornithology, ecology, zoogeography, anthropology and history. He also has a well-earned reputation as a bibliographer, biographer and historian of Australian natural history. His contributions to the natural sciences were acknowledged by the Australian National University when it awarded him the honorary degree of Doctor of Science.

Many scientists are personally grateful to John Calaby because of the generous way in which he helped them by drawing on his vast knowledge and experience, often in private discussion or by detailed comments on a manuscript.

He will continue to work in the Division as an honorary research fellow.

Bunny Fennessy

A new series of CSIRO Occasional Papers has been launched, with a paper from the Chief Executive, Dr Boardman.

The series is intended to improve CSIRO's debate on issues which relate to Australia's national development.

Dr Boardman's paper, entitled *The Role of Research in Australia's Economic Future: the End of Natural Comparative Advantages*, formed the basis of a talk he gave to members of the Committee for Economic Development (CEDA) in Sydney last November.

For further information about the Papers, contact Mr Lindsay Bevege at Headquarters.

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

Vale John Sanders

Dr John Sanders, an internationally recognised electron microscopist and a chief research scientist at the Division of Materials Science and Technology, died on 3 December 1987.

Dr John Sanders

With his considerable experimental and analytical skills, John epitomised the great Cambridge tradition in physics, and will be sorely missed.

John graduated with honours in physics from Adelaide University in 1947 and proceeded to a CSIR overseas studentship to study under Drs Philip Bowden and David Tabor at the Physics and Chemistry of Rubbing Solids Laboratory in Cambridge. He was awarded his PhD in 1949 by the University of Cambridge for his thesis on the application of electron diffraction to surface layers on metals. This research experience served him well in establishing electron diffraction (and later electron miscropy) as a basic tool for surface studies, when, on his return to Australia in 1950, he was appointed a research officer in the Division of Tribophysics at Melbourne University.

Over the next 20 years, John Sanders played a crucial role in establishing the Division's international reputation in the general area of the atomic structure of solid surfaces and, in particular, an understanding of the manner in which thin metallic films are formed and grow upon solid substrates. These and associated studies led to a better understanding of the nature of solid catalysts.

John's interests later expanded towards the use of electron microscopy for studies on the bulk structure of solids.

He was one of the first to recognise the enormous potential of the lattice imaging technique for obtaining detailed structural information. An outstanding feature of his contribution was that he '..showed quantitatively how the resolution of lattice images was determined by a combination of spherical aberration and beam divergence and how the effect could be computed'. John was able to test successfully some ideas resulting from these studies in 1976, when, as a visiting professor, he gained access to the 1 MeV electron microscope at the Tohoku University in Japan.

An area of consuming interest to John was the structure and physical properties of gem stones. His pioneering work on the elucidation of the structure and colour of precious opal gained him international acclaim.

These discoveries, reported initially in *Nature* in 1964, led to a close association with the Gemmological Association of Australia, of which was to become Federal Patron.

During his scientific career, and particularly his 35 years with CSIRO, John made a significant contribution to the understanding of the physics and chemistry of solids and their surfaces, both through more than 85 publications in the area and through his many, always popular, lectures – which he laughingly referred to as his 'slide shows'. John's achievements in his chosen fields of research were recognised by his election in 1980 to Fellowship of the Australian Academy of Sciences.

John had shown great courage in the face of what was recognised 12 months ago as a terminal illness, and was taking electron micrographs for a review article the day before his death. Nevertheless, his death came as a blow to his many colleagues and friends who will remember John not only for his exceptional skill as an electron microscopist but also for his gentleness and generosity. The members of the Division take this opportunity to extend sincere sympathy to his wife Gloria, and their children, Jeffrey, Toni, Lynne and Andrew.

Linda Bruce & John Spink

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CoResearch

No.310 March 1988 CSIRO's staff newspaper

CSIRO AUSTRALIA

The corporate centre

Task force established to deal with redeployment and retrenchment

The process of reorganising the corporate centre – shedding about 240 positions and changing the emphasis of the remaining jobs – has started, following decisions taken by the CSIRO Board on 16 February.

It's expected the new structural arrangements will be in place on 5 April, by which time it's hoped senior management positions (i.e. SES, SSO5 and AO7) will be filled. These jobs were advertised shortly after the Board's endorsement of recommendations.

As reported in last month's *CoResearch*, the massive changes to the corporate centre have resulted from a review carried out by Pappas, Carter, Evans and Koop, with recommendations formulated (after a period of staff consultation) by a CSIRO review group headed by Chief Executive Dr Keith Boardman. This is the final stage of the major restructuring of CSIRO which started nearly three years ago with the ASTEC review.

Once the senior positions are in place, other positions will be advertised internally. The need for redeployment and outplacement will flow from this process.

'As we advertise and fill positions, existing positions will be phased out and new positions will come into being,' said the Director of Corporate Services Mr Peter Langhorne.

Management was negotiating with the unions on the criteria for the implementation of retrenchment, in particular how decisions would be taken to release people who want 'fast track' retrenchment.

'We want to develop criteria acceptable to the unions to stop prolonged debate after the decisions are taken. That is, if more people put up their hands than we can afford to let go, what are the criteria we will use to determine which ones can go and which ones can't?' said Mr Langhorne.

The Officers Association was opposed to the notion of a 'spill' of all jobs in the corporate centre and was negotiating with management on this matter.

According to an OA statement, 'to establish actual redundancy the Organisation must demonstrate both that an officer's job has ceased and that no redeployment or retraining opportunities exist. Accordingly, where a job in the new structure is for all intents and purposes the same as that currently being performed...that officer must retain his/her job if he/she so desires.

'If however a job in the new structure is genuinely a new job, it can be opened to general internal application with the proviso that [staff] who are potentially redundant must receive preference for any suitable position.'

Two groups have been set up to deal with a range of issues as the new, slimmed down structure is established: the Implementation Team - IT - and the Redeployment and Outplacement Task Force - ROTF (see box for names of the members of these groups).

Briefly, the IT has a planning and communication role, as well as implementing the 'nuts and bolts' of the decisions taken on corporate centre service levels. All staff may contact the Team for advice, information or to make comments.

ROTF has been set up to cater for redundancies, retrenchment and redeployment of people within the corporate centre, and in cases of substitution of people between divisions and the corporate centre.

For example, if a member of a division wants to leave CSIRO and a person working at the same level in the corporate centre is willing to take the divisional position, then a swap may be arranged.

This would apply to any comparable classifications in the corporate centre and divisions.

Not everyone who puts his/her hand up for voluntary retrenchment will necessarily be accepted.

If there are no suitable applicants for a particular position, a person at that level may be placed in that job at CSIRO's discretion, even if he/she hasn't applied for it and wants retrenchment.

Cont. on p.4

IMPLEMENTATION TEAM

Dr Alan Reid:	***Director, Institute of Minerals, Energy and Construction, PH: 02-887 8666***
Mr Peter Langhorne:	***Director of Corporate Services, PH: 062-48 4546***
Mr Jim Lumbers:	***BIPC, PH: 062-48 4256***
Mr Bernie Mithen:	***Chief Internal Auditor, PH: 062-48 4260***
Mr Chris Thurlow:	***Divisional Secretary, Entomology, PH: 062-46 4911***
Mr Greg Batchelor:	***Manager, Financial Services and Systems, PH: 062-48 4236***
Ms Carmel Macpherson:	***Personnel, PH: 062-48 4273***
Ms Wendy Parsons:	***062-48 4615***

REDEPLOYMENT AND OUTPLACEMENT TASK FORCE

Ms Michelle Narracott, Mr David Rodd, Mr Don Thomson, Mr Tony Culnane, Mr Gary Garland.
ROTF 'HOT LINE' NUMBER: 062-48 4555

Groundwork for new systems advancing

Under the restructuring, divisions will be required to do considerably more of their own administrative work. Groundwork on the necessary computer systems to help them do some of this work is well underway.

A pilot divisional accounts payable system has been in place at North Ryde since last September, and now has settled down and is proving the viability of devolving accounts payable functions.

Earlier this month a pilot project for a new software package which can deliver the required accrual accounting format started at the Division of Entomology in Canberra.

Called the TIMS system, it enables the use of dedicated local Ngen terminals and a batch system rather than an interactive, on-line connection to the mainframe Facom computer at Black Mountain. North Ryde has used the on-line system for its pilot project.

The North Ryde experience, although using a slightly different method to the one most likely to be adopted in all divisions, was important for ironing out some early difficulties.

'To say that we travelled a rocky road in the first two months of the pilot study would be an understatement,' said Mr Warwick Carpenter, divisional secretary at the Division of Coal Technology.

'However, despite numerous hardware, communication and personnel problems, coupled with the complexities of processing accounts for five different cost centres [i.e. the five CSIRO entities operating at North Ryde], I believe the exercise has been a success.'

Apart from demonstrating the viability of devolution, the study also has identified a number of general problem areas which will be addressed and improvements made before general devolution.

Accounts payable is one of a number of functions to be devolved to the divisions from Headquarters, and divisional

Cont. on p.6

Third time lucky for Science Prize winner

David Dommett, Science Prize winner. Photo: Emile Brunoro.

It was a case of third time lucky for 16 year old David Dommett of Brisbane Grammar School last month, when he won the BHP Science Prize for excellence in scientific research by school students.

David, who has reached the finals on three occasions – 1985, 1986 and now 1987 – researched the influence of the greenhouse effect on plants.

For his efforts he won a gold medal and $5000 cash.

Second prize winner, Donald Syme, 17, of Toowoomba Grammar School in Queensland, won a silver medal and $1000 cash for his project *ECOSOFT* – a mathematical model of a coastal ecosystem.

The winners of the gold and silver medals will be sent to the 39th US International Science and Engineering Fair in May, courtesy of Westinghouse. Westinghouse.

Seventeen year old Stuart Clough of Hawker College in the ACT won a bronze medal and $500 cash for his research into gluten and proteins in grain.

The Science Prize is organised by CSIRO, BHP and the Australian Science Teachers Association with support from Westinghouse.

From the Chief Executive

A column by Dr Keith Boardman

A successful workshop for the new top management team in CSIRO was held over two days at the end of February in the very pleasant setting of the conference facilities of the Country Comfort Motel overlooking the estuary of the Clyde River at Batemans Bay.

It was ably led by Dr Peter Saul of the strategic consulting group and attended by myself, the six Institute Directors, Mr Langhorne, Dr Pitman, Mr Dunstan, Dr Heyde, Dr MacRae, and Mr Marshall of our staff development and training group.

The main aims of the workshop were to obtain agreement on the culture, corporate objectives and key performance indicators for CSIRO and to identify issues affecting progress in implementing the new directions for CSIRO.

As stated in my introduction to the Board's strategic plan, which will be published shortly, CSIRO has three crucially important objectives:

. to carry out strategic research which can be applied by Australian industry or by Government for community benefit;

. to collaborate with other institutions and industry to strengthen the research effort and ensure the transfer and application of that research; and

. to lead and promote expanded science and technology effort in Australia.

The major restructuring of the institutes and divisions and the corporate centre are designed to improve the application of research for economic and social benefit while maintaining our research effort at the cutting edge of developments in science and technology.

The performance of the Organisation is subject to the judgement of a number of stakeholders including the Government, industry and other users and beneficiaries of our research, the public and particular interest groups and the scientific peer groups in Australia and internationally.

At the conference we agreed that an important task for the top managers was to closely monitor the changing external environment for CSIRO, including the judgements of these various stakeholders. CSIRO managers and staff must effectively communicate the achievements and importance of CSIRO research to influence perceptions of the Organisation and secure the continued support of the Government. In his interview for the recent *Bulletin* article on CSIRO, Mr Wran stressed the great importance of communicating to the public and obtaining wide recognition and support for the importance of our research to Australia's continued development.

He said 'If there's one thing I've learned in politics it's that if you want to secure the support of the politicians, first secure the support of the public'.

At the Batemans Bay workshop, we agreed *Excellence, Leadership and Teamwork in research to benefit Australia* as the desired culture for CSIRO. We identified the attributes of a good leader or manager and agreed that these should be highlighted in programs to develop better management skills in the Organisation and included in the criteria for assessing staff for promotion. Rewards and incentives were seen as important in attracting, developing and retraining high calibre staff.

There has been considerable discussion in the Organisation on the question of how royalties should be distributed. There seems to be general agreement that royalty payments cannot be separated from the broader issue of rewards and incentives, including the payment of bonuses for outstanding achievement. A green paper on these matters is being prepared for wide circulation to staff and staff associations for their comment before a paper is prepared for consideration by the Board.

###

The Hyatt on Collins provided a great setting for the announcement and presentation by the Prime Minister of the BHP Bicentennial Awards for the Pursuit of Excellence. It certainly was a great thrill for me when the Prime Minister announced Dr Jim Peacock as winner of the science and technology award. CSIRO as a whole and the Division of Plant Industry in particular can take much pride in the award, and on behalf of the Board and all staff I offer our warmest congratualtions to Dr Peacock and the Division for a well deserved honour for outstanding and pioneering work on gene structure and transfer in plants.

Cont. on p.6

Letters to the Editor

Dear Editor,

I would like to congratulate Dr Charles Gerrard on the succinctness and relevance of his 11 point summary of the pilot project management workshop printed in the November 87 issue of *CoResearch*.

Responding to the invitation of the Editor, I would like to make some comments from the viewpoint of the Northern beef cattle industry.

The long term viability of the Northern beef industry depends on increasing economic efficiency (reducing per unit cost of production) through the adoption of new technology. With 80-90 per cent of beef exported and a long term trend of declining export prices in proportion to producer costs, it means that to stay still technologically is to become non-competitive. Even over the past five years, buoyant beef prices have not risen as fast as costs. Since CSIRO is a major source of new technology to us, your long term viability is our long term viability.

The 'market' for the divisions of Tropical Crops and Pastures and Tropical Animal Science is primarily beef cattle producers. In the Cattlemen's Union we believe the ability of these divisions to deliver relevant research findings depends very much on effective liaison between producers and researchers. Liaison is necessary to identify projects than have a potential to increase economic efficiency, to develop results that are cognisant of managerial limitations, and to see that they are delivered. Effective liaison will not just happen. It needs to be fostered and allocated resources by both research bodies and producer organisations.

With joint funding (ALMR-DC) and joint projects (DPI, universities, etc), the selection and management of CSIRO research projects is no longer a sole role of CSIRO. There needs to be a positive, constructive approach to co-operation from selection through to delivery. Senior status for CSIRO is not a perogative.

There needs to be a balance, even in CSIRO, between short and long term projects (applied/basic or tactical/strategic/basic). With severe funding cutbacks, long term research and long shot research must, unfortunately, be the main sufferers. They can only be justified when the potential economic payoffs are large enough to justify the risk and opportunity cost of research funds. This opportunity cost is represented by the following equation:

> Funds to be spent by the number of years until the result by the real interest rate.

Given severe fund limitations, we believe carrying out research to keep up with Professor Jones cannot be justified, especially with spurious or ill-defined economic objectives.

Serendipity (the eureka factor) is more likely to occur in projects with clearly defined objectives for an eager 'market'.

In conclusion, I would like to say that the size of the contribution of agriculture to Australia's net balance of trade is, in mathematical terms*, a function of previous research work from the contribution of past taxpayers. Cutbacks in funding for agricultural research may reduce Australia's future dependence on agricultural exports. It will certainly reduce the quantity.

Do the Government and the Board of CSIRO have the moral right to so affect the standard of living of future generations?

Peter Emmery
Chairman, Industry Research Committee,
Cattlemen's Union

**Quantity exported = f (research + other factors).*

Dear Editor,

I refer to Mr Upton's letter (*CoResearch* 308), criticising the CSIRO Board for abrogating responsibility with respect to maintaining the Organisation's property assets.

It is true that changes are being made to the repairs and maintenance (R&M) policy and procedures but it should be realised that the Board is of course ultimately responsible for approving these changes as well as approving associated funding levels and other relevant matters.

The changes leave headquarters, institutes and divisions with similar but more clearly defined responsibilities to those held before and also give divisions more flexibility in implementing their responsibilities, and it may help if staff are made aware of the general reasons for and intent of the proposed changes.

Two years ago, after mounting criticisms from divisions about the R&M procedures, a steering committee was established to review the procedures. The steering committee comprised senior management representatives from divisions and headquarters. The committee was supported by two working parties who received technical and administrative inputs from a wide cross-section of the Organisation as well as from discussions with external bodies.

Major problems which were identified in the review related to difficulties which divisions had in obtaining details regarding the implementation of the R&M work and serious doubts with regard to value for money. The proposed new procedures address these by making divisions directly responsible, through a maintenance manager, for identifying their own R&M requirements and allowing them a freedom of choice in implementing the R&M work in a sound technical and cost effective manner within an annual R&M budget allocation.

The review also raised serious doubts with regard to the adequacy of funds being spent on maintaining the Organisation's assets. It is hoped that the above changes to the implementation of work procedures will result in a more efficient utilisation of funds. In addition, it is planned that headquarters, using information provided by divisions, will develop a data base which will, among other things, result in an improved management reporting service which can be used to justify increased levels of funding as part of the Government's budgetary process.

Headquarters will continue to perform a policy establishment and monitoring role together with providing an advisory and assistance service to divisions within available resources. In conjunction with the institutes, headquarters will continue to play an important part in the overall program formulation stages.

In short, the proposed changes are intended to give divisions greater flexibility in the R&M area.

J D Cattanach
Headquarters

Dear Editor,

The laboratory craftsmen in CSIRO for the past 12 months or so, have been engaged in the exercise called 'translation' (meaning craftsman to technical ranks). This translation involves a wide range of things, one being a computer course, which we are told is designed to teach us technical skills.

I realise a need for change and improvement of skills and therefore welcomed this 'translation'. BUT.

Since starting the course, which wasn't complete then and isn't complete now, I have very real reservations about it.

The course structure and contents (what we know of them) are to me not the slightest bit relevant to the needs of laboratory craftsmen or our role in CSIRO. Senior research and personnel staff I have spoken to on the subject have a low opinion of the course's relevance or potential worth to our divisons. The maths (precalculus mainly) part of the computer course is proving to be extremely difficult. For the

Cont. on p.6

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A Matter of Opinion

This month's point of view column comes from CSIRO's acting senior media liaison officer (until 5 April when the job no longer exists), Mr Tom Gosling.

Last month CSIRO staff at headquarters received a circular signed by Dr Boardman and Mr Wran referring in conciliatory terms to statements contained in the Pappas Carter review. The circular said it was 'unfortunate that single statements taken out of the context in which they were made were included in the report'.

For most of us at headquarters, this came as a welcome acknowledgement that the Pappas Carter review had contained some gratuitous insults.

But the cat was out of the bag. No amount of effort could really take back words like 'imbeciles at Limestone Avenue' (attributed to an anonymous Chief).

Were the comments taken out of context? For my part I doubt it. In fact, I believe the Pappas Carter review served a useful purpose in getting some real communication going – in bringing out into the open the real attitudes and prejudices that are abroad in CSIRO.

The review made it very plain. It said that 'many' interviewees had 'spoken harshly of the corporate centre'. It spoke of a 'general strong view' that the centre was 'not worth its cost and was tending to impose values alien to science'.

I think we at headquarters have to face facts: no matter how hard or well or usefully we work, the perceptions of our work are bad.

What I would question is whether these perceptions are well-based. I have a strong impression that they are not, and that blind prejudice is alive and well within this Organisation.

Most of us cherish the notion of the scientist as an impartial observer, a logical thinker dedicated to pursuit of the truth. We think fondly of 'the scientific method', which insists on an open mind and on careful examination of the facts before postulating a conclusion.

This model may well be the case for many CSIRO scientists within the confines of their discipline. I hope it is.

But as soon as our scientists move outside their disciplines, they seem to lose their cool. All thoughts of attempting to speak from a well-informed base are abandoned, and raw emotion rules the day.

In CSIRO divisions, young scientists hear from their peers that everyone at headquarters in an imbecile, and readily adopt that view, allowing it to colour their thinking until the day they retire.

Thus it is rare for a divisional critic to pause to ask the following questions: What is the magnitude of the task these people are being asked to do? What resources do they have to do it? What obstacles do they have to overcome? What success do they achieve?

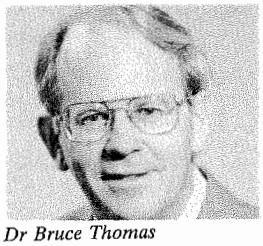
It is generally assumed that non-scientists have little to do, plenty of resources to do it with, that it's an easy task anyway and that they fail dismally. Most scientists (and some Board members) believe that they could do the job better themselves, but have more important things to do.

If CSIRO is truly to embrace a more entrepreneurial ethos, this will not do. At least, give us the benefit of the doubt.

Two honours

Dr Bruce Thomas from the Division of Radiophysics has been honoured by the award of a Doctor of Engineering degree from the University of Melbourne and election as a Fellow of the Institute of Electrical and Electronics Engineers, USA.

Both awards were for his contributions to the development of corrugated waveguide feed systems which are now universally used on radio telescopes and satellite earth station antennas.



Dr Bruce Thomas

Dr Thomas, who joined the Division in 1964, is a senior principal research scientist and leader of an antenna group which has been involved mainly in contracts with OTC in the earth station antenna area.

Sylvaspade launch

From Gallipoli diggers to the future

An idea by a CSIRO scientist came to fruition in grand style when the Bicentennial 'Sylvaspade' was launched by the Governor-General, Sir Ninian Stephen, at new Parliament House last month.

The Sylvaspade was developed by Boral Cyclone in Melbourne in collaboration with the Institute of Foresters of Australia and CSIRO, from an idea by Dr Wilf Crane at the Division of Forestry and Forest Products in Canberra.

The launch was attended by 250 people including senior Australian industry executives, CSIRO Chief Executive Dr Keith Boardman and his wife, members of CSIRO's Canberra staff, school children, conservationists, tree growers and foresters.

Sir Ninian, who is Australia's Chief Scout, invited a scout to help him plant the first eucalypt using Sylvaspade No.1, as part of the landscaping for new Parliament House.

In the words of Sir Ninian, combined creative forces had designed and produced for our Bicentenary 'that most prosaic yet perhaps useful of all man's implements – a spade'.

The prefix 'Sylva' has nothing to do with the polished finish of the special hard-wearing stainless steel from which the head of the spade is made. Rather it is named from sylviculture – the growing and tending of trees.

It is a tool specially developed for planting and tending trees in untilled Australian soils, and rigorous attention has been paid to design, materials and evaluation by tree planters, soil scientists and foresters throughout Australia in the past three years.

This has resulted in a spade of exceptional strength, weight, durability and balance. The basic design has its origins in the tool which made Australians famous as 'diggers' in Gallipoli.

The adaptation in the past three years of the same basic concept has involved using a 1980s high-tech approach and both high temperature pressing and special steels not previously available.

Dr Bob Ellis of the Division of Forestry and Forest Product's Hobart laboratory and National President of the Institute of Foresters of Australia pointed to Australia's international fame as the world champion at tree felling. Australia's Hytest axe (also manufactured by Boral) is sought after worldwide by sporting axemen.

Now the Sylvaspade also has the potential for fame, and will help further expand the booming Australian export of Australian tree genes (seed) and forestry expertise.

In focusing on the individual effort required for Australians to regreen our land and conserve our soils, Sir Ninian said 'sylviculture...must become a word familiar to us all if we, the custodians of this land in 1988, are to leave it to future generations as a land worth living in'.

This echoes last year's Senate debate on the Australian environment in which all political parties, conservationists, foresters and soil scientists concluded that soil was Australia's number one environmental priority.

The Bicentennial Sylvaspade says in symbol and in the Australian pragmatism of a working tool that soils and trees are an essential combination on the generally depauperate and toxic parent material on which Australian soils are based. Trees not only protect our soil from erosion, salting and acidity, but act as agents for the very formation of the thin mantle of fertile loam on which our water and food supplies depend.

The stainless steel version of the Sylvaspade is a special edition which is stamped, numbered and registered in an individual or institution's name, and costs $99. It is available only by mail order from Freepost 3, Boral Cyclone, PO Box 77, East Bentleigh, VIC, 3165. PH: 03-579 1777 or write for an application form. A standard version in high carbon steel will be available from most hardware stores for about $20.

At the launch Mr Bruce Kean, Chief Executive and a Director of Boral, announced that as a result of the Sylvaspade the company will financially support Australian forest research, and his company already has made a cash donation to the Forest Institute.

He said the unique Australian land demanded innovative approaches to developing stable forms of land use based on sound scientific understanding of our soils and the plants which were an integral part of them. This, he said, was the message that had to accompany our celebrations in 1988.

The Governor-General, Sir Ninian Stephen, officially launches the Sylvaspade. Photo: Joe Oris.

Revolutionary cotton

A new cotton variety developed at the Division of Plant Industry's Cotton Research Unit at Narrabri and officially released only two years ago, is causing a revolution in the Australian cotton industry.

Siokra (pron: sigh-okra), bred by Dr Norm Thomson in collaboration with Mr Craig Patrick with further assistance from Mr Peter Reid and Mr Lyndsay Heal, already has ousted the US-bred variety Deltapine 90 as the most widely planted in Australia.

Siokra (plus to a lesser extent the other Cotton Unit-developed variety, Sicala), now accounts for about 70 per cent of plantings in Australia, from five per cent two years ago.

Last year the 10 per cent yield increase resulting from Siokra and Sicala gave Australian cotton growers an extra $20 million in sales. It's anticipated that growers will make an extra $45 million this year. The 10 year research program to develop the varieties cost about $2-$3 million.

Plant Industry Chief Dr Jim Peacock predicted that next cotton plantings in Australia will be comprised of either Siokra or Sicala.

A feature on these important and lucrative cotton varieties is planned for the July 1988 issue of *CoResearch*.

Laboratories Credit Union

There is another CSIRO credit union apart from SIROCREDIT. In this issue the Laboratories Credit Union Limited, which has served members in New South Wales since 1954, outlines some of its services and contact points.

Membership is available to CSIRO staff in NSW and their immediate families, as well as to staff of CSIRO associated organisations.

LCU provides:

- low cost personal loans to $50 000
- term investment accounts
- on-call savings accounts
- member chequing facility
- travellers cheques free of fees, and travel insurance
- whole of pay deposit and cash withdrawal

RATES AS AT 1 MARCH 1988

Low cost loans to $50 000 at 14.5 per cent p.a (maximum monthly balance)

Term deposit accounts:
minimum $5000 6-12 months 11 per cent p.a
minimum $1000 6-12 months 10.75 per cent p.a
minimum $1000 3-6 months 10.5 per cent p.a

On call savings 10 per cent p.a. (minimum monthly balance))

Member chequing with an overdraft 16.5 per cent (daily balance)

Free travellers cheques and competitive travel insurance

Periodical payments, whole of pay deposits, payroll deductions

REGISTERED OFFICE

C/- CSIRO,
Building 41,
Institute of Minerals, Energy
and Construction,
Delhi Road,
NORTH RYDE NSW 2113
PO Box 52,
NORTH RYDE NSW 2113
PH: 02-887 8608

Chairperson
Ian McDonald, Division of Food Processing, **PH:** 02-887 8333

Directors
Trevor Clark, Regional Administrative Office, **PH:** 02-261 7011
Greg Goodfellow, Internal Audit, **PH:** 02-261 7090
Warren King, Division of Radiophysics, **PH:** 02-868 0284
Kevin Loughry, (formerly) Division of Applied Physics, **PH:** 02-98 0252
Garry Rae, Regional Administrative Office, **PH:** 02-261 7014
Doug Shaw, SIROMATH, **PH:** 02-436 0500
Bruce Sheldon, Division of Animal Production, **PH:** 02-631 8022

Secretary/manager
Michael Sinclair, **PH:** 02-887 8607
Assistant manager
Leanne Harris, **PH:** 02-887 8608

Sydney Science Centre opening

CSIRO, in conjunction with the NSW Department of Technical and Further Education, has just opened its latest Science Education Centre. It's housed at the Division of Applied Physics at West Lindfield and was opened by CSIRO Chairman, Mr Neville Wran, on 24 February. The Centre is an important addition to the science education network that CSIRO is establishing across the country. As with the other centres in Adelaide, Hobart and Melbourne, the Sydney Science Education Centre will offer primary and secondary schools a stimulating, hands-on environment to discover science. Besides demonstrating basic principles of science, the centre aims to highlight practical applications and showcase some of CSIRO's achievements.

Above, Double Helix member David Reynolds is seen here demonstrating electronic circuits to Mr Wran and the Centre's Manager, Mrs Janette Griffin, at the opening of the the new Science Education Centre. Photo: Maria Basaglia

Retrenchments

Cont. from p.1

The proposed package for people accepted for fast track retrenchment would include two weeks' pay for each year of service, to a maximum of 48 weeks. This is not available to those forced into involuntary retrenchment, who in lieu of this benefit may remain with CSIRO for an extra seven or 13 months (depending on age and years of service).

Those forced into involuntary retrenchment are staff who want to stay, have applied for the available jobs and have been unsuccessful.

If this is the case and they are entitled to their seven or 13 months' employment, and commence this, they can't then decide to go and take the two weeks' pay benefit. 'Once you make a decision on a particular benefit, you can't then revoke it,' said Mr Rodd.

Those eligible for fast track retrenchment may in some cases go almost immediately, but like any other employer, CSIRO reserves the right to retain that person for several months to fulfil a particular function. In this situation, that person will still get his/her two weeks' pay per year of service lump sum.

These are just some guidelines to the retrenchment options. ROTF is able to provide detailed information depending on individual circumstances. 'Hot line' telephone numbers have been installed to take calls from staff around Australia.

Interstate numbers are switched through to Canberra and there is no STD charge. The numbers are – Canberra: 48 4555; VIC: 542 2980; and NSW: 887 8980.

The task force emphasised the confidentiality of the service. Staff may ring or visit the ROTF office which has been set up in Headquarters building two on the ground floor near the word processing area.

Members of the task force will visit people in their own offices, or talk to small groups of staff if approached to do so. Visits interstate are part of the overall process.

The task force will be supported by the personnel branch and CSIRO's personal counsellors. Members will help arrange counselling appointments if requested.

Career counselling also is available on request for people leaving the Organisation and needing advice on getting a new job.

Through the IT and ROTF, management is hoping to dispel some of the uncertainty caused by the sweeping changes to the corporate centre, by at least helping people to look at the options and start planning their future.

Mr Langhorne said communicating information about the changes was now being made more effective and fast.

'Individuals naturally want to know how these changes will affect them directly, and that really can only be determined after we finalise the structure and go through a selection process, but at least they have an idea of the timing involved and that we are not in the business of just terminating or devolving jobs and discarding the people,' he said.

'We are in the business firstly of making the selection process for the jobs in the permanent structure fair and equitable, and secondly of making sure people who do have to leave CSIRO have assistance in finding employment elsewhere and access to financial advice.

Cont. from p.8

the problems householders encounter with termites in Canberra. He helped plan a revision of the booklet, but didn't live to contribute to it.

Rob had many other interests, two particularly noteworthy. He was skilled in waterskiing, and delighted in it; he died while enjoying his sport, after a barefoot ski on Burrinjuck Dam.

He reared Cashmere goats on his property near Canberra and was closely involved with the Cashmere industry. It is another measure of Rob that his Cashmeres took major prizes at the Bicentennial Show in Canberra in February.

He is sadly missed.

His colleagues

SLAR seeks schools of fish

Trials of Side Looking Airborne Radar (SLAR) for fisheries assessment are now underway in Tasmania.

The SLAR, built in Sweden and originally designed for coastal surveillance and oil spill detection, is being used by the Division of Fisheries to assess the distribution and abundance of surface schools of pelagic (ocean) fish in eastern Tasmanian waters.

The Division has a six month lease on the high performance, low cost radar system, which has been installed on the F27 research aircraft operated by COSSA.

The instrument scans either side of the aircraft, unlike conventional radar which only looks forward. It has advantages over spotter aircraft which rely on human eyesight for the detection of fish.

The radar works over longer ranges and can be used in rougher conditions. Tuna schools, for example, have been detected at a range of 13 miles during overseas SLAR operations.

The SLAR trials this month are being run in conjunction with trials of an ocean colour scanner which senses subtle changes in the colour of ocean water. The scanner is being developed jointly by the Divisions of Fisheries and Oceanography as a means of determining biological activity in surface waters.

Tasmanian land and lakes also will be scanned by both sensors to provide information for the mining industry and the University of Tasmania botany department.

Later the SLAR is to be used in Victoria, Queensland, the Northern Territory, Western Australia, South Australia and possibly Papua New Guinea, by search and rescue, coastal surveillance and rural water authorities, mining and forestry industries.

BHP Bicentennial Awards

Dr Peacock honoured for pursuit of excellence

On 11 February 1988, the Prime Minister, Mr Hawke, presented the Bicentennial BHP Awards for the Pursuit of Excellence. The Chief of the CSIRO Division of Plant Industry, Dr Jim Peacock, received the science and technology award, for his contributions to genetics and molecular biology research. In this feature we look briefly at Dr Peacock's career to date, including several of his major projects.

Australia, and specifically CSIRO, is very lucky to have Dr Jim Peacock. Overseas research bodies have been trying to lure him away for years. Fortunately, he chooses to pursue his excellent research and research leadership here.

Dr Peacock's list of achievements is extensive and impressive. More of that later, but how did it all start?

His interest in natural science was first sparked during his boyhood and adolescence in Leura in the Blue Mountains. An Anglican Minister (Colin Burgess, who died recently in Canberra) fostered his interest in the fascinating surroundings of the Mountains.

'He was a marvellous botanist who encouraged me to observe,' said Dr Peacock.

Walks with his grandfather, James McIntosh, further fuelled his enthusiasm for natural science – an enthusiasm which still is so evident today.

But it was not biology, but economics, that he initially chose for his degree. He decided to become a high school economics teacher and was accepted by Sydney University. However, he was told that there were too many economics students, 'so why not try science instead?'

He took on botany and zoology, found he liked them and finished up majoring in both.

The world of research beckoned once he finished his honours year in 1957.

CSIRO awarded him a studentship to do a PhD. But first he wanted to learn more about genetics, so before starting his degree he went to Adelaide and worked in Adelaide University's department of genetics – at the same time as the eminent geneticist Sir Ronald Fisher. Dr Peacock was then only about 20 years old.

'That academic experience as a scholar in genetics was very formative,' he said.

After just over a year, he returned to Sydney and did his PhD on native flora, then was awarded a CSIRO post doctoral fellowship. Following contact with a visiting American geneticist who happened to be in Sydney at the time, it was arranged he would do his post doctoral work in Oregon.

It was to be three months before he could go, so in the meantime he came to Canberra to work with a senior scientist, Dr John Langridge, at the Division of Plant Industry.

'It was one of the most exciting periods of research in my life,' he said. 'I was so happy here that I never thought I would go anywhere else.

'Langridge was a very imaginative scientist and it was my first taste of molecular biology. We worked day and night.'

He then went to Oregon and researched the genetics of *Drosophila* (fruit fly). He was offered a permanent position there, but opted to return to Australia and CSIRO.

And he has been here ever since, apart from several stints as visiting professor to US universities such as Stanford and UCLA. In those days, the US was the place to go for the latest research on genetics and molecular biology, although other countries such as West Germany and England also are now at the forefront.

'At Stanford I realised I really wanted to get into molecular biology rather than genetics which I had concentrated on before,' said Dr Peacock. In 1971, when he returned from Stanford, he established a molecular biology project at PI.

The then Chief, Dr Lloyd Evans, was 'extraordinarily generous', according to Dr Peacock. 'Not only did he allow me to set up a project in molecular biology to study *Drosophila* rather than plants, but he also took what must have been an unpopular decision in those days and agreed to form a group around me.

'This is now the norm in CSIRO, but in those days it decidedly was not the norm – we all worked as individuals,' he said.

This group has gone on to be recognised worldwide as one of the best of its kind.

One of its first projects was on the basic aspects of chromosome structure and function – how genes were positioned and worked in the chromosomes.

'I ultimately was going to progress to plants as soon as the technology made it possible, but it would have been stupid to have been forced to work with plants at that time. After about six years I started work on cereals.'

From the early 1970s the era of big breakthroughs in genetic engineering started.

Dr Jim Peacock

One of these in which Dr Peacock was involved was the isolation of the alcohol dehydrogenase (ADH) gene from maize – probably the first fully characterised gene for a plant enzyme.

'This immediately put us into international prominence,' said Dr Peacock.

This work, first published in 1982, led to still-continuing research into switching genes on and off.

Soon after ADH, the first 'jumping gene', or transposable element, was isolated. Barbara McClintock got the Nobel Prize for genetically identifying these elements, but the molecular biology group at Plant Industry was the first to actually isolate one and show how it moved in and out of chromosomes.

Another current project involving Dr Peacock, in association with Plant Industry colleagues Dr Cyril Appleby, Dr Elizabeth Dennis and Dr Jorg Landsmann, plus visiting scientist Dr Didier Bogusz, has resulted in work of major significance on plant haemoglobin.

'We have found some very interesting things about the plant haemoglobin gene which has attracted quite a bit of attention around the world,' said Dr Peacock.

Basically, the scientists have found haemoglobin (the protein which makes blood red) in the roots of non-nodulating plants (it was already known to be in the nitrogen fixing root nodules of legumes).

This research has been published in *Nature*, and the *New York Times* followed it up with an article titled 'You can't get blood from a turnip – or can you?'

'What started out as a line of academic research into evolution has opened up a completely new piece of biochemistry in plants,' said Dr Peacock.

'We're very interested in how the gene is being captured to work in nodules. We believe its normal job in plants is to work in roots, and evolution has seized on it to do a particular job in nodules, in association with symbiotic nitrogen fixing bacteria.

'Our best guesses say that in roots it probably isn't concerned with facilitating diffusion of oxygen as it is in nodules,' he said.

'We're wondering if it might be involved in measuring the amount of oxygen in roots and it might even be concerned with the mechanism that switches on the ADH gene, which activates when there is practically no oxygen.'

These exciting projects are just a few of the many Dr Peacock has played a major part in. His research has led to fundamental breakthroughs in the knowledge of plant gene function, which might result in greater productivity and value for Australia's agricultural industry.

He is described by members of his staff as a 'whirlwind' – he is full of enthusiasm and energy for his work. And he has the invaluable gift of communication. He is able to talk to people at all levels about science and the natural world. With this skill, he has been particularly successful in promoting science education.

He is Chairman of the Australian Academy of Science's School Biology Project, and a major contribution in this role has been the initiation of the *Biology in Action* newsletter issued to high school biology students around Australia. This outlines some of the exciting new findings in biological research, and has been so successful that similar newsletter on chemistry and geology are now issued by the Academy.

Dr Peacock also has started a new project, 'Disease and Society', which is the first step in an upgrade of teachers' resources in biology.

During his term as Chief of Plant Industry, he has recognised the need to transmit research results into Australian agricultural practice. One of his most important contributions in this regard has been the development of SIRATAC – a computer-based cotton production management system.

He also is leading a team to develop AUSFARM, a strategic management package for all Australian agriculture production systems.

His other achievements are too numerous to mention here. Suffice to say that Australia and CSIRO has a valuable resource in Dr Jim Peacock.

In keeping with the spirit of his award for 'the pursuit of excellence', Dr Peacock plans to establish yearly Chief's prizes for staff in his Division, to reward excellence.

He will invest a large part of his $40 000 prize and use the interest to fund prizes each year – probably two for research staff, two for technical staff and two for support/administrative staff.

He's not sure yet of the value of the prizes, as he has yet to investigate all the details of investment, tax, etc.

'The criteria for winning would be excellence in contribution,' he said. 'I'm a great believer in this kind of award, and think there should be more of it in CSIRO.'

Letters
Cont. from p.2

time needed to master this part, between 50 and 150 hours for five points out of the total course 100 points, is an over-commitment of time to this subject.

Since the beginning of translation I have noticed a rapid deterioration of morale amongst the laboratory craftsmen at this Division. The 'translation' seems to be splitting the trade staff and causing friction amongst former workmates. Craftsmen, I believe, feel they will be disadvantaged if they don't or can't complete the course and a lot of us are bewildered when we have tried to do the course.

Considering there are no guarantees of achieving any substantial gains at the end of this exercise, I wonder if the powers that be should consider some other form of conducting the 'translation' – i.e. division by division, individual need by need, craftsman by craftsman basis.

John Milne
Division of Wool Technology

Dear Editor,

I hope that the implementation manual for the new corporate identity was worth most of the $25 000 which the Organisation spent. The symbol which has been adopted is an insult to the talents of the graphic designers within CSIRO.

The designer of the logo appears to have been a slightly myopic plagiarist who was probably inspired whilst standing sideways at the photocopying machine (example 1). So much for a logo which clearly identifies CSIRO and 'acts as a unifying symbol' (Dack, *CoResearch* No. 308).

At least in the two examples below of very similar logos (both blue) those organisations got it right and the design can be reduced without loss of definition (Mosmondor, *CoResearch* No. 308).

A L Morrison
Division of Minerals & Process Engineering

Dear Editor,

For some years I have been proud to wear my T-shirt or windcheater with the 'old' CSIRO Science for Australia and map motif. Then at the end of last year a new T-shirt was displayed by our Social Club with an invitation for orders. This T-shirt had a funny pattern of lines in a circle, the name CSIRO and some other thin lettering. 'Aha' I thought, 'must be an X-ray diffraction pattern from one of our physics divisions'. Other local suggestions were nematodes from one of our biological divisions, or something to do with spinning and weaving from one of the textile divisions. But nobody knew what it was.

Then lo and behold in *CoResearch* for December/January all is revealed – it's our new corporate symbol that doesn't mean anything and the time for debate is over! Now I know that up here in the Deep North we're considered a bit far away from the action, but I can't find any locals who were aware of the pregnancy let alone the 'many months of gestation' (p.1 *CoResearch* 308) for our new emblem. Neither can I find any locals who like it. By the way, who were the parents and were they married?

Anyhow I think I'll finish now as I have to write to Textile Industry at Geelong (although that's probably not their name anymore) to see if they have any old stock with the intelligible symbol.

Mike Muller
Division of Tropical Animal Production, Brisbane

Dear Editor,

Without, I hope, boring the pants off any of your readers who may still be interested, I thought I might add some background information to the corporate identity debate still going on.

Since I joined CSIRO I have twice been party to a proposal to introduce a corporate identity. On both occasions they failed due to conservatism and apathy. So, although I have some reservations on the design of the symbol itself, it will in a period of time be accepted by its regular appearance within and outside the Organisation.

By way of an example, I offer the case of British Airways. Their new identity was panned by the British press and the professional designers of their country and dubbed 'The Flying Fag Packet' – yet after a period of time it became one of the most successful designs in the aviation business. Now, I'm not suggesting our own symbol will achieve the heights of British Airways (no pun intended) but I'm sure they have never suffered from interference in the implementation program as I've witnessed.

Could anybody imagine the manager of British Airways Operations Africa fiddling with parts of their symbol and changing type style to suit personal taste?

Corporate identity means just that:

Corporate

Brian Gosnell
Chief Graphic Designer
Public Communication Unit

Dear Editor,

CoResearch No.308 for December 1987/January 1988 justly paid tribute to Mr Jack Cummins. I believe he was largely responsible for generating the idea that a national science centre should be created as a memorial to Sir Ian Clunies Ross, and he brought it to fruition.

Jack Cummins is honoured also as the patron of The Sciences Club within Clunies Ross House at Parkville.

I wonder, however, whether Jack Cummins is 'the oldest living CSIR appointee' (*CoResearch* No.308 p.7), because Dr W A Empey, who was a veterinary research officer in the Division of Food Preservation before World War 2, is still living in Sydney at 91 years of age.

Bill Empey was the author, with W J Scott, of two notable publications, 'Investigations on Chilled Beef' *CSIR Bulletins* No.126 and No.129, 1939.

These detailed studies on microbial contamination and on cooling and storage of beef carcases in abattoirs are still pertinent today and indeed laid an important technical foundation for Australia's huge export of beef.

Bill Empey commenced serious athletic competition quite late in life. He has competed in the annual Sydney to Surf race – and has finished! He will be competing in the Veteran Olympics this year in sprint and distance events. He runs 100 metres in 23 seconds.

He is a Life Member of the Australian Veterinary Association.

A K Sutherland
Australian Veterinary Journal

(Editor's note: sorry about the confusion – the item about Jack Cummins was meant to imply that he is the earliest *CSIR appointee still alive. He was appointed in 1929.*

Dear Editor,

Blow up your division

I recently saw a TV program on new building materials, including inflatable or air supported buildings, and it set me thinking about the typical stodgy CSIRO pile. CSIRO is of course an imaginative, dynamic, forward looking Organisation, so we should be a pacesetter in building trends.

My favourite are air supported buildings. Such structures have concrete floors, optional walls, and use a slight difference in air pressure to support a circular or rectangular roof. They are suitable for public areas such as divisional libraries, computer rooms, stores and possibly conference rooms or staff common rooms. I have been inside a stadium in Vancouver with an air supported roof and was impressed.

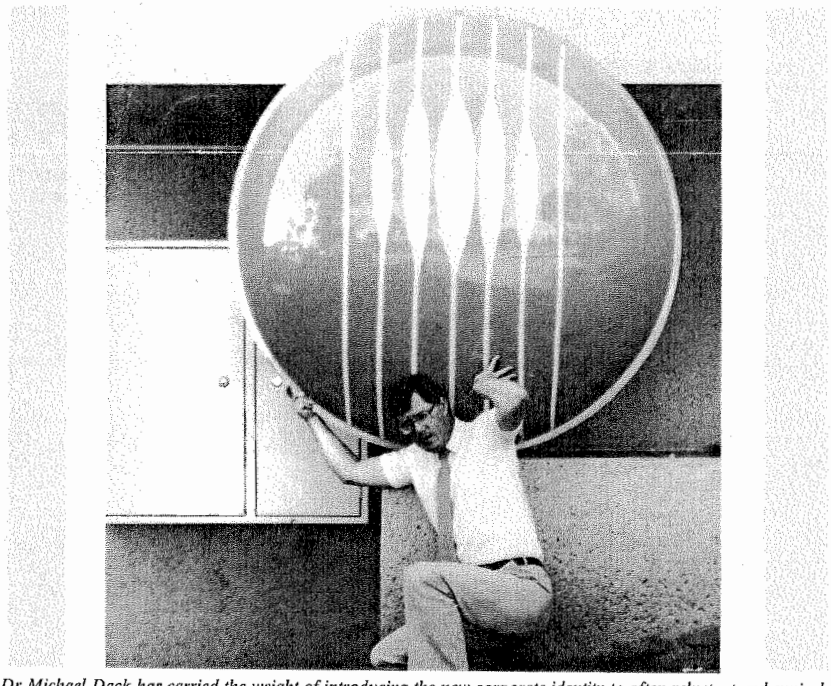
Inflatable buildings have higher heating and cooling costs but lower capital and construction costs. There are some extra power costs due to air pumps compensating when people enter or leave. Doors must be automatic to minimise loss of pressure. The larger the building the slighter the effect of people entering and leaving.

Heating and cooling costs can be cut by having an air supported ceiling inside the outer cover. The ceiling is protected from the elements and can be slacker than the outer cover and nearly horizontal.

Erecting futuristic buildings should be an advantage at a time when CSIRO is concerned about its public image.

David Erskine
Water Resources, Griffith

Dr Dack crushed by criticism of logo



Dr Michael Dack has carried the weight of introducing the new corporate identity to often reluctant and cynical CSIRO staff. But though he's down, he's not out – lesser persons than he might have been overcome by the criticism of the new logo (some of which has been printed in CoResearch*), but he is bearing up well and performing his herculean task with characteristic aplomb and an old fashioned British stiff upper lip. There is absolutely no truth in the rumour that when it comes to the logo he has been heard to mutter 'don't call me, I'll call you'.*

Cont. from p.2

In accepting the award, Dr Peacock was generous in his praise of CSIRO for providing a stimulating work environment equal to the best in the world, and excellent colleagues. He described CSIRO as a great research organisation, and I only hope that the Prime Minister received and retained that important message.

Keith Boardman

New systems
Cont. from p.1

administrative staff have expressed concern about taking on the new functions (see *CoResearch* No. 309, February 1988).

However, the manager of applications systems Mr David Rofe (who has been overseeing development and implementation of the new systems) said he believed the use of the new accounts payable system together with the wide range of other systems, would probably require less time to perform the specific function than is now spent.

Training will be undertaken by recruiting 'teams' from CSIRO regions around Australia, who will report to a regional co-ordinator. These teams will attend each division and provide in-house training in the systems to all relevant staff.

Training for these teams starts this month.

Meet the Directors: Part 2

In last month's issue of CoResearch, we introduced three of the six new Institute Directors (Dr Roy Green, Dr Bob Frater and Dr Alan Donald). This month, we outline the background and plans of the remaining three Directors who lead CSIRO's reorganised and more autonomous Institutes.

DR TED HENZELL, DIRECTOR OF THE INSTITUTE OF PLANT PRODUCTION AND PROCESSING (BASED AT HEADQUARTERS IN CANBERRA)

Dr Ted Henzell

Dr Henzell is a long-serving CSIRO officer, having joined the Division of Plant Industry in Brisbane in 1956, where he worked on nitrogen fertiliser responses of tropical pastures.

He had earlier obtained his D.Phil. in plant physiology from Oxford University in the UK.

In 1959 the Brisbane group of Plant Industry became the Division of Tropical Pastures which undertook pasture research for the beef cattle industry of northern Australia. In 1970 he was made assistant Chief of that Division, and in 1977 was made Chief of the Division of Tropical Crops and Pastures.

In 1985-86 he was acting Director of the Institute of Biological Resources, based in Canberra.

Now as Director of his new Institute he has again left Brisbane to be based in Canberra.

He said one of his major aims for the Institute was to make it as 'outward looking' as possible.

'I am looking for close links with State departments of agriculture and the farming industry, as well with those who market plant products,' he said. He also plans to foster greater contact with universities and overseas agencies.

In line with the McKinsey recommendations, the structure of Dr Henzell's Institute follows the chain of activities from the earliest stages of plant production through to value added high quality products for export and domestic markets.

Optimum planning for the co-ordination of these activities would be extremely important, to ensure the research was timely and appropriate for users. Dr Henzell said he would be 'listening carefully' to the views of a range of industry bodies so as to be in tune with industry needs.

Apart from support staff, the Institute will have a planning officer, finance and staff officer, business development opportunities officer (unless this function can be covered by Sirotech) and a combination assistant to the Director/communication officer.

In addition, Dr Henzell said he would share with Dr Alan Donald's Institute (Animal Production and Processing) a person who will act as a contact with the National Farmers Federation, relevant Commonwealth agencies and State departments of agriculture.

Dr Alan Reid *Photo: N Prosser*

DR ALAN REID, DIRECTOR OF THE INSTITUTE OF MINERALS, ENERGY AND CONSTRUCTION, BASED AT CSIRO'S NORTH RYDE SITE.

Dr Reid was Director of the Institute of Energy and Earth Resources for three years before his appointment to head this new Institute.

He has a PhD in reaction kinetics and isotope exchange reactions, and a DSc in solid state chemistry, both from the ANU.

He was a research scientist with the Division of Mineral Chemistry between 1959 and 1982, and as well as working on numerous applications of chemistry to minerals processing, he also headed the development of a major image analysis system for mineral ore characterisation (QEM*SEM) in collaboration with AMIRA and eight major Australian mining companies. He was assistant Chief from 1972.

Between 1982 and 1984 he was Chief of the Division of Mineral Engineering. During this period he enhanced the Division's strong interaction with the mining and minerals process industry and initiated a major program of research into direct iron bath smelting of iron ore to metals in collaboration with CRA.

Dr Reid has played an important role in the development of the new institute and divisional structure in CSIRO, and his former Institute (IEER) was used to formulate the model for reorganisation.

He said his oveall goal for the new Institute, in the minerals and energy area, was to contribute to the maintenance of Australia's pre-eminence in the discovery, extraction and export of these commodities and their processed higher value forms.

Better technology and better grade control on products would be elements in this strategy.

The Divisions in the Institute would further strengthen their ties with the wide range of exploration and production companies operating in the Australian minerals industry.

In the construction area, closer links would be forged with the relevant construction companies and consultants who serviced that industry, and with the merger of Energy Technology and the Division of Building Research, the new Division of Construction and Engineering would have a very strong role to play in support of the building and construction industry and its associated engineering support.

Dr Colin Adam

In all areas of the Institute, the aim was to improve efficiency, reduce costs, research new or value-added products and work towards the development of new Australian-based industries.

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DR COLIN ADAM, DIRECTOR OF THE INSTITUTE OF INDUSTRIAL TECHNOLOGIES, BASED AT CSIRO'S CLAYTON SITE IN MELBOURNE.

Dr Adam was most recently Chief of the Division of Materials Science and Technology (from July last year).

He has a PhD in metallurgy and a Bachelor of Metallurgical Engineering (Hons), both from the University of Queensland.

In 1971 and 1972 he was a post doctoral Research Fellow at the University, then between 1973 and 1978 was a Senior Lecturer in Materials Engineering at the University of Auckland.

In 1978 he became an Associate Professor in Mechanical Engineering at the State University of New York, then from 1979 to 1982 was Program Manager in advanced alloy development for Pratt and Whitney Aircraft in Florida.

From 1982 to 1985 he was Manager of the Materials Laboratory for Allied Corporation in New Jersey and went on to become Director of the Metals and Ceramics Laboratory, Corporate Technology, for Allied – a position he held until mid-1987.

In that position he was responsible for the development of technology implementation plans for proprietary technology developed from fundamental research. He was associated with joint venture agreements, co-operative arrangements and joint marketing agreements.

His background in corporate research should stand him in good stead in his new role as head of the CSIRO Institute most closely related to Australia's manufacturing sector.

One of the bigger aims of the new Institute, he said, was to see the development of several billion dollar Australian industries resulting from current research programs.

Dr Adam said this was achievable, initially through the development of structural ceramics based on aluminas, and the development of specialty chemicals from protein and amino acid biotechnology research.

A $1 billion industry will take about 20 years to build, but the solid grounding already existed in some 50 projects within the Institute, all of which had the potential to become at least $20 million businesses.

Concentration of research effort was crucial, he said. Projects in the Divisions have been restructured and concentrated from, in some cases, 100 down to 15. This, he said, gave them more of a focus on both existing industry and possible future industries.

It was important, he said, that the trend for scientists to think seriously about embryonic Australian industries, be strengthened and encouraged.

He said 'the Institute will only be as strong as its constituent Divisions'. There already were many strengths – for example in the areas of biotechnology, new materials and manufacturing technology. Boosting other, less industry-oriented areas based on world-class research, would be a priority, he said.

Board Members and new Institute Directors gathered in Canberra on 16 February, where the first Board meeting for 1988 was held. Standing, left to right, Bill Mansfield, Alan Reid, Kevin Foley, Roy Green, Colin Adam, Peter Langhorne (new Director of Corporate Services), Tony Gregson, Ted Henzell, David Hoare and Gustav Nossal. Seated, Alan Donald, Adrienne Clarke, Neville Wran (Chairman), Keith Boardman (Chief Executive) and Bob Frater. Absent were Roderick Carnegie and Graham Spurling. Photo: David Coltman, Division of Plant Industry.

Scientist leads attempt to conquer Nepalese peaks

For John Finnigan of the CSIRO Centre for Environmental Mechanics at Black Mountain, an upcoming trip to Nepal is the culmination of a 25 year climbing career.

Finnigan, 41, is the leader of the 1988 Baruntse Expedition, a group of 10 Canberra-based mountaineers who will attempt to climb 7220 metre high Baruntse, an ice spire about 10km south of Mt Everest in the Himalayan mountains of eastern Nepal.

The group will leave Canberra on 23 March, arrive in Kathmandu the next day, and shortly thereafter begin the 17-day march from near the India-Nepal border to the Baruntse base camp in the upper Hongu Valley.

'We will try to climb the mountain by the southeast ridge,' said Finnigan, referring to a route pioneered by a New Zealand expedition on the first ascent of Baruntse in 1954. 'The major difficulties, in addition to coping with the altitude, will probably be deep, soft snow and fickle weather.'

Although Baruntse has now been climbed several times, Baruntse Nup, a spectacular peak a few kilometres to the west, remains one of the highest unclimbed summits in eastern Nepal.

'We intend to have a go at Baruntse Nup,' said Finnigan. 'We'd like to climb it by the steep south face, but we won't know until we actually get to the base of the mountain whether that route, or any other, is feasible.'

Finnigan has the broadest range of mountaineering experience of any of the 10 climbers going to Baruntse. His background includes a solid base of rock and ice climbing in Britain, trips to the European Alps and an ascent of the massive Trollfind Wall in Norway.

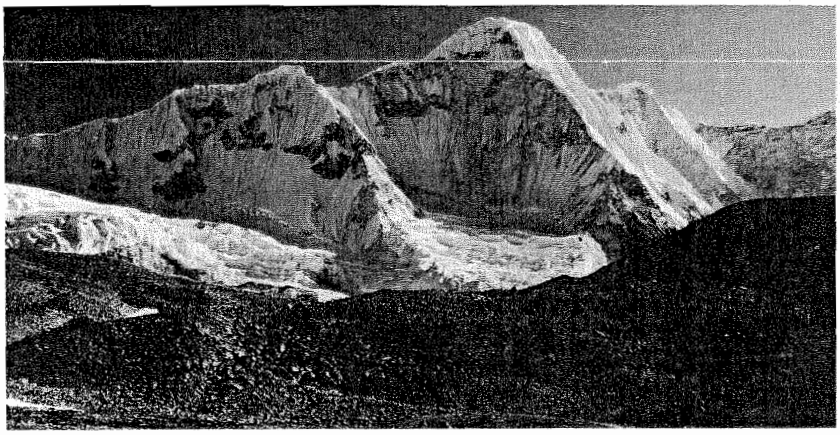
Since his move to Australia in 1973, Finnigan has become one of the ACT's better known rock climbers. In addition, he has made several climbing trips to New Zealand's Southern Alps and was a member of the ANU Mountaineering Club's 1978 expedition to Dunagiri in the Indian Himalaya.

As a member of the Centre's micrometeorology group, Finnigan is in a position to contribute more than just his climbing expertise to the expedition. One of his scientific areas of interest is wind flow over hills, although extrapolating our knowledge of flow over gentle, two-dimensional ridges to predict the weather on Baruntse requires a giant leap of faith!

Also in the Australian Baruntse Expedition team are John Armstrong, a retired experimental scientist from the Division of Plant Industry and Will Steffen of Environmental Mechanics.

Armstrong, who also was a member of the 1978 Dunagiri Expedition, has 40 years of mountaineering experience under his belt. Steffen, past president of the ANU Mountaineering Club, joined Finnigan in 1985 to climb a new route on the precipitous south face of Mt Hicks in New Zealand.

The Baruntse team hopes to have climbed the mountain by mid-May and will return to Canberra on 31 May.



A view of the south face of Baruntse Nup (the highest peak, just right of the centre of the photograph) from near the Baruntse base camp. The favoured route is via the prominent rib leading up from the lower right.

Mr John Payne

Vale John Payne

CSIRO staff were saddened to learn of the tragic death of John Payne on 14 January 1988.

John joined CSIRO in November 1967 in the then Division of Tropical Pastures. He worked in that Division in a variety of positions until 1976 when he was promoted to the position of administrator/contracts officer in the RAO, Brisbane.

In 1979 he moved to headquarters and worked in various senior positions in the Finance and Administration Branch. At the time of his death, he was acting Manager (Financial Resources and Property).

John was one of the most popular and respected members of HQ. His knowledge and guidance were constantly sought on a wide range of matters by HQ, division and institute staff. His views were always respected.

Outside work, John enjoyed a number of interests including ornithology, an awareness and appreciation of the region's flora and fauna, yoga, sketching, gardening and extensive reading, all of which gave him a deep sense of satisfaction.

John is survived by his wife Judy and children Alexandra and Andrew, to whom all his friends and colleagues at CSIRO extend their deepest sympathy.

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

Rob Barrett

Robert Barrett, one of the best known and best loved of the technical staff in the Division of Entomology, died suddenly on 25 January, aged 41.

Mr Rob Barrett

Rob was born in Summer Hill, Sydney, in 1946 and spent much of his early life in rural NSW, on the Southern Tablelands and Murrumbidgee Irrigatiion Area.

He joined CSIRO in 1964 as a TA1 in the termite group and worked in that group (in the same room!) until he died, an STO2.

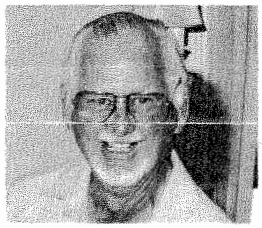
Rob was intelligent, practical and immensely helpful, and his influence spread far beyond the room in which he worked. He introduced newly appointed and visiting scientists to the secret ways of termites. He was tremendous in the field, organising and participating in field work and surveys in remote areas of all states except WA; his hopes of going there were repeatedly frustrated. He built close liaison with the agricultural, chemical and pest control industries. He enjoyed interaction with the public, and his enthusiasm was infectious when he spoke to local groups about termites or manned the termite exhibit at Divisional Open Days.

He was co-author of more than 20 papers. Perhaps most typical was his co-authorship of *Termites in the Canberra Region*, a practical booklet directed to the public, the pest control industry and the administrators, as a response to

Cont. on p.4

Retirement

Jack Harris has retired from the soil biology section of the Division of Soils after 41 years with CSIRO.



Mr Jack Harris

Jack joined the Division as the bacteriologist in charge of the distribution of *Rhizobium* cultures for nitrogen fixation in clovers during the time when new areas were being opened up for improved pasture.

In one of his early publications he proposed the idea that not only should the *Rhizobium* cultures be effective, they should compete well with indigenous, less effective strains. A lover of the English language, Jack coined the term 'incursiveness' to describe the desirable character. Some 30 years later other workers in the *Rhizobium* field came to recognise the importance of incursiveness.

Jack returned to his first interest, soil fungi, during the latter stages of his career and studied the fungi causing diseases on cereal roots. This has led to an illustrated manual on the identification of such fungi which he is completing in his retirement. This manual is designed for use by agronomists, pathologists and extension staff.

Being a man of action, Jack took to flying some 15 years ago to take aerial photographs of crops affected by root diseases. He graduated to flying a de Havilland Dove for vertical photography but tough financial times grounded the Dove and forced him out of aerial photography.

Besides his work on agricultural problems, Jack has become the guru of turf diseases and has been in great demand in recent years to solve problems of football ovals, cricket pitches, golf courses and bowling greens.

Jack is an effective debater and communicator who believes in extending research findings to farmers. He was in popular demand for farmers' meetings and founded the Crop Science Society as a bridge between the scientist and the farmer. This Society has been an extremely effective forum for the exchange of information and ideas on all manner of agricultural problems. His ability to communicate with students showed by the many visits they made to his laboratory to learn about soil fungi.

Jack has been quite a sportsman, having captained the Waite Cricket Club for many years and has now turned his attention to bowls.

Over the years, Jack has made many contributions to the field of soil biology and could always be depended on to start a discussion or debate. His breadth of knowledge and outstanding memory for details were often tapped by his colleagues. With his retirement the Division loses one of its more colourful and controversial scientists.

310-1988

CoResearch

No. 311 April 1988 CSIRO's staff newspaper

CSIRO AUSTRALIA

Probe into death of staff member

A CSIRO committee is investigating the accidental death of a 25 year old technical assistant from the Division of Water Resources while on a field trip in Western Australia.

Mr Michael Rayner was electrocuted on 25 February near Southern Cross. He had been working with two other CSIRO colleagues on an investigation into water and salt cycling within Lake Deborah.

Mr Rayner had gone to the aid of co-worker Mr David Briegel, who received a shock when a motor vehicle became 'live' after a portable refrigerator was connected to a 240 volt supply at a base camp.

Apart from investigating the specific circumstances of Mr Rayner's death, the committee is also looking at whether safety arrangements could be improved to minimise the possibility of future accidents.

Without pre-empting its recommendations which are likely to go to the Chief Executive next month, the committee urged that several steps be taken immediately to alleviate similar hazards, and these precautions would apply to other field trip equipment. They included: the thorough inspection of portable electrical equipment and provision for regular inspection by a qualified person; the examination of all field vehicles modified to accept 240V AC; prevention of any modification of electrical equipment by non-certified staff; and recommendations relating to the future use of radios by field parties.

Committee chairman Dr David Koch (Chief of the Division of Mineral Products) said the formal recommendations and outcome of the enquiry would be made known to staff.

Apart from the CSIRO enquiry, the accident is also being investigated by the WA Police, the WA State Energy Commission and the WA Mines Department, and their evidence will be presented at a Coronial enquiry.

Colleagues wish to extend their deepest sympathy to Mr Rayner's wife and family.

###

EEO Census
Data to aid human resources policy formulation

The EEO Census Report has wide human resources implications for CSIRO which extend further than equal employment issues, according to the Director of Corporate Services Mr Peter Langhorne.

The report, which was presented to the Executive Committee meeting last month, contains data on many aspects of human resources in CSIRO and highlights some dissatisfaction with areas such as training and development.

'It has to be very closely looked at and evaluated,' said Mr Langhorne. 'It's my view that we now have an excellent base to look at our EEO policies and the way we are implementing them and to make any necessary adjustments.

'One pleasing thing about the report is that it did not identify any problems at the point of entry to CSIRO. In other words, our selection processes are geared to allow people who are qualified and competent, regardless of their sex, religion, physical situation, etc, to enter CSIRO,' he said.

'Leaving aside the EEO aspects of the report, it also provides useful data on issues such as development and training needs which can be used very effectively to develop a CSIRO employee development strategy.

The report did show up the marked 'sex segmentation' apparent in the workplace in general. This means women tend to dominate the lowest ranks in terms of status and money, and men the upper ranks. This was highlighted by the fact that 71 per cent of women in CSIRO earned less than $25 000, while 52 per cent of men earned more than $30 000.

The report showed that those few women who made it to the senior ranks were usually single with no or few children. This seems to suggest that those who are married and have children drop out of the workplace at the most crucial time in their scientific careers, and either choose not to re-enter or if they do are unable to make up the ground lost to their male counterparts.

'Science is an enormously competitive career, particularly today when quite often people don't get any sort of tenured position until they have two or three or even four post-doctoral appointments,' said CSIRO Chief Executive Dr Keith Boardman.

'I don't believe the fact there is a low number of women is discrimination. It could be called unequal opportunity because of being away at the most competitive time, when people work 10-11 hours a day, seven days a week in some labs around the world.

'That's the time when you really begin to make a name for yourself and get established,' he said.

Because it emerged that women at all levels most often had responsibility for care of the children, they were often left behind at that point.

One solution could be work-based child care. Mr Langhorne would not be drawn on this, saying it was just one element to be considered as part of a total human resources strategy.

Dr Boardman said there were moves afoot to introduce child care for CSIRO employees – so long as it was self funding and did not present a drain on the annual budget.

One model might be the Australian National University, where the University provided the premises and users paid for the service.

'I don't believe that if both parents are working it's necessary to subsidise the running of child care centres,' said Dr Boardman.

'Our policy is to provide the facilities, but the proposal is being held up because of discussions over who will meet the maintenance costs.'

Turn to page 7 for a run-down on the contents of the census report.

Well, sheep love modern tomatoes....

One Victorian sheep farmer has found a novel use for the much maligned modern tomato – he feeds them to his sheep.

Mr Clyde Hammond, who farms in the Murchison district of northern Victoria, started feeding his sheep tomatoes during the drought of 1982/83 when he was desperate for any sort of sustenance for the animals. He also fed them pears during this time, until that fruit became too hard to come by.

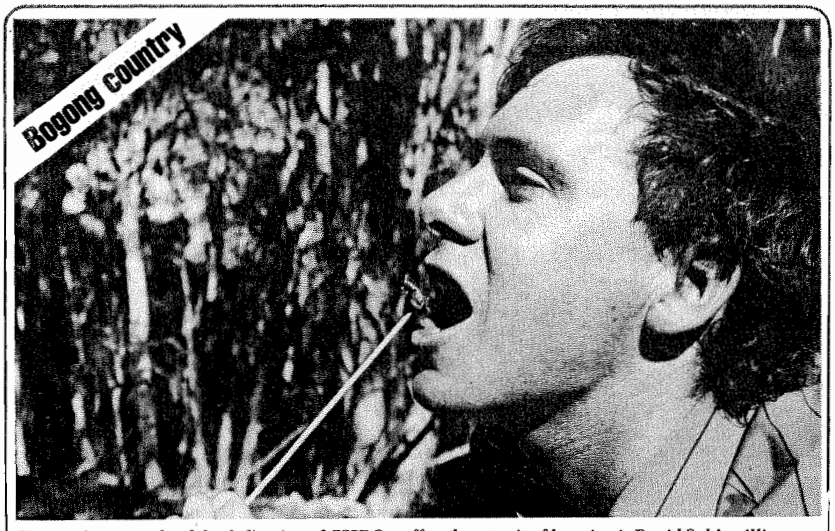
Now the sheep love their tomatoes and while Farmer Hammond keeps dishing them up, the animals are not interested in fresh green grass or hay. For 300 ewes, Mr Hammond gets about 12 tonnes of reject tomatoes from Joe Varaca's large packing shed in the district. Many of the sheep munch through about 50kg per week.

Mr Hammond approached CSIRO's resident tomato expert, Dr Barry McGlasson from the Division of Food Processing, to advise on the nutritional value of tomatoes after he heard Dr McGlasson being interviewed on the ABC.

Information provided by Dr McGlasson suggested that some sort of more protein-rich supplementary food was required by the sheep, although the tomatoes certainly wouldn't do any harm.

Mr Hammond said his sheep had thrived on the tomatoes and never shown any ill effects (unlike, he said, some cattle on the farm down the road which were fed rather mature peaches during the drought and spent three weeks rolling drunk).

He is a tomato eater himself, and has found himself in the rather unusual position of pinching tomatoes from his sheep to have with his dinner.



Yet another example of the dedication of CSIRO staff to the pursuit of learning is David Salt's willingness to eat bogong moths in the interests of science education. David (pictured above) helps run the extremely successful CSIRO Double Helix Club for budding scientists, and he led some members and their families on a journey recently to Mt Gingera in the Brindabellas west of Canberra. Here he distinguished himself by lifting up a handful of moths to reveal a big hairy funnelweb spider. After this shock, he and the kids settled down to a feast of bogongs. David said you eat them wings and all, so they are rather crunchy but also quite delicious once your stomach stops heaving. Most of the kids entered into the spirit and downed a moth or two. Of course the big question remains: does science really need people who eat moths?

From the Chief Executive

A column by Dr Keith Boardman

There is general agreement at Board level and within the Organisation that the allocation of resources must be based on a more systematic identification of national research priorities, and more rigorous procedures for assessing the relative strengths of research projects and progress towards achieving objectives. At its March meeting the Board established a sub-committee to prepare a paper on the identification of national research priorities for the Board's consideration.

Assured funding over a period of years is needed to successfully implement longer term plans, but the reality of the annual budget process has meant considerable uncertainty in the funds available to CSIRO from year to year.

In the budget discussions in 1987 the Government acknowledged the desirability for more stability in CSIRO funding, and requested the Minister to bring forward a submission on future funding arrangements in advance of the 1988-89 budget formulation.

The major issue to be addressed in the submission is the amount of revenue to be retained by CSIRO without a reduction in appropriation funds. The Board agreed that CSIRO should seek to retain all revenue over the next few years; from research contracts and from the sale of goods, services and underutilised property. It acknowledged, though, that in the longer term as royalties increased from the successful commercialisation of CSIRO research, it was reasonable for the Government to claim a share of revenue received from royalties.

The main arguments for retaining revenue are the urgent need for Australia to markedly increase its R&D effort and the vital role of CSIRO in the nation's R&D. CSIRO must increase its overall effort in order to maintain research capacity for the traditional areas: rural, mining and those in the national interest, and increase research for the manufacturing and information sectors, particularly the emerging high technologies. Adding value through greater processing of rural and mineral commodities can greatly increase export earnings from the primary sector, and offers the best prospects for substantially reducing the trade deficit in the shorter term. In the longer term considerable scope exists to develop competitive technology-based manufacturing enterprises and diversify the base of our exports.

At the Board's discussions with Senator Button for part of its March meeting, Senator Button stressed the great sense of urgency with restructuring the Australian economy and Australian industry to meet the tremendous competitive pressure internationally. He acknowledged that CSIRO had a tremendously important role to play, and would remain the flagship of Australian R&D. He stressed the need for CSIRO to have effective management systems and evaluation processes to continually assess projects in terms of their progress towards objectives and the resources involved.

###

Senior appointments in institute headquarters, the corporate centre and my own office have been finalised. I am confident the new groups will work together harmoniously and effectively to provide essential support for the research effort and the application of research results for the nation's benefit. I thank the previous teams for their important contributions over the years, and for their support.

###

On behalf of the Board and staff, I offer warm congratulations to Dr Alan Head on his election to Fellowship of the Royal Society. Alan has made outstanding contributions to the understanding of dislocations in crystals and the application of the knowledge to fatigue of metals.

A Keith Boardman

Call for papers

Australia is developing a substantial tourism infrastructure, and this has implications in a number of areas.

A conference to discuss this issue, called 'Frontiers in Australian Tourism', is being held at the Australian National University 29 June-1 July, and the University is now calling for papers from a wide range of sources with an interest in tourism development.

Contact the ANU Centre for Continuing Education, GPO Box 4, Canberra ACT 2600, PH: 062-49 3891 or 49 4580 for further details.

Letters to the Editor

Dear Editor,
So, CSIRO now has six strong institutes and a corporate centre that has been kneed in the groin. What does it all mean?

An obvious interpretation envisages a scenario where the institutes build up their autonomy and corporate identity to the point where they are ripe for hiving off to other government departments or, through increased industry funding (privatisation?), to the private sector.

The end result would be the same: fragmentation of a once-cohesive body of expertise, which used to have a clear mission and place in Australian society.

The PCEK review team ensured the weakening of CSIRO as a corporate entity by destroying the one part of the Organisation capable of promoting a corporate image and presenting corporate information services – the Bureau of Information and Public Communication.

Although it is open to debate how effective the Bureau was in the prosecution of its task, at least it acted as a focus for corporate communication/information. Only the most optimistic (and naive) would expect the institutes and divisions to fill the vacuum caused by the dismantling of the Bureau and the placement of its remaining staff into the wastelands of corporate services.

Those few remnants of the Bureau now comprising the public affairs unit, plus the Chief Executive's office, have a virtually impossible job to keep CSIRO glued together. And while institute directors will claim that *they* are charged with corporate as well as more sectional responsibilities, self interest will inevitably determine where the effort goes.

There is no point in becoming maudlin over this. Organisational structures do not last for ever. To be effective, they must adapt to suit changing environments.

Maybe the days of the multi-disciplinary research body are over. However, those of this view should pay heed to the British experience of carving up their DSIR into smaller laboratorties. Government funding quickly dwindled; high quality staff became hard to attract.

Between them, government and sundry management consultants and accountants have altered the face of CSIRO. But at what cost to its people? At what cost to this nation's capacity to conduct strategic research?

By the year 2000 we will have the answers.

Michael R J Dack
Corporate Centre

Dear Editor,
Mr Cattanach's letter (*CoResearch* 310) in response to mine (*CoResearch* 308) only outlines the background to the changes of which I was critical.

He does not explain why external advice was not sought when it was recommended.

Nor does he say how the information supplied to Headquarters by a variety of non-professional staff (myself included) to develop a data base, will justify increased levels of funding.

Development of a data base will take some years. Years in which the deterioration of our assets will accelerate due to continued lack of funds.

While the private sector is spending more than five per cent of the value of their assets on repairs and maintenance, CSIRO continues to allocate a paltry 0.9 per cent. Need I say more?

Murray S Upton
Manager, Engineering Services & Buildings
Division of Entomology

Dear Editor,
I am writing this letter as a tribute to a CSIRO staff member, Mr Michael Rayner, who was tragically killed in a work related accident on 25 February near Southern Cross, Western Australia.

Michael was electrocuted while attempting to rescue a friend who had received a possibly fatal electric shock.

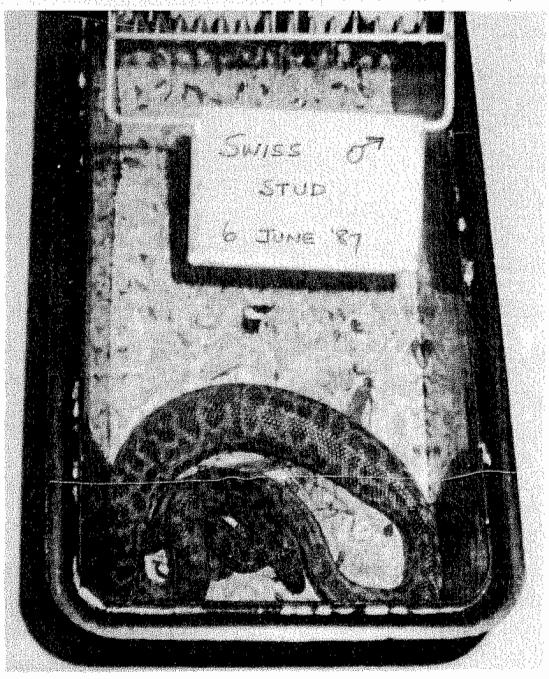
Mike gave his life not thinking of the danger to himself and he will always be remembered for this great act of heroism.

He is sadly missed by all his friends and workmates at CSIRO Perth, and I would like to offer my deepest sympathy to Michael's wife Lorena on her sad loss.

Greg Humphries
Division of Mineral Products
Perth

Letters to the Editor are welcome from all readers on any topic of interest.

Scientist discovers the python variable



Dr Martin Sillence is still coming to grips with the challenge of conducting basic animal research in the tropics. Dr Sillence arrived at the Tropical Cattle Research Centre, Rockhampton, in November last year fresh from the United States and eager to establish his own mouse colony for a program of research aimed at studying the effects of adrenal hormones on growth. Dr Sillence's own adrenal hormones were elevated considerably when, upon checking on the performance of his prize stud mouse, he found a rather satisfied looking python, which had squeezed into the cage, and, with the mouse inside him, was unable to escape. Dr Sillence, who had never seen a python before, had no plans to recover the mouse, but claimed he might use the snake in future studies as a means of selectively reducing experimental error among his subjects.

Scanning Tunnelling Microscopy

A fascinating look at surfaces

Australia's first operational Scanning Tunnelling Microscope has been commissioned at the Division of Materials Science and Technology by Dr Brett Sexton and Mr John Meldrum. The microscope is capable of resolving atoms on surfaces and reveals a new world of steps, terraces, valleys and previously unexplored surface features.

The Scanning Tunnelling Microscope (STM) was developed by Gerd Binnig and coworkers in Zurich in 1979. Binnig and Rohrer subsequently shared the 1986 Nobel Prize in physics with Ernst Ruska for contributions to microscopy.

The tunnelling microscope has attracted considerable interest in overseas laboratories for its ability to resolve features as small as atoms on surfaces in environments ranging from vacuum to air and even under fluids. For the first time, the surface scientist can see the complex surfaces with unprecedented resolution, with a simple apparatus.

The experiment works by scanning a sharpened tungsten needle over the surface of a metal or semiconductor. Driven by precise piezoelectric elements similar to those found in gas stove igniters, the tip hovers at a distance of 5-10 Angstroms above the sample surface without touching. A small tunnel current of 1-5 nanoamperes flows between the tip and surface and is constantly monitored to keep the tip in place.

The profile of the surface is then scanned in less than 30 seconds, by moving the tip across the surface and recording the movement of the piezoelectric driver. The CSIRO microscope utilises a design known as a tube scanner, and both the microscope and electronics were constructed at the Division.

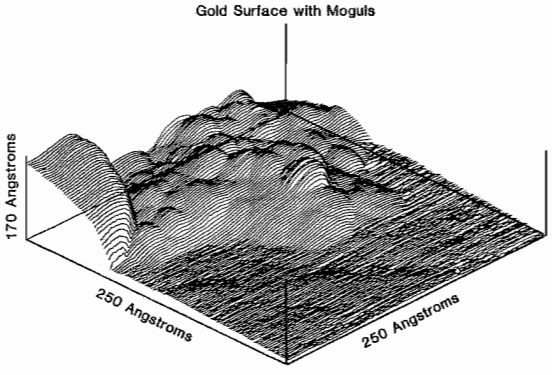
The results are startling. In images taken on gold and brass surfaces, large flat planes with single and multiple atomic steps can be seen, and in other areas large rolling hills emerge, with steep valleys and sudden cliffs and facets. These surfaces are not static, changing by the minute as atoms migrate and diffuse to change the surface topography.

A remarkable feature of the tunnelling microscope is its ability to operate in air and even under oils and liquids. Applications of the technique in studying tribology, industrial surfaces, corrosion and electrochemistry are numerous.

The biggest potential impact of this instrument lies, though, in the application to processing of semiconductor surfaces, particularly silicon and gallium arsenide. Development of new semiconductor devices depends critically on an understanding of how to control the microscope surface structures on these materials.

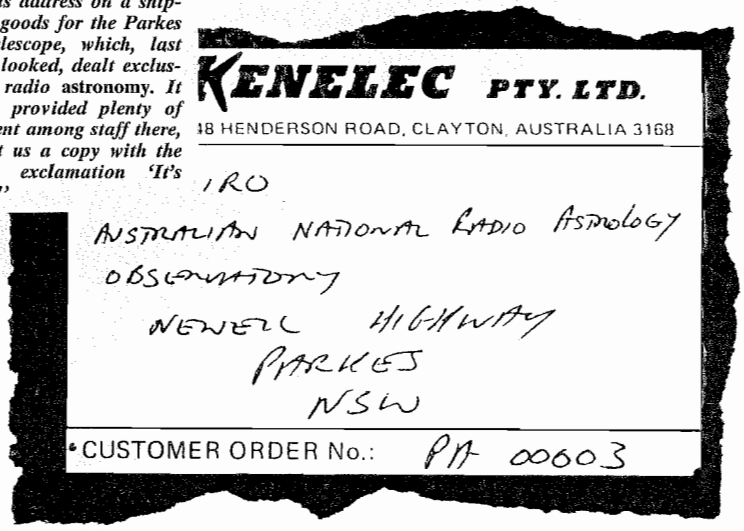
A collaborative program between CSIRO, Telecom Research Laboratories and RMIT will explore surface modification of these materials.

The STM and a more recent development, the atomic force microscope, have been applied to some studies of ceramic surfaces. Exploration of surfaces such as the zirconias and silicon carbide will undoubtedly provide new insights into these important materials.



It's in the stars

Below, it must have been a whimsical Piscean or a good humoured Sagittarian who wrote this address on a shipment of goods for the Parkes radio telescope, which, last time we looked, dealt exclusively in radio* astronomy. *It certainly provided plenty of amusement among staff there, who sent us a copy with the attached exclamation 'It's official!!'


KENELEC PTY. LTD.
18 HENDERSON ROAD, CLAYTON, AUSTRALIA 3168
CSIRO
AUSTRALIAN NATIONAL RADIO ASTRONOMY OBSERVATORY
NEWELL HIGHWAY
PARKES
NSW
CUSTOMER ORDER No.: PA 00003

Prize winning software helps in a crisis

A software package devised by a CSIRO team has won second prize in *The Australia* Farm Software Competition run by the Royal Agricultural Society in Sydney.

The Rangepack HerdEcon package has been developed in Alice Springs by Dr Mark Stafford Smith, Mr Barney Foran and Mr Oscar Bosman with the Division of Wildlife and Ecology. The work was made possible by a two year grant from the Rural Credits Development Fund of the Reserve Bank of Australia.

HerdEcon has been designed for the pastoral areas of Australia, to deal with the variable animal productivity rates due to large differences in annual rainfall.

It mimics the operations of an individual livestock enterprise so that a manager can examine the impact of management decisions in his or her own particular circumstances.

There is a high risk that climatic downturns will reduce animal productivity and cash flow. Management advice under conditions of uncertainty can be confounded by an endless array of options, none of which can be properly evaluated in a crisis.

HerdEcon allows the effects of a management decision to be projected into the future. This is particularly important in tracking the financial implications resulting from new technologies such as new mustering methods, pasture improvement, etc. It enables a manager to plan such things as drought strategy well ahead in order to avoid knee-jerk decisions.

In one trial of HerdEcon, an extra $40 000 per year cash surplus was achieved for a northern cattle run which was restocking after the brucellosis and tuberculosis eradication campaign.

HerdEcon is user friendly and can be run using 10 simple commands. It operates on all IBM compatible computers with at least 512K of memory, and is available from the Division in Alice Springs at $295 per copy.

Guide for preparing conference posters now available

Ms Anne Warrener at the Division of Plant Industry has produced a booklet to help scientists prepare effective conference posters.

Posters are becoming increasingly prevalent at scientific conferences. They can be an important talking point which, if effectively put together, can spark further discussion about the complexities of the subject.

As Ms Warrener states in her booklet, for maximum impact the cardinal rule for all posters is simplicity, and she sets out in clear step-by-step fashion how to achieve this.

The booklet complements an earlier one entitled 'Preparing effective slides to present your research results'. The 'amazing response' to this publication encouraged her to proceed with the conference posters booklet.

For copies of either booklet, contact Ms Warrener on 062-46 5889.

Random solutions to the timetable problem

School timetables may look simple enough, but constructing them can be a nightmare of juggling variables and fixed constraints.

Now a scientist with the Division of Information Technology, Dr David Abramson, in conjunction with the Royal Melbourne Institute of Technology, has come up with a model for formulating timetables using a concept which seems far removed from the schoolroom.

Simulated annealing is a 'Monte Carlo' technique which can be used to find solutions to organisational problems. As the name may suggest, Monte Carlo techniques are a bit like rolling a dice – they make use of the properties of randomness to solve problems.

This particular technique simulates the cooling of a collection of hot vibrating atoms.

When the atoms are at a high temperature they are free to move around, and tend to move randomly. However, as the mass cools the inter-particle bonds force the atoms together. When the mass is cool, no movement is possible and the configuration is frozen.

The idea with annealing is to have a low latent energy when the system is frozen.

In applying this to the timetable problem, atoms are modelled by available teachers, rooms and classes. The system energy is modelled by a measure of how many clashes are present in the timetable. When a timetable is frozen it should have as few clashes as possible.

The result, after a series of computer calculations, is a neatly arranged timetable which takes account of the numerous variables and constraints and would save much wear and tear on the person responsible for putting together the timetable. At present, methods vary in schools, but in many cases a pencil and many sheets of paper, or a pinboard, are used.

Dr Abramson intends speaking to relevant education bodies soon to see if they are interested in further investigation of the technique.

Archive faces mountain of paperwork each year

Imagine, if you can, a stack of papers almost twice as high as the Empire State Building. The papers, in the form of documents, letters and records of various kinds, would soar 750 metres into the sky.

That was the amount of material submitted for disposal to the CSIRO Archive during 1986 and 1987. Of the 750 metres, about 250 metres was kept and about 500 metres destroyed. If the Archive had the resources to cover the whole of CSIRO, the quantity could well have been doubled.

By law, and in the interests of the Organisation, decisions must be made on proper authority as to whether that paper is destroyed or kept. The person holding this responsibility in CSIRO is the Archivist, Mr Colin Smith.

The major job of the Archive is to determine what unpublished records of the Organisation require short-term or indefinite retention, and to keep them safe, retrievable and available.

Almost everyone in CSIRO is a record maker, churning out letters, reports, data, information, information, information...and a very large proportion of the paperwork comes from Headquarters.

Far-flung

As Mr Smith puts it, CSIRO is like a crab 'with a lot of meat in its claws'. The divisions are where the scientifically creative people are, and a large part of the really valuable documentation is generated there as well as at the centre. This is unlike most government departments where the central records account for most of what is of long-term value, and it leads to particular problems in dealing with the documentation from a far-flung organisation.

Apart from maintaining an office in the registry at Headquarters and spending a considerable amount of time at the repository in Fyshwick on the outskirts of Canberra, Mr Smith also visits CSIRO divisions to assist with archival work there, but it is a huge task (see separate story).

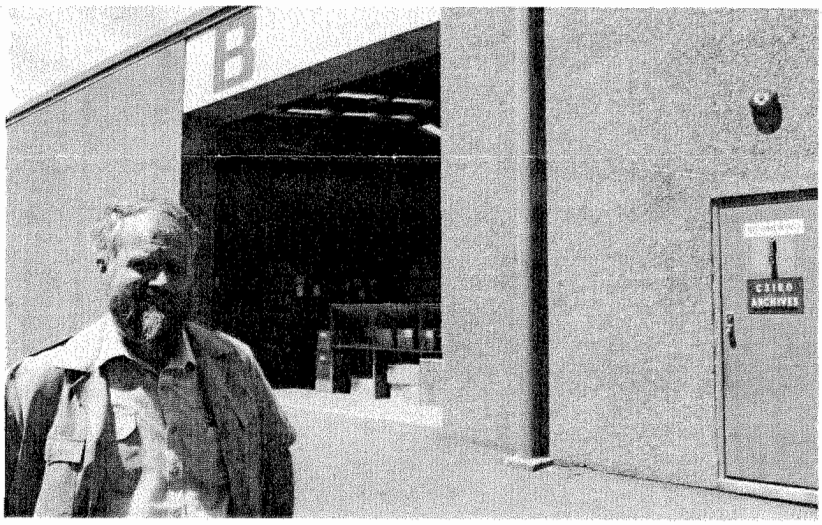
Mr Michael Moran is the Deputy Archivist and plays a major role in the retrieval service. Two part-time assistants, Ms Gertrude Gerstle and Ms Ingrid Jarrett, provide vital assistance. Ms Gerstle is working on the detailed listing and indexing of the Organisation's most precious records, while Ms Jarrett is assisting with disposal, transfer and other tasks. Mr Ted Parker, formerly of HQ registry, also is assisting at present.

If all the current holdings of the CSIRO Archive could be stacked file on file, they would make a column one and half kilometres high — forget about talking in terms of buildings at that height. To put it another way, this is about three times the distance between the south and north pylons of the Sydney Harbour Bridge — so the documents could fill three lanes running across the Bridge.

It is a great challenge, according to Mr Smith, devising simple, cheap and effective means of relating each item to its historical context, and thereby making it easily retrievable.

Thousands of files and documents are retrieved and studied each year. In many cases their interest and usefulness increases with age.

They are an important part of our national heritage — a mine of primary information about the development of Australian science and technology — and resource which could never be replaced if lost.



CSIRO Archivist Mr Colin Smith outside the Fyshwick repository of the Archive.

Archive source of material for range of subjects

One outside user of the Archive, Ms Wendy Way of the Department of Foreign Affairs and Trade, is enthusiastic about the scope and usefulness of the Archive.

A research officer, she is preparing a biography of F L McDougall, CSIR's first liaison officer in London.

There is a considerable amount of documentation concerning McDougall at the Archive, including correspondence with Sir David Rivett, the Chief Executive of CSIR at the time (a book of McDougall's correspondence has already been published).

McDougall was liaison officer from 1926 to 1944, but he was also involved in a number of other activities during his career. For instance, with S M Bruce, the then Australian Prime Minister, he is credited with the foundation of the FAO.

Ms Way said the CSIRO Archive is the main source of documentation on McDougall's activities in the 1930s.

History there for the asking

Many CSIRO divisions have had long and distinguished histories, and it isn't surprising that on occasion staff members feel moved to record for posterity the achievements and personalities which have made their divisions great.

To do this, a considerable amount of historical information is necessary to get a clear picture of events. The CSIRO Archive is a central source of documents dealing with divisions, including research notes, personal history files of staff, important and interesting letters, photographs and many other primary sources.

Answering enquiries is a major part of the work at the repository. These vary from simple factual requests (e.g. for the principal dates in a scientist's career) which can be answered by Deputy Archivist Mr Michael Moran in an hour or two, to requests for information about sources for historical research which can take a considerable amount of time to compile.

Mr Moran said for the compilation of a history, often the writer will need to spend days or weeks at the Repository going through documents and photographs.

With sufficient warning and adequate indication of the sort of documents required, anyone is welcome to spend time there and Mr Moran and the other Archive staff help where possible.

Mr Moran has dealt with a wide and intriguing range of enquiries, not just from CSIRO employees or ex-employees, but also from overseas people. For example, a Professor Woodruff T Sullivan* [see below] of the University of Washington in Seattle made an enquiry about D F Martyn's pioneering work on lunar radar and lunar-bounce communications, 1930, while Sir William McCrea, the British astronomer, made an enquiry about Martyn himself. Roberta Spieckerman from San Fransisco wanted to get hold of 1920s prickly pear photos for a biology textbook. Closer to home, the Queensland Beach Protection Authority sought pre-war aerial photos of the Queensland coastline for work by coastal engineers today.

'Answering enquires is one of the most enjoyable tasks in Archives and has valuable spin-offs,' said Mr Moran. 'In particular, it is an excellent advertisement for CSIRO when we are able to help people outside get hold of valuable information.'

Anyone with a query concerning the history of CSIRO should contact Mr Moran at the Archive Repository in Canberra.

Professor Sullivan wrote to CSIRO Chief Executive Dr Keith Boardman earlier this year in support of continued funding for our archives. He said '...they are a priceless resource for historians of science and technology and I trust the amount of support they receive over the coming years will not be diminished...CSIRO and its archives are that rare combination of excellence in science and "bureaucracy" (meaning files of various types are created, maintained and then saved) that gives historians the wherewithal to study the development of the best science. It would be ironic if in this Bicentennial year any moves were made that lessened our ability to study Australia's past.'

Every division needs a HALO

Many divisions seem to go out of their way to keep archival records in squalid conditions, according to Archivist Mr Colin Smith.

'So much of the storage in CSIRO is gratuitously bad,' he said.

'No doubt this reflects the assumption that these old files are just rubbish and that it's appropriate that they should be kept in dust and filth.

Those divisions where the old files are kept in reasonable condition are likely to have HALOs. There are about a dozen of these Honourary Archives Liaison Officers around the Organisation. They are the 'eyes and ears' for Mr Smith in the divisions.

'A number of them have been extremely helpful in bringing things to my attention and preventing important files from being thrown out,' he said.

The HALOs are usually connected with the library, or are scientists with a particular interest in archives.

Of course, Mr Smith would like to see full time archivists at each division, or at least each major site – 'that way you could really get to grips with the nitty gritty of what is going on in those divisions and provide a really valuable service in storing and keeping their data. But unfortunately, that is cloud cuckoo land', he said.

'In the absence of professional assistance, the main means of making progress is by gradually changing attitudes and behaviour,' Mr Smith said.

'Staff can help by keeping records coherently. Also, it would help if people could become informed about some of the simpler aspects regarding the disposal of papers,' he said.

'Officers and their staff, for instance, could do a lot in the way of keeping emphemera in one file and the more substantive material in another. They could do things like clarifying who keeps the master set of any particular file of important records. More use of central registries would help greatly in that regard.

'It comes down to simply taking the business of making and keeping records more seriously,' he said. 'While I don't expect the tail to wag the dog and don't advocate record-making with a deliberate view to informing posterity (there are dangers in that!), I do think there are minimum standards of coherent, orderly filing and indexing which are in the interests of both present and future users of records – and of the archivists who try to build a bridge between them.'

Ms Gertrude Gerstle

A lasting record of Australia's science and technology development

The records of CSIRO held by the Archive go back to the origins of the Organisation in 1916, and represent a lion's share of the unpublished documentation of 20th century Australian science and technology.

There is information not only about CSIRO's activities, but also about industry, the universities, scientific research centres in Australia and overseas and the research activities of other government agencies, as well as about the research activities of thousands of scientists, not necessarily CSIR/CSIRO employees.

There are, for instance, significant records on the origins of the Australian National University, scientific links with Britain, the British atomic tests, wartime radar research and development and the introduction of computing in Australia.

The cream of these records comprise top-level minutes and tabled papers from 1916 to the present day, as well as much of the correspondence of the leading lights in CSIR/CSIRO.

They make fascinating reading, revealing inside information about most of the major issues of science and technology since Federation.

This particular irreplaceable and historically important material is just a small part of the total documentation which has found its way to the Archive. The rest comprises a mass of records created in scores of laboratories, offices and field stations. About 10 per cent of this material has permanent value because it often details the start, progress and outcome of research projects.

It is scientific data in particular which presents the greatest challenge for the Archive. Data tend to require interpretation of their cryptic contents which goes far beyond available resources. Apart from this, they are increasingly found in machine-readable formats, and there is little perception that they require archival action.

Meteorology seems to be one of the few fields where it is accepted as a disciplinary obligation that unrepeatable observations should be cumulatively recorded and preserved forever.

Modern communications: 'records written on sand'

Ironically, the progress of communications this century is producing records which are inferior both in their content and their life expectancy.

Apart from the telephone which has made the long, explanatory letter of earlier times much more rare, computer technology is creating extremely ephemeral records.

'The magnetic tape is probably going to be an archival disaster,' said Mr Smith.

'It's like records written on sand.'

'Apart from being physically impermanent, you have got to have the right machine and software to read the tape, and you have to understand the conventions on which the data has been put together in order to have access to it.

'The tapes have to be recopied continually and reformatted if they are to remain readable and usable,' he said.

'For that matter, though, our paper records aren't all that long lasting either. Most paper made since the 19th century is faintly acidic and will steadily lose its strength over the decades until it eventually crumbles.

'Taking the long term view, we have been going steadily backwards ever since we gave up parchment which lasts for 500 to 1000 years,' he said.

'Microfilm is being used as a lifeboat medium for records at risk. CD-ROM may prove to be a superior alternative, but recopying into such media is a massive and expensive undertaking. Certainly little Archives like mine aren't in the race. All we can do is get the originals out of harm's way and keep them in order under some form of control and hope that the next generation will put substantial resources into the long-term presentation of what we have saved in the short-term.'

Left to right, Ms Gerstle, Ms Ingrid Jarrett, a visitor to the Archive, retired CSIR/O employee Mr Jack Cummins, and Mr Colin Smith, look at an album of old photographs.

Forget the image – archives are for the future

It seems there are few parts of an organisation easier to forget than an archive. All those documents mouldering away in antiquarian and cobwebbed surroundings, perhaps tended by a quaint old person wearing a cardigan and granny glasses. It hardly seems worth the effort.

Wrong. Archives are a vital resource for an organisation – and their preservation is a requirement of Australian law.

The CSIRO Archive Repository is a large warehouse with no apparent cobwebs, staffed by enthusiastic and dedicated people (who may or may not wear cardigans). And their job, often not recognised as such by the powers that be, is important, both for the present and the future.

The history of science and technology in Australia is important and relevant and interesting today. Despite very few visible means of support over the years, many of the records of CSIRO's part in the development of Australian science are documented and preserved. Records on the atomic absorption spectrometer, myxomatosis, cloud seeding, coal research, etc, etc, etc.

Research and events happening today will one day be looked back on and written about. It's been said the recent reorganisation is as radical as the change which took place in 1949 (when CSIR became CSIRO). Surely then it's very important that all the relevant records be maintained in a safe and easily accessible way.

Archivist Mr Colin Smith has fought against many odds to establish a credible and functional Archive. It has been built to its current extent on the basis of rather uncertain commitments going back to 1965.

His dream of a more suitable repository than a Fyshwick warehouse looks unobtainable, however he finds considerable encouragement in the fact that the complement of two full-time and two part-time staff has survived the recent review of CSIRO. In the circumstances, this is to CSIRO's credit, he said.

311-1988

Power station plume under scrutiny

The most exhaustive field experiments on pollution from a power station ever to be undertaken in Australia are scheduled for August/September this year.

The Division of Atmospheric Research, the Centre for Environmental Mechanics and the Division of Coal Technology, as well as the Queensland Electricity Commission (QEC) and the Defence Force Academy will jointly study numerous aspects of the smoke plume from the Tarong Power Station in Queensland.

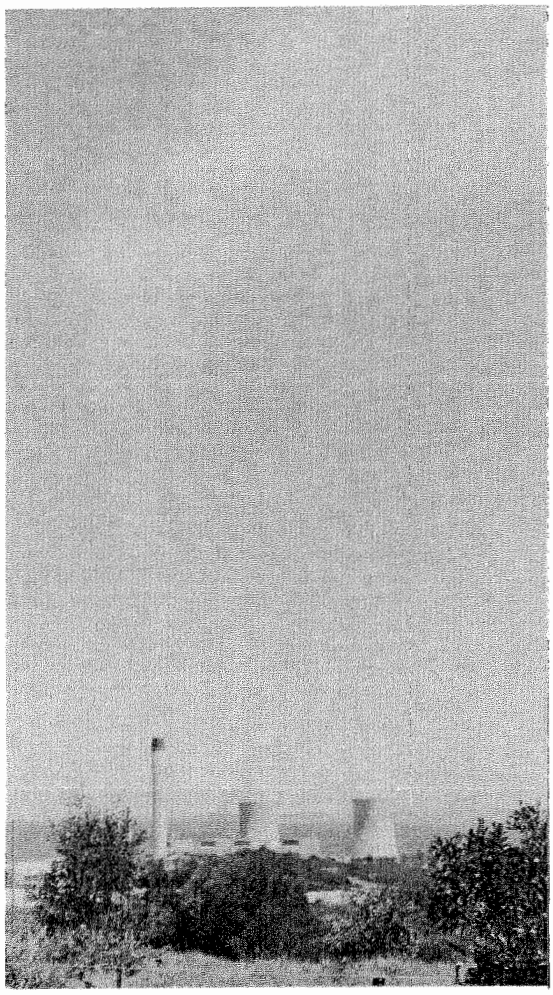
The work has been made possible by a grant of more than $213 000 from NERDDC.

Although plumes have been researched for some time in Australia (particularly in Victoria's Latrobe Valley where there are a number of smoke stacks in a small area, presenting a slightly different scientific problem), models for predicting and understanding plume movement from a single large source such as Tarong are still inadequate.

It appears the plume doesn't always move up into the upper atmosphere and disperse, but rather is subjected to a range of often conflicting atmospheric conditions which can result in it being pushed back down to earth some distance away, creating serious air pollution problems.

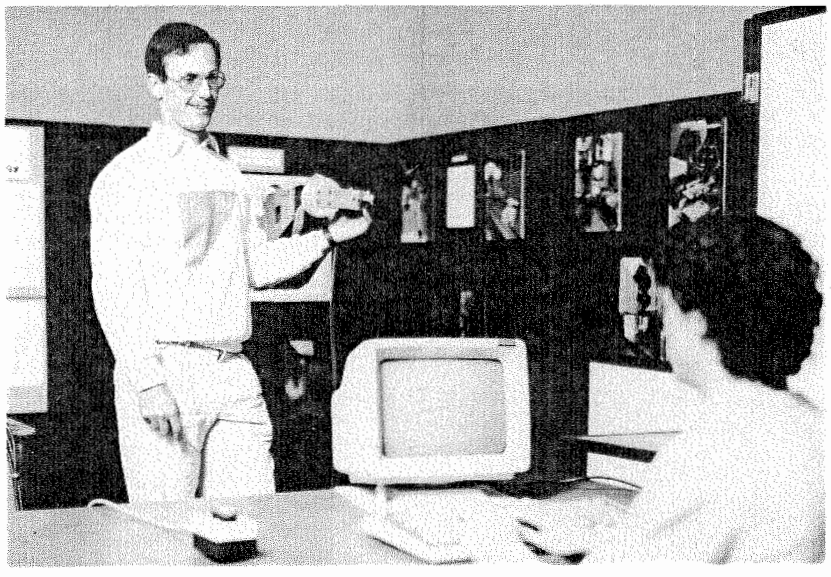
The data from this project through the development of improved models could provide regulatory authorities with accurate information to assist in selecting power station or factory sites and designs, putting them into places least likely to cause pollution.

A number of instruments will be used to test the plume, including lidar (light detection and ranging), which has never before been used so extensively for this type of work in Australia. Lidar, which is similar to radar but uses light instead of radio waves, has mainly been used for probing the upper atmosphere.



The Tarong Power Station and its plume.

About 20 scientists and technicians will descend on the Tarong Power Station site to conduct the experiments.



Vaughan Roberts, left, and Dennis Mills starring in the Aussat lecture. Photo: H Niblett

Sirocredit

SIROCREDIT has introduced its own in-house financial advisory service for members.

The service will include personal interviews, telephone consultations, seminars around Australia and portfolio management for the years after a personal plan is put into place.

Mr Mario Modica has been appointed to manage the new financial planning area. Mr Modica is a qualified accountant, tax agent and registered investment planner, as well as being up-to-date with such specialised areas as the Commonwealth Superannuation Fund, CSIRO terms and conditions and separation schemes.

The financial planning service is backed and licensed by the Securitor group of companies.

SIROCREDIT said although it can advise on all types of investment, the bias would be towards security and conservatism. 'Gambling with your livelihood is a no-win situation for all concerned, so funds will only be placed where the member's best interests will be served and all risks are minimised'.

In common with all investment advisory services, SIROCREDIT participates and shares in brokerage income. All brokerage rates will be clearly highlighted on any written assessment.

Services available include:

Retirement planning

Advice will be offered on all the available options so that planning isn't left too late. With the help of a consultant, members can review their individual circumstances and hopes in order to come to the best possible arrangement.

Investment advice

The range of advice covers:

. personal finance planning
. retirement and estate planning (including wills, social security and pension benefits)
. personal, business and investment loans
. venture capital and business investment
. short term cash management
. insurance bonds, superannuation and Friendly Societies
. fixed interest investment (including government bonds, finance companies, credit unions, building societies and mortgage trusts)
. stocks and shares (including equity trusts)
. property trusts
. film investment
. commodities (including futures and precious metals)
. primary industry investments (forests, crops, livestock, etc)
. effective tax investment planning

For further information, contact SIROCREDIT in Melbourne (03-267 5377), Canberra (062-46 5400) or toll free (008-33 8698).

The investment planning forum at headquarters last month: left to right, Mr Mario Modica (Sirocredit's new financial planning manager), Mr Tony Culnane (HQ) and Mr Peter Nairne (from Canberra RAO).

Inaugural AUSSAT lecture

Friday 26 February, 3.30pm. A large audience assembled at the Sydney Entertainment Centre to witness the inaugural Aussat lecture.

Organised by Aussat and the Institution of Engineers Australia, the program was beamed by satellite to 17 locations across Australia to an audience of about 60 000 upper secondary students.

The purpose of the lecture was to highlight careers in engineering and technology by showing a range of engineers at work. The program featured clips from organisations as diverse as Aussat, Fairlight Instruments and CSIRO.

The CSIRO segment, produced by the Film & Video Centre, starred Manufacturing Technology's Vaughan Roberts and Dennis Mills working on force-sensing and vision systems for industrial robots. The response to the whole program has been very positive, with students finding it both entertaining and very informative.

Major information base on CSIRO staff attitudes through census

The final report of the EEO Census, formally presented to CSIRO at the Executive Committee meeting in Melbourne on 19 March, had a remarkable return rate of 92 per cent. This provides the Organisation with the most comprehensive picture of its workforce ever available.

The purpose of the census was to identify:
. patterns of employment
. occupational and status differences
. access to income, benefits and conditions
. perceptions and experience of discrimination and harassment
. childcare needs and the impact of childrearing on careers, and
. to review personnel policies and practices

Occupational segmentation

Australia has the most highly sex-segregated workforce in the OECD, and CSIRO fits this general pattern of employment. In CSIRO the census identified 'women's' jobs, 'men's' jobs and 'mixed' jobs. Salary level was the most noticeable difference between the men's jobs and the women's jobs: 71 per cent of females earned less than $25 000, while 52 per cent of men earned more than $30 000.

Only six per cent of research scientists were women and in May 1987 there were no women in 'senior management' (there are now several women in this category). Women are clustered in the lower-pay, lower-station positions.

There was only one division in which women comprised more than 25 per cent of research staff. In other words, in every other division, less than a quarter of research staff were women. There were two divisions with no female research/experimental staff. Women suffered considerable isolation in the workplace, given the geographic spread of the larger divisions and the thin spread of women within divisions. Women were concentrated in the fields of biology, biochemistry and chemistry and underrepresented in physics, engineering and agriculture.

Workforce experience

Women had fewer years of work experience than men. Twenty-seven per cent of all staff had worked at CSIRO for three years or less, whereas 42 per cent of females had three years less experience at CSIRO. Does this explain why women earn less? That hypothesis was tested for administrative staff by comparing groups of men and women, with the same qualifications (either HSC or Bachelor degree) and the same years of experience in CSIRO. On average men earned close to $2000 more than women. The only variable not taken into account which may be relevant was pre-CSIRO work experience, but it appears reasonable to assume the importance of that would decrease over time. Yet even after seven years or more of CSIRO experience, men still earned significantly higher salaries.

Marital status

Some interesting patterns of marital status emerged for different designations. Senior men nearly always were married and senior women nearly always were not married. As 70 per cent of our staff are men, and 74 per cent of males are married, it is not surprising that no married men reported experiencing unfair treatment based on marital status. Men in de facto relationships did, though. Women who were married or in de facto relationships were most likely to report unfair treatment.

Age profiles

The age profile of staff also was interesting: it was found that CSIRO men were significantly older than women. Thirty-seven per cent of staff were under 35 years of age – 56 per cent of females and 29 per cent of males.

Language/migrant background

CSIRO has a highly 'Anglo' workforce. Most staff were born in Australia (71 per cent), with a further 15 per cent born in New Zealand or the United Kingdom. Only 0.4 per cent of staff were of Aboriginal/Torres Strait Island descent.

Twelve per cent of staff did not have English as their first language. The major languages spoken, other than English, were German, Italian and Dutch. There were differences in the first languages between men and women. The most frequent languages for men were Dutch, Italian and German, and for women German, Polish, Greek and Italian.

There was evidence that staff born in Australia of non-English speaking parents received less favourable treatment, despite having higher than average qualifications. In contrast, staff of non-English speaking backgrounds born overseas generally fared better in the Organisation than average.

Physical impairments and disabilities

A significant 15 per cent of staff (predominantly males) reported having disabilities. Thirty-eight per cent of women reporting disabilities reported RSI (repetition strain injury). The RSI figures for the Organisation were higher than average and of concern to management. Staff with disabilities on average had long years of service and were concentrated in the higher salary groups.

Workforce interruptions

Staff were questioned about interruptions to their workforce participation. An analysis of the pattern of parenthood compared with interruptions for childbearing and rearing produced some interesting results. Males were *most* often parents, but *never* interrupted their careers for childrearing (a few men did, but not enough to register a percentage point). Women staff were less likely to be parents, but more frequently interrupted their careers for childrearing.

Employment Basis

Women represented the majority of part-time staff. There was a significant number of full-time staff (male and female) who would prefer part-time work. Women more often than men were employed on term, and particularly short-term, appointments. The majority of staff were satisfied with their employment basis. Predictably, though, many term appointees would prefer indefinite status.

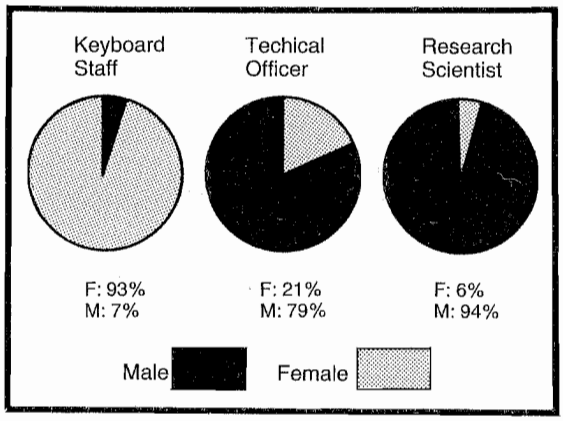
Staff Training and Development

More than half our staff wanted training for the jobs they now hold. The main types of training requested were computing, management, communications skills and technical skills. Women had a greater demand for training, but at present men received the greater financial assistance for training.

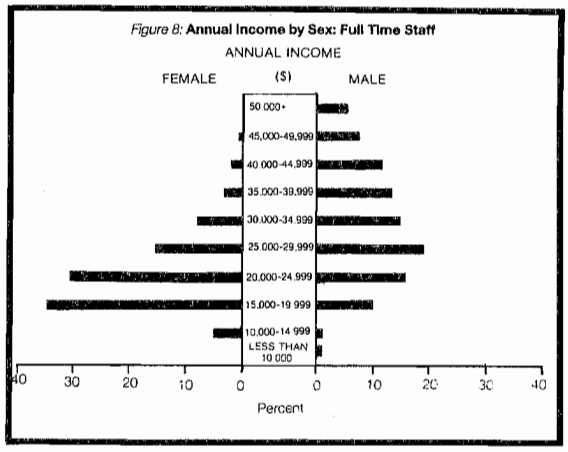
One third of staff indicated their desire to undertake study or training to change their jobs.

Career satisfaction

Staff were questioned about the level of career satisfaction, and most indicated they were satisfied, but one quarter indicated they were dissatisfied and nine per cent were very dissatisfied. Women were more dissatisfied than men. The designations most satisfied were senior management and research/experimental staff. It appeared levels of satisfaction could be co-related with factors such as employment basis, support for training, career paths and so on. Staff were asked whether they wanted to be in the Organisation in five years' time. Most did, but seven per cent indicated they would retire or leave the workforce, six per cent would leave because of their term status and 12 per cent indicated they would leave by choice.



Above, a selection of pie charts from the census report, indicating the sex segmentation in CSIRO.



Childcare

Although 53 per cent of male staff had dependent children, only five per cent of them undertook the major part of the work associated with them. On the other hand, 28 per cent of female staff had dependent children and 61 per cent of them had the major role in childrearing. There were differences among the male designations: the more senior the man, the less likely he was to undertake most or share the work. Female responses were more consistent: they were more likely to undertake the major part of the work if they had children, irrespective of designation.

Staff opinions and experiences

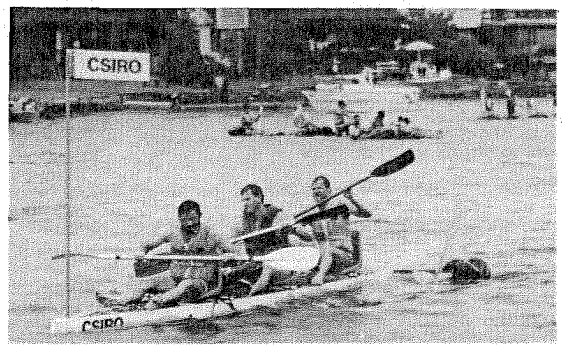
Staff were surveyed about their opinions and experience of discrimination. There was a significant discrepancy between opinions of discrimination, which were high, and those reporting actually experiencing discrimination, which was a lower response. When the low responses were analysed, though, they did represent significant numbers from particular target groups. For example, there was a reasonably low response from staff overall indicating they had experienced some form of discrimination within CSIRO on the basis of race, but when the responses were further analysed the positive responses indicated a high proportion of our relatively small group of people from non-English speaking backgrounds had experienced some form of unfair or discriminatory practice.

Review of Personnel Policies and Practices

On the last page of the census, staff were invited to express their opinions about various personnel policies and practices. In general:
. appointment procedures were considered satisfactory
. induction was considered satisfactory, but with a great divergence of responses and a lot of people simply reporting that they had none
. most staff were dissatisfied with the promotion system and complained of poor information, secretiveness and the slowness of the system which was far too dependent on the chief or supervisor
. conditions of service generally were considered satisfactory, but there was a significant demand for further information, particularly in areas of concern such as superannuation

When asked about staff development and training opportunities, most staff responded 'what opportunities – there are none'.

Staff were then asked what training they would like in their present job or in order to change positions. The resulting answers were particularly valuable, as respondents were quite specific about the training they wanted. Computing skills was the most frequent response across all staff (27 per cent), with management/business skills next (15 per cent). In fact, all but one designations rated computer skills first. Research scientists put management/business skills first.



For the third year in a row, those daring young women (and men) of the Division of Fuel Technology participated in the Woronora River Rubber Raft Race.

Following on from last year's revolutionary, if unsuccessful, winged keel design, an even higher-tech design was developed in consultation with Lucas Heights Research Laboratories experts. Although the CSIRO craft was not the fastest in the fleet, it was definitely the best looking on the river, according to team manager Graeme Batley, who predicts a 'back to basics' approach for next year's efforts.

And the CSIRO logo balloons (organised by Glen Callaghan) were a big hit with the juniors, being issued subject to satisfactory answers to questions such as 'what does CSIRO stand for?' and 'which is the best looking raft on the river?'

Team members were Jenny Stauber, Kerrie Mann, Lisa Jones, Glen Callaghan, Greg Morrison, Gary Vaughan, Olle Nygren and Jan Dyrssen.

Letters Cont. from p.2

Dear Editor,

No doubt a great deal of energy will continue to be expended by both the pro- and anti-logo groups on the needs for, and comprehensibility of, the new Corporate logo. I nearly wrote 'our new Corporate logo' but my feelings on the logic of logos are well known.

What is of much greater concern to me and, I hope, others who aspire to communicate accurately, is the recent decision, taken it seems just as arbitrarily as that regarding the new logo, to 'Macquarie' the spelling of organization and, consequently, organize.

If our leaders choose to identify the Organization by 'nearly-naming' it Organisation, in the same way as commercial organizations skirt around use of proper nouns as trade names, then so be it. However, this gives them no right to change the spelling of organize and other-ize words.

Let's face it, if the rest of the world sees that we cannot even spell correctly why should they have any faith in our results?

Michael H Jones
Division of Mineral Products

Retirement

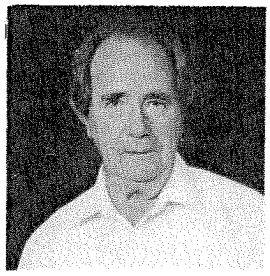
Senior research scientist at the Division of Soils in Adelaide, Mr Cliff Gurr, has retired from CSIRO.

Cliff began work with the Organisation as a junior laboratory assistant on 4 September 1940 and colleagues believe he is the longest serving member of the current CSIRO staff. 'With 48 years' service, it would be hard to beat'.

When Cliff started work he earned £94 per annum and had to work Saturday mornings too. Initially he worked on old fashioned wet chemical analysis was well as hand sieving and pipette analyses. High tech was represented by a mercury drop micro-polaragraph and recording on photographic film for trace element work.

Chief Whiteley

Dr Ken Whiteley has been appointed foundation Chief of the new Division of Wool Technology. ###



Mr Cliff Gurr

He was much involved in the early development and subsequent refinement of electronic methods for the measurement of soil moisture, including a gamma ray instrument and the now widely used neutron probe.

Cliff has many interests outside his work, but will return to the Division for at least one more year as an honorary fellow.

Another CSIRO Citation Classic

A paper published in 1976 by Dr Graeme Gatley and Dr Mark Florence, both from the Division of Fuel Technology, has joined the ranks of those CSIRO papers designated 'Citation Classics' by the Institute for Scientific Information (USA), publishers of *Current Contents*.

The paper was titled 'Determination of the chemical forms of dissolved cadmium, lead copper in seawater' *(Marine Chemistry* 4, 349, 1976).

It described the first systematic approach to the measurement of heavy metal speciation in natural waters.

A novel analytical scheme based on techniques of anodic stripping voltammetry was proposed for the measurement of seven different classes of heavy metal species. This system formed the basis of many later speciation schemes and has been widely applied by environmental chemists both in Australian and overseas.

A brief commentary is to be published in the Citation Classics section of *Current Contents*.

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

Women in Science at Rockhampton

Division of Tropical Animal Production scientist Miss Margaret Mackinnon and technical officer Mrs Heather Burrow, right, demonstrate the rather arcane science of animal sperm collection to North Rockhampton High students Sandra Gittins and Julie Holzheimer, as part of the Women in Science program.

The Division of Tropical Animal Production at Rockhampton is among many divisions helping to promote the Women in Science project.

Since the Rockhampton launch of WIS last June, staff members Margaret Mackinnon, Heather Burrow, Honey Butz and Vera Hickey have presented talks to students at North Rockhampton High School, the Range College and Glenmore State High.

The project has been met with great enthusiasm from school and College of Advanced Education representatives in the Rockhampton area.

Women in Science will be featured in the Division's display at this year's Central Queensland Careers Market Day in July.

Get set for the Black Mountain Cup

The time is fast approaching for one of the world's great sporting events. No, not the Olympic Games in Seoul, but the Black Mountain Cup in Canberra.

Now in its 12th year, this fun run is one of the premier events on CSIRO's sporting/social calendar. So, whether you want to compete as an individual or represent your division in a team of four, now is the time to start training.

DETAILS

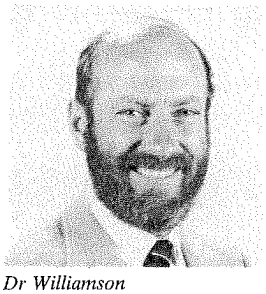
Distance: 5.6km
Location: Pye Laboratory, Canberra
Time: 12.30pm
Date: Friday, 15 July
Contact: Gregory Heath 062-46 5692
Colin Hazelton 062-46 5939

Csironet appointment

Dr Hugh Williamson has joined Csironet as a senior consultant and project manager in the professional services group. He will work on engineering and computer modelling projects for defence, public sector and related industries.

Before joining Csironet, Dr Williamson worked for the University of Technology in Sydney for 10 years. During 1987 he was seconded to the Division of Mathematics and Statistics and the ANU where he was a Visiting Fellow in the Research School of Physical Sciences.

Dr Williamson has a PhD in mechanical engineering and a strong industrial background in the metals industry. As well as teaching, he has been active in research and consulting in the areas of stress analysis, metal processing, structural analysis and engine technology.



Dr Williamson

CoResearch
No. 312 May 1988 CSIRO's staff newspaper
CSIRO AUSTRALIA

Tactical research

Have we gone too far?

The chill winds of market change said to dictate the direction of private enterprise have bypassed Australian business when it comes to research and development, and public sector R&D is paying the price.

According to the Chief Executive Dr Keith Boardman, who addressed the ANZAAS Congress in Sydney this month, in this respect the private sector has changed too little while the public sector is in danger of going too far the other way.

Although there has been some upturn in the level of business R&D in Australia in recent years, public sector research bodies like CSIRO are having to compensate for the dismal lack to R&D by the private sector, he said.

Contrary to popular opinion that publicly-funded organisations were inflexible and out of touch, in fact it was those very research bodies which have had to change the most in recent times. Not all that change has been good.

'It is in the public sector that the danger of "over correcting", taking changes too far, exists, while in the private sector, despite considerable improvements in recent years, the response of management to the implications of economic changes has been sluggish,' said Dr Boardman.

There would be few companies that have undergone the sweeping changes that CSIRO has had to face in the past few years, and the latest reorganisation was the most sweeping.

In making CSIRO much more entrepreneurial, the aim is to at least double the level of funding from the business sector over the next four years.

This will mean more contract research and lifting commercial returns, said Dr Boardman, and will place greater emphasis on joint ventures and the venture capital market. While this was desirable and necessary for the future of the Organisation and the country, the danger was in entrepreneurialism degenerating into trouble shooting for industry.

The major weakness in Australian R&D continued to lie in the private sector – not in CSIRO or other Government-funded research agencies, argued Dr Boardman. 'This weakness is taking on a new significance,' he said.

'Because of the sense of urgency over the restructuring of the Australian economy and industry, there is a growing risk that change in the public sector will be taken too far, with too much emphasis on short-term tactical research to compensate for the deficiencies that remain in business R&D.

CSIRO should not be forced to focus and direct its R&D towards the immediate needs of industry. 'Yet the pressure is there to do this, not just on CSIRO and other Government laboratories, but on the tertiary system as well.'

He said the trend was apparent in the shift in CSIRO's funding over the past few years. The Organisation's nett appropriation fell by nine per cent in real terms over the past three years, and by 20-25 per cent as a proportion of total Government outlays. External funding had increased by 40 per cent over the past 5 years.

'The inevitable result, if this trend continues, will be a marked drift towards the short-term R&D that industry in Australia is willing to fund.

'The importance of longer-term strategic research to the national economy is so great, and the case for Australia to strengthen its R&D support for all sectors of industry is so strong, that Government funding for CSIRO...should be, at the very least, maintained in real terms, and not reduced as industry support increases.'

Are these trends being reflected in the divisions? A* CoResearch *phone-around of several chiefs revealed a certain amount of dissatisfaction with the direction of CSIRO research. The following comments give an idea of the concern about the growing dependence on industry funding and the problems this can entail. The most serious perhaps is the decline of basic research in CSIRO – which companies are going to fund it? Not all division chiefs could be contacted, so the following remarks should not necessarily be taken as entirely representative, rather as a sample of opinion among senior CSIRO staff.

Safety training plays an important part in the lives of CSIRO researchers who regularly spend time at sea. In April, 14 staff from the CSIRO Marine Laboratories in Hobart graduated from the 1988 class. This brings to 71 the number of Labs personnel who have completed the certificate course since it was introduced in 1985. Subjects studied included fire prevention and fire fighting, first aid, ship and water safety and the use of life rafts, lifejackets and pyrotechnics. The syllabus is designed by the Commonwealth Department of Transport and Communications, and the course for Marine Laboratories staff is conducted by Associated Steamships Pty Ltd, which manages the oceanographic research vessel,* **Franklin.** *The four days' training is based at Tasmania Fire Service headquarters in Hobart, in the Service's training centre at Cambridge and at the Marine Laboratories.

Thor Carter's photo above shows Matthew Sherlock, Clive Stanley and Geoff Dews, all from the Division of Fisheries, taking part in the fire fighting course.

Dr Dave Koch, Chief of the Division of Mineral Products, agrees that the public research sector is being pushed too far into tactical research, to its detriment. He said the (unofficial) aim of 30 per cent industry funding within the next few years is incompatible with the aim for scientific excellence because of the short term nature of that funding. At present, his Division earns about 20 per cent of its funds from outside, and will probably reach 30 per cent without too much difficulty. But...already 60 per cent of his staff are tied up with tactical research, because in many cases industry funding is being used, not for new appointments, but for operational expenses which used to be covered by appropriation funds. Tactical projects can last for as little as three months, and average out at about 12 months. Very few last even three years. However, the long term strategic research which must underpin this project work needs the continuity of five or more years, said Dr Koch, and companies have been unwilling to fund this type of work in the public sector.

Dr Dave Mahoney, Chief of the Division of Tropical Animal Production, expressed concern about the future of Australian agricultural research as less and less money was available for long term research. His Division already did a lot of tactical work in conjunction with industry, but this was the end result of years of basic research. The long term research which needed to begin now for the requirements of the next decade and century was simply not being funded, he said. 'The technology for the year 2000 should be started now,' he said. In 1982, when the Division first started, Dr Mahoney had $600 000 available for basic research. In 1987 this figure had been eroded to $250 000, and Dr Mahoney said there was a big question mark over whether any appropriation money would be available by 1991. Australian exports were still heavily dependent on its agricultural industries, said Dr Mahoney, and yet (despite official statements to the contrary), CSIRO's agricultural divisions 'are being slowly strangled'. Dr Mahoney said his Division already received 30 per cent outside funding, and yet he was having to put off staff (19 in the past two years), with the only financial benefit to the Division being the ability to pay for budget cuts.

Dr Peter Diggle, Chief of the Division of Mathematics and Statistics, said his Division had been forced to quickly change its direction last year from being a Division mainly driven by its association with other CSIRO divisions to one primarily directed at assisting industry. This had been necessary for the survival of the Division, but there had been a cost in lower staff morale because of a prolonged period of uncertainty. However, Dr Diggle said despite financial pressures, it was vital that CSIRO protect its intellectual base and this meant maintaining an element of long term research. While his scientists were still able to carry out a certain amount of this type of research, there was a widespread perception of increasing pressure to spend time on work directed at quick results. Although his scientists didn't need expensive equipment and therefore large amounts of money to do long term research, the most precious resource for a mathematician or statistician was time, and there was less and less of this available. Changes at the Division are not over yet. On 1 July a number of staff will be transferred to the animal, plant

Cont. on p.4

From the Chief Executive

A column by Dr Keith Boardman

In his address to the first Canada-Australasia law conference, Barry Jones spoke of the great reluctance of lawyers, politicians, bureaucrats and society generally to address and make appropriate responses to the social, cultural, political, economic and legal implications of significant technological changes.

The Minister concluded that our education system with its emphasis on excessive specialisation at too early an age had much to answer for 'the rigidity in our mind set and our reluctance to accept that there may be alternative ways of tackling problems'. He said that 'the need for interaction between various intellectual disciplines has never been greater in this age of almost unprecedented change'.

I conveyed some similar thoughts in my occasional address to a recent LaTrobe University graduation ceremony. I said that science and technology make up the greatest force for change in the world today. If we as a society are to make the most of this power, if we are to manage science and technology responsibly and effectively, then we need a technologically-literate community, and use people with a background in science and technology in a whole host of occupations – business, government, law, politics, economics, journalism. I said that we ought to be thinking about an education in science and technology as more than an entry to a career in research, or teaching or engineering. It should be part of the equipment of every well-educated man and woman, and it will become increasingly an important opening to satisfying careers in all sorts of other areas.

I also took the business schools to task for continuing to neglect the central importance of technological innovation to business opportunities and industrial growth. I believe that CSIRO could play an important role by interacting with business schools and raising their awareness of the vital importance of innovative science and technology.

In my address I outlined the enormous changes that had taken place in the world of science and the science system in the past three or four decades. In the past, governments adopted a largely *laissez-faire* approach to science policy, leaving its controls and direction largely in the hands of science. That approach is changing with governments striving to improve the economic efficiency of scientific research, tightening links to industry and relating it more closely to national priorities. I said that I had no quarrel with these developments provided the changes are made wisely and not taken too far.

###

Her Majesty the Queen and Prince Philip visited the Australian Bicentennial Exhibition during their state visit to Western Australia and the Australia Post/CSIRO module was included in their tour of selected displays. I had the honour and great pleasure to provide a short briefing to Her Majesty and Prince Philip on the CSIRO module. Exhibits which particularly interested the Royal couple were the plastic bank note, especially the anti-counterfeit device, the Siroscour process for cleaning raw wool, the edible oil from linseed and the products from partially-stabilised zirconia (PSZ).

The exhibition as a whole has received a poor press, but it is proving a popular attraction in the country centres. I was impressed by the CSIRO display, and its popularity with the public demonstrates the increasing interest in science, and the important role that CSIRO can play in further boosting public interest in science and technology.

The success of the CSIRO display owes much to the local CSIRO staff who are manning the exhibit and explaining the items to the public.

###

Dr Michael Pitman has been seconded to DITAC for an initial period of 12 months as Science Adviser. As well as providing high level advice to Senator Button, Mr Jones and Dr Charles, Dr Pitman will have the important task of improving the linkages between the government, scientific community and industry. Michael's distinguished career and achievements and his many links with the scientific community make him an ideal choice for the position. The scientific community has responded enthusiastically to the appointment. Dr Pitman also has been appointed to the interim Australia Research Council.

Cont. on p.7

Letters to the Editor

Dear Editor,

The irony of watching our Chairman at his recent press conference [at the Press Club in Canberra] comment that one of his mates was not out of touch with his grass roots could not have been lost on many members of this Organisation. The significance of the timing of the press conference (I assume called for the legitimate purpose of our Chairman to communicate our achievements and raise the profile of science) only a few days before a State election cannot also be lost.

Morale and motivation in many areas of CSIRO has currently ebbed to an all time low. Massive change, a history of no training, an inability to implement previous reviews, staff reductions, employment uncertainty, ongoing budgetary restraint and the further elevation of HQ positions amongst an ever thickening fog of administrative rearrangements are all contributory factors. Staff could rightly expect that the nationally televised question time of our Chairman's press conference would not be a venue to leave science in the back seat for the communication of political reassurance.

If science remains isolated and separate from the national interest then we have little hope of turning the current tide. It should be our collective objective to take every opportunity to turn that tide.

D Richmond
AAHL

Dear Editor,

A number of us in Plant Industry read with interest A K Sutherland's letter in the March edition of *CoResearch* and also your footnote response, in which he questioned whether or not Jack Cummins is 'the oldest living CSIRO appointee'. We in turn challenge your statement that 'he is the earliest CSIR appointee still alive', if in fact you are correct in reporting that he was appointed in 1929.

Two of this Division's earliest research appointees, Drs J G Bald and H R Angell, are still living. Both were appointed in 1928. Bald, who is 83 years of age, commenced in April, while Angell, who commenced in December of that year, is 94.

Dr Angell resides directly opposite the Headquarters entrance in Limestone Avenue where he has lived to the best of my knowledge, for the past 40 years or more. Dr Bald lives in Santa Cruz, California.

Perhaps you could clarify for readers just who is the earliest CSIR appointee still alive, although I concede it might be difficult to establish this with any degree of certainty.

Paul Brown
Divisional Secretary
Division of Plant Industry

Editor's note: The controversy rages! CSIRO's Deputy Archivist Mr Michael Moran sent* CoResearch *the following note: 'Dr J W Evans of...Bellevue Hill, Sydney, aged 82, joined the Division of Economic Entomology in 1928!' Incidentally, Mr Cummins worked for Dr Boas at the Division of Forest Products from 1929, but in fact had been on a CSIR senior studentship since 1927. He will be 86 this year.

Letters cont. on p.6

Queen confers new forestry award on CSIRO scientist

Dr John Turnbull, a principal research scientist at the Division of Forestry and Forest Products, has been awarded the inaugural Queen's Award for Forestry.

Dr Turnbull, who is attached to the Division's Canberra-based tree resources program, is currently on secondment as forestry program co-ordinator for the Australian Centre for International Agricultural Research (ACIAR).

His award, founded by the British Commonwealth Forestry Association, takes the form of a fellowship for travel aimed at assisting forestry in other Commonwealth countries. It was presented to Dr Turnbull by the Queen at a ceremony at Melbourne's Government House on 29 April.

During his career, Dr Turnbull's work has ranged from conducting Australia-wide seed collecting programs to carrying out studies on the ecology and genetic variation of native tree species.

In recent years he has committed much of his time to initiating and co-ordinating ACIAR's collaborative forestry projects between Australian scientists and researchers in developing countries. He also has edited an ACIAR publication, *Multipurpose Australian Trees and Shrubs – Lesser Known Species for Fuelwood and Agroforestry*, which has gained international acclaim.

Below, Dr John Turnbull receives his award from the Queen in Melbourne.

Honorary degree for Dr Boardman

The Chief Executive, Dr Keith Boardman, has received an honourary degree from the University of Newcastle.

At the degree convocation on 30 April, Dr Boardman received the Doctor of Science *honoris causa*.

He has held a Doctor of Science from Cambridge since 1974.

312-1988

A Matter of Opinion

This months's point of view column comes from Ms Jennifer Pringle-Jones, communication officer at the CSIRO Marine Laboratories in Hobart. She is employed by the Division of Oceanography, but also works for the Division of Fisheries.

Mention 'communication' in CSIRO a few years ago and a shudder ran through many ranks. Fortunately, in most instances, the Organisation's communicators are no longer regarded as second class citizens. In fact, it's becoming increasingly obvious that the divisions with good communicators are the ones that are reaching wider audiences and achieving the most success in creating awareness of the benefits of divisional research.

I guess one of the main things I have had to come to grips with during my two years with CSIRO is the *variety* of communicators and the *diversity* of jobs. It's no wonder that scientists are sometimes confused about the role of a communication officer. Even the title conjures up images of someone involved in two-way radio operations or computing. I find it much simpler to introduce myself as a journalist. At least people know that journalists write something!

Generally, I find there has been an increase in the number of scientists recognising the advantage of using a professional communicator to get their message across to target groups

Sometimes, though, it's like going six steps forward and seven backwards. Whilst the communicators appear to be succeeding in promoting the research of divisions, they are being cut off at the knees when it comes to central support services. I am just one of the growing band of staff who are already feeling the effects of closure of the CSIRO printing centre. Outside the Sydney-Melbourne environs it is very difficult to find printers who can handle our specialised requirements in the time and for prices that even remotely compare with those offered by this centre.

On numerous occasions I have used the resources of the media liaison group to assist in handling national media events and other interstate activities on behalf of the divisions for which I work. Now, we are to have a much-diminished central media group, plus institute communicators. These pyramid situations invariably lead to a breakdown in the one-to-one personal communication.

Without divisions there is nothing in CSIRO. This point cannot be made too strongly or too often. But, while divisions are having to produce and pay more for their communication activities (e.g. printing) they are receiving less support from headquarters.

Many communicators feel that the introduction of communication grants for just two years was worse than not having them at all. The fact that the grants were withdrawn after a considerable amount of time had been spent on the preparation of applications for the third year made the matter even worse. The grants enabled us to broaden our horizons and aim for activities that were beyond the normal resources of divisions. As one communicator said, 'the scheme enabled us to bid for external funds in the same way as our research colleagues'.

We are being urged by institutes to hold open days. This is a costly exercise if it is done properly, and requests for events of this type need to be accompanied with financial support. We are expected to help row the corporate boat, but, at the same time, must paddle the divisional canoe. I believe we can do this, but we need help from those holding the tiller if we are to steer a steady course.

Irrespective of how many bureaux, units or centres are established to handle information and public communication, it still comes back to divisional communicators working at the grass roots level to sow the seeds in spreading the work about CSIRO research and achievements.

Bug off

The Division of Entomology at Black Mountain. Surely a in Canberra has a problem division full of insect experts with insects – in fact you could can come up with a solution say there are some bugs in the which doesn't harm the insect system. There is a cockroach cultures necessary for research. plague in the south wing of the* CoResearch *will keep you Division's venerable building posted.

New genetic research

Breeding the cattle of the future

The Division of Tropical Animal Production at Rockhampton has embarked on a new field of research which promises to drastically alter the ways in which animals are bred in the future.

The project aims to develop DNA probes which will allow direct detection of genes for economically important traits in animal production.

By doing so it will be possible to screen animals for both desirable and undesirable genes at any time after conception. Therefore the genotype of either embryos, newly born or adult animals can be determined without depending on the expression of the genes.

This is particularly useful for sex limited traits such as calving rate and milk production for which males carry genes but never express them.

Breeders therefore will be able to make selection decisions more accurately and at an earlier age.

Initial studies are being directed at the genes for Pompe's Disease and horns in cattle, and the Booroola high fecundity gene in sheep.

However, in future, research will identify major genes for complex or polygenic traits such as parasite resistance, muscle growth, fat metabolism and reproduction.

The basic approach requires the development of DNA markers which act as flags on the chromosomes. With a panel of such markers it's possible to follow the segregation of chromosomal regions within families.

If a marker cosegregates with a particular gene, it is physically close or linked to that gene. Having identified a marker for a particular gene, it's possible, using molecular biology techniques, to clone the gene, develop a direct gene probe and determine the primary gene product.

This overall strategy is known as reverse genetics since the gene product is worked out after cloning the gene, the reverse of the traditional approach.

The method has been successfully applied to cloning important human genes such as those for cystic fibrosis, Huntington's disease and Duchenne muscular dystrophy. Having cloned a gene, it's possible to study its structure and regulation. This may open up new ways of manipulation via gene modification, gene transfer and immunisation.

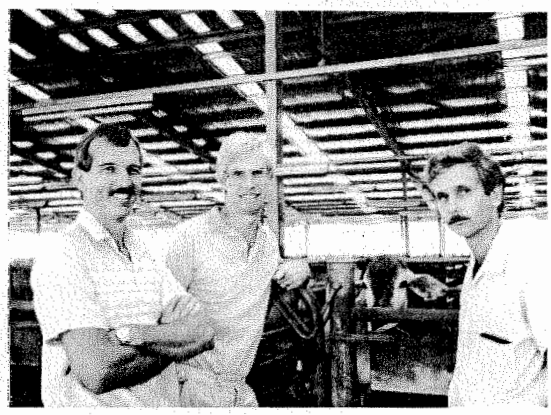
Leader of the research team is Dr Jay Hetzel. In 1986/87, he spent nine months at the Federal Institute of Technology, Zurich, working on new systems of DNA markers and gene mapping. Dr Hetzel has recently been joined by Dr Roger Drinkwater from Adelaide, and another scientist will become part of the staff later in the year.

In addition, a visiting Swiss scientist with gene mapping skills will join the team in August. The combined team will have considerable skills and expertise in genetics and molecular biology.

Although large scale application of the research is well into the future, there are also some industry applications in the short term. The Australian Meat and Livestock Research Corporation is providing substantial funding as well as the genetic resources of the National Cattle Station, 'Belmont'.

The next phase of the project will be to establish a national program to develop genetic maps of the major livestock species i.e. cattle, sheep, pigs and chickens. The program, to be centred at Rockhampton, will consist of a series of projects throughout Australia to rapidly produce genetic maps for use in animal genetics research.

It's proposed to establish a network of research groups in which gene mapping via genetic linkage studies or physical methods is closely co-ordinated. Use of a limited number of reference families will allow pooling of data and the efficient computation of genetic maps. This initiative will establish Australia at the forefront of molecular genetics research of our livestock species.



The research team, left to right, Dr Roger Drinkwater, Dr Jay Hetzel (project leader) and Mr Bill Syden, pictured outside the animal yards at the Tropical Cattle Research Centre at Rockhampton.

Women in Science project gets outside funds

The Government-run Curriculum Development Centre has granted $10 000 to CSIRO's Women in Science program for this financial year.

According to Women in Science program co-ordinator Mr Ross Kingsland, the money will be spent on upgrading materials accompanying the CSIRO video shown to school students before visits by women scientists and technicians.

The discussion pamphlet and other material will be given a more effective and appealing presentation, and a person will be contracted to undertake this task.

The W-i-S project has been running for two years. It aims to present role models to students to show that women can study and work in science as well as men. In particular, it encourages girls to continue with their maths and science at senior school level.

Mr Kingsland said the program appears to be having some impact – he has been told of a number of students changing their senior school electives to science subjects as a result of the CSIRO presentation followed by discussions with teachers and parents.

Direct result

For example, at Coomoora High School in Victoria, there was a jump in female participation from 0 per cent to 35 per cent in physics and from 11 per cent to 50 per cent in chemistry as a direct result of the visit by CSIRO women.

Applications for further grants from the Curriculum Development Centre have been forwarded.

The Great Science Citation Classic Competition

An article in the April issue of *CoResearch* (No. 311, p. 8) on the designation of a paper by Drs Graeme Gatley and Mark Florence as a Science Citation Classic has prompted a vigorous response from our readers. The comments have ranged from 'what's a Science Citation Classic?' to 'so what, our Division has several'.

To understand what a Citation Classic is, it is necessary to understand how Science Citation Indexing works.

This is an area of bibliometrics pioneered by Eugene Garfield, the multimillionaire proprietor of Science Citation Indexes.

Every week the reference lists of articles published in several thousand scientific, medical and social science journals are recorded and tabulated into a computer generated index which relates the cited author and reference to the citing author and reference.

Clearly, articles which are helpful (or wrong) will be cited more frequently than articles which are out of the mainstream, or trivial.

Each article thus accumulates citations and when it reaches a predetermined number it is deemed a 'Citation Classic'.

Garfield notes that 'Citation rates differ for each discipline. The number of citations indicating a classic in botany, a small field, might be lower than the number required to make a classic in a large field like biochemistry. The relative impact of each classic can be seen by considering that the average 1973 article published in an SCI-covered source journal was cited approximately 10 times between 1973 and 1982. Citation counts include data from the 1955-1964 SCI cumulation when relevant'.

On the second point, to give all divisional publicists a fair go, *CoResearch* announces the publication of a consolidated list of CSIRO Citation Classics in the next edition.

Divisions are invited to forward details of all their 'Classic' papers by **Friday, 2 June.**

Report from the Himalayas

News has come via runner and aeroplane of the Centre for Environmental Mechanics' intrepid mountaineers, John Finnigan and Will Steffen, who are now climbing in the Himalayas (see *CoResearch* 310, p.8).

After travelling 300 miles south-east of Kathmandu by truck, the party of 10 climbers from the ANU Mountaineering Club's Baruntse Expedition and a team of 75 porters, started a 15 day walk up the Hongu River Valley. Their initial goal is to attempt to climb Mt Baruntse, a 7220m high mountain first climbed by a New Zealand team led by Sir Edmund Hillary in the early 1950s.

In their first letter back to the Centre they reported a very easy progress through rainforest, rhododendron glades and then onto alpine meadows before traversing 11 000′ ridges. With three hot meals a day and cups of morning tea brought to their sleepingbag side, the trip so far has conformed to the Alpinist rule of 'for the first week take it easy, and then slacken off'.

On 12 April the party was approaching the 19 000′ Meru Pass, the last major pass before descending to the proposed base camp site. Already the mountains appeared huge, and Will Steffen reported terrific views of Everest, Lhotse and Makulu, three of the great mountains defining the Tibetan-Nepal border and forming an amphitheatre around Baruntse.

STOP PRESS

Latest report (14 April) is of storms and severe weather conditions on the approach to the Meru Pass. Many of the porters have 'gone home' leaving the remaining 25 expeditioners with 75 loads of food and equipment on the wrong side of the pass.

International audience for microBRIAN

MicroBRIAN, the CSIRO-developed microcomputer-based image processing system, will get considerable international exposure when it is displayed next month in China at a major water technology meeting.

Ms Barbara Harrison from the Division of Water Resources will demonstrate the system at the WaterTech China 88 Exposition and Congress in a bid to capture the interest of overseas organisations.

The relatively low cost and flexible package provides objective monitoring of many types of resources and geographic features – such as crops, forests, soils and coastline.

Ms Harrison's trip has been made possible by an Academy of Science exchange grant.

Already one microBRIAN system has been sold in China – to the Northwestern Institute of Soil and Water Conservation at Yangling in Shaanxi Province. A scientist from the Institute had spent a couple of years at the Division and was aware of the capabilities of microBRIAN.

That unit will be used to map land use and monitor the serious soil erosion problem in the Loess Plateau region.

Ms Barbara Harrison has taken microBRIAN to China.

China is an important potential market for such systems because of its area, population pressures for efficient resource usage and current technological growth. MicroBRIAN is particularly suitable for the conditions there because of its cost (less than comparable systems from the United States), flexibility and functions tailored to remote sensing data.

About 50 microBRIAN units have been installed over the past two years. Most of these have been for use in Australia, although some have gone overseas. In addition to the one in China, Fiji has one and five have gone to the ASEAN countries (under an ADAB scheme). Saudi Arabia is now making arrangements to buy the system.

Direct revenue to CSIRO from sales of microBRIAN has been over $150 000 so far.

MicroBRIAN can be used for processing any picture numerically. Its principal application is in processing data from satellites, but it can also deal with aerial photography, and it's in this area that it could have a major use in China.

The system has been energetically commercialised through the services of Sirotech and Microprocessor Applications (MPA), a Melbourne based company which is actively marketing microBRIAN around the world.

Tactical research **Cont. from p.1**

and environmental institutes where they will continue to provide statistical input to research staff. The remaining staff will form the core of a much more industry-directed division which will be about two thirds its current size.

Dr Geoff Grigg, Chief of the Division of Biotechnology, said in this area of science and business there was a strong emphasis on the importance of basic and long term strategic research. Companies who sought the benefits of research in biotechnology mostly believed tactical research was best done within the companies, and the longer term research in big research organisations like CSIRO. At present, his Division earns 30 per cent of its funding from outside (not including funding of company employees working in the Division on collaborative projects). Some of this has included a 'fee' which goes towards strategic or fundamental research. Biotechnology is a CSIRO 'priority area' and its appropriation funding is perhaps higher and more certain than for non-priority areas. It is a relatively new field and its science base is very immature. Pushing back the scientific frontiers often results in totally new technologies, and therefore basic research can be very lucrative for companies. This has been recognised by, for instance, Merck, Sharpe and Dohme, Hoffman La Roche and Hoescht, which are heavily committed to fundamental research. Dr Grigg said it was his hope the Division could support the growth of Australian-based businesses which would use the developments in biotechnology uncovered by fundamental research. Already it has been closely involved in the establishment of five new biotechnology related businesses.

Dr John Possingham, Chief of the Division of Horticulture, said his Division already did a lot of applied, problem-oriented research and he wasn't too concerned about the swing in CSIRO research priorities. Certainly he and his scientists were more actively seeking external funds, and they were 'relishing the independence' gained from securing their own research money. However, he made the point that it was difficult when a scientist had to use part of his precious research grant to employ an existing staff member. This did release an appropriation-funded salary for at least a short time, which eased the pressure on the rest of the Division, he said. However, the difficulty in making indefinite appointments was a drawback because of the short term nature of the funds. Dr Possingham believed in the end the principle of 'user pays' would apply to users of his Division's research (and other divisions) and the unofficial aim of 30 per cent outside funding would eventually near 100 per cent. The problem would then lie with funding the necessary basic research, and Dr Possingham suggested a federal pool of money to which CSIRO scientists could apply.

Big turnout for forest products golf day

The annual Forest Products Golf Day was held in March at Cranbourne Golf Club in ideal weather conditions. Seventy golfers from the timber industry and CSIRO divisions competed for the prestigious Muncey Cup, a 4BBB stableford event for official teams of two pairs, and the Andy Stashevski Memorial Shield, an individual stableford event open to all players. The program consisted of eight events with excellent trophies sponsored by ACI-Timber, Victorian Sawmillers Association, Sirocredit, Amcor and Paul Knightly's Discount Gifts Store. Above, left to right, the Appita team of Don Lampard, Reg Brown, Grant McGregor and Frank Martel, which won the Muncey Cup.

Bicentennial display

CSIRO out among the people

'It's good to see CSIRO out among the people', 'I never knew that CSIRO did this sort of thing', and 'it's good to see CSIRO doing something useful'.

These are some of the many comments CSIRO staff in Western Australia have been hearing over recent weeks as they spent time assisting with the CSIRO display that is part of the Australian Bicentennial Exhibition which is now touring the country.

The last remark caused the speaker some momentary embarrassment, but he went on to explain that, while he was familiar with CSIRO research in the agricultural area he had not heard of some of the industrially-oriented developments – in this case Scrimber and PSZ.

The exhibition drew big crowds wherever it set up and has proved a very good way for CSIRO to show off at least some of its wares to audiences that it might not often reach.

Out of a total CSIRO staff in WA of about 300, 75 have spent, or will spend, time on the CSIRO display by the time it leaves the state. Those involved to date are enthusiastic about the public response to CSIRO and there is a general feeling of pride in being able to represent the Organisation in such a public venue and in such prestigious company.

The total exhibition was officially opened by Queen Elizabeth in Perth on 23 April and during a short inspection of some of the exhibits the Queen and official party inspected the CSIRO display. CSIRO Chief Executive Dr Keith Boardman met the Queen and showed her the various items that comprise the display.

Mr Deane Hutton, star of Channel 9's Curiosity Show (who also featured in CSIRO's presentation at the Royal Melbourne Show last year), entertained audiences of children and adults with the help of a little liquid nitrogen and an easy relaxed style. At one stage a sizable crowd stood in light but persistent rain to watch one of Deane's presentations.

Overall, the CSIRO exhibit was very well received by the large number of visitors at the different locations. In Kalgoorlie the total attendance was 72 per cent of the town's population, while in Albany the total was 110 per cent of the population – a lot of people from the surrounding area also came to have a look. On one day in Perth 12 000 people came through the gates.

A sample of Scrimber proved to be extremely useful since the many interested people were able to feel it and examine it closely or, in the case of a wood-turner, pull out a pocket knife and cut a small piece from it to see whether it might be turned on a lathe. The verdict was that he felt it would be suitable for turning.

Samples of some other items would have been handy if only to allow people to get their hands on the particular item.

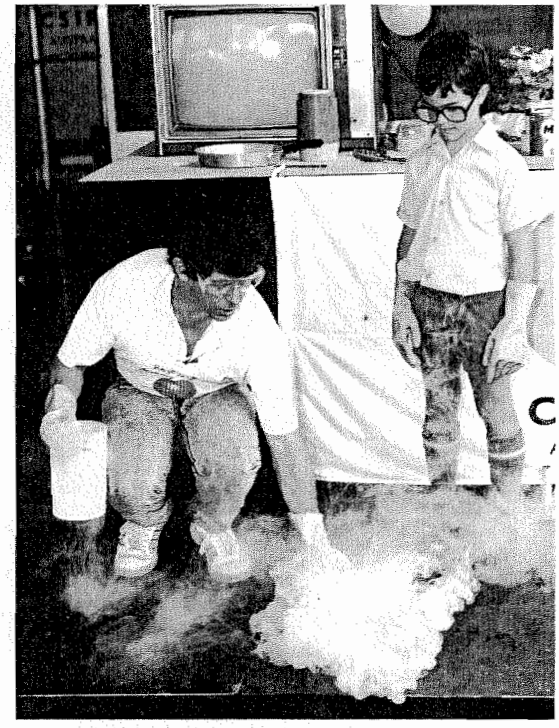
A lot of people asked for handout material – a brochure or leaflet – and this is something that should be looked at before the exhibition gets much further on its journey around Australia. It would also be useful to spell out in full, somewhere on the display, the words that make up the acronym CSIRO. There is ample room to do this and a number of people, while knowing what CSIRO did, were uncertain what the letters represented.

At times when visitors spent time talking more widely about CSIRO's work, they often expressed surprise at the range of work carried out in the Organisation, and showed particular interest in the divisions of Human Nutrition, Food Processing and Construction and Engineering.

The Bicentennial Exhibition is well worth a visit, and CSIRO is fortunate in having such an opportunity to show its work to so many people, particularly in rural Australia.

Meanwhile, in Geelong the Queen and Prince Philip viewed a CSIRO display which was one of the activities of Wool Week. The display, assembled by the Division of Wool Technology, featured two major advances by the Division – its unique fluffy and light wool blend quilt filling and the scouring technology package, Siroscour.

Divisional staff who manned the display and met the Royal party were Mrs Maria Babaniaris, Mrs Bernadette Lipson, Dr Jock Christoe, Dr Geoff Naylor and Mr Jack Finlay.



Above, Deane Hutton's Science Show at the Exhibition, in which he used liquid nitrogen to freeze everyday articles, food, flowers, rubber, etc., and demonstrate superconductivity. It drew big crowds at every session.

Photo: W van Aken

New institute appointments

Many senior institute appointments have now been finalised, and are listed here with contact numbers:

INSTITUTE OF INDUSTRIAL TECHNOLOGIES

Director:	Dr Colin Adam	03-542 2897
Manager, planning, policy and evaluation:	Dr Tom Spurling	03-542 2894
Manager, financial & human resources:	Dr John Yates	062-48 4510

INSTITUTE OF NATURAL RESOURCES AND ENVIRONMENT

Director:	Dr Roy Green	062-48 4614
Manager, policy planning:	Dr Andrew Pik	062-48 4519
Manager, finance & human resources:	Mr Bob Garrett	062-48 4547
Manager, public affairs & communication:	Ms Wendy Parsons	062-48 4615

INSTITUTE OF MINERALS, ENERGY AND CONSTRUCTION

Director:	Dr Alan Reid
Manager, planning, policy and evaluation:	Ms Christine Astley-Boden
Manager, financial & human resources:	Mr Peter Bosci
Personal assistant to Director (acting):	Ms Wendy Hossack

At present, the main telephone number is (02) 887 8658, but the number will change when IMEC staff transfer to the Sydney corporate centre at what was previously the Materials Handling Bureau.

INSTITUTE OF ANIMAL PRODUCTION AND PROCESSING

Director:	Dr Alan Donald	02-660 4411
Manager, planning and policy:	Mr Alan Charles	062-48 4529
Manager, rural industry relations (a shared position with the Institute of Plant Production and Processing):	Dr Keith Dash	02-660 4411
Manager, finance & human resources:	Mr John Bastow	02-660 4411

INSTITUTE OF INFORMATION AND COMMUNICATION TECHNOLOGIES

Director:	Dr Bob Frater	02-887 8220
Manager, policy and planning:	Dr Ian Elsum	062-48 4421

Still to be appointed: business manager and administrative officer

INSTITUTE OF PLANT PRODUCTION AND PROCESSING

Director:	Dr Ted Henzell	062-48 4613
Manager (resources):	Mr Chris Thurlow	062-48 4511
Manager (planning & evaluation):	Mr Tim Healy	062-48 4512
Manager, public affairs & communication:	Mr John I'Ons	062-48 4582
Manager, rural industry relations:	Dr Keith Dash	02-660 4411

The Executive Committee

Summaries are now available to staff of matters considered by the Executive Committee.

The Executive Committee is chaired by the Chief Executive and comprises, in addition to Dr Boardman, the six Institute Directors and the Director, Corporate Services. It meets each month in a variety of locations associated with divisional sites.

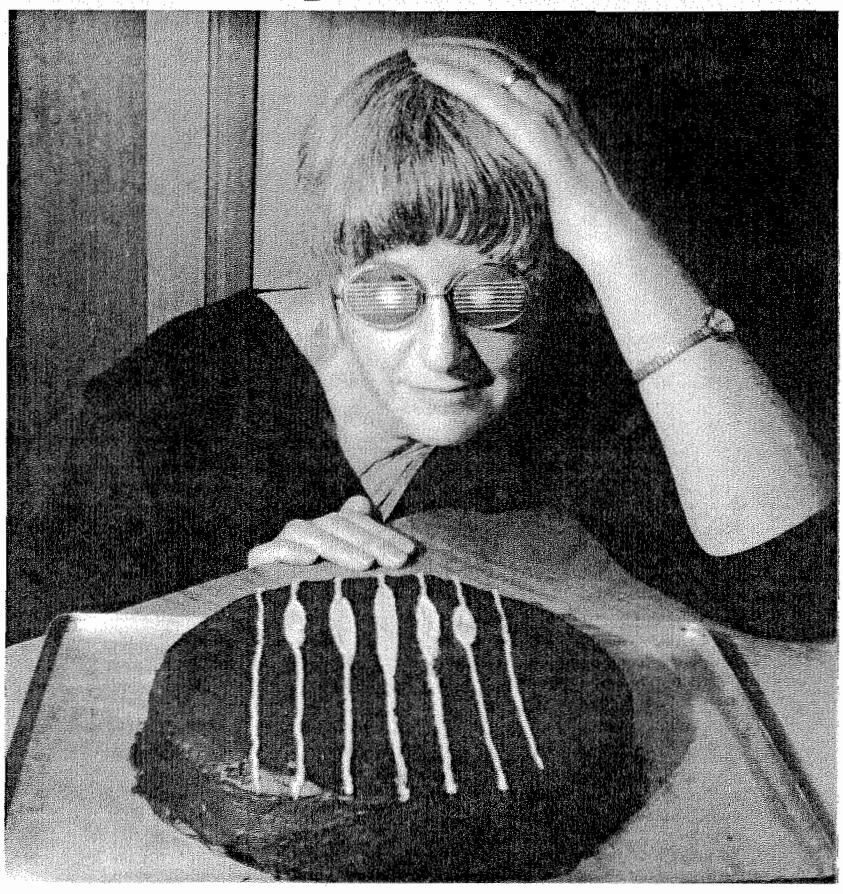
The Committee initiates policy development and decides procedures for implementing policies determined by the Board. It has responsibility for determining management policies and practices for research, finance, human resources, information services, public relations, technology transfer and commercialisation.

Information about the matters considered by the Executive Committee is now being made available to staff as a summary of the Committee meeting topics. Hard copy is distributed from HQ to all sites within a week of the meeting. The summary also is available on Telecom's electronic mail/bulletin board service, Keylink T. This service is available to anyone in CSIRO with a terminal capable of accessing the AUSPAC network.

For registration as a Keylink T user contact Jenny North, Manager, Corporate Communications, on 062-48 4545. For information about the Executive Committee contact the Manager, Secretariat, Office of the Chief Executive (Geoff Wines) on 062-48 4124.

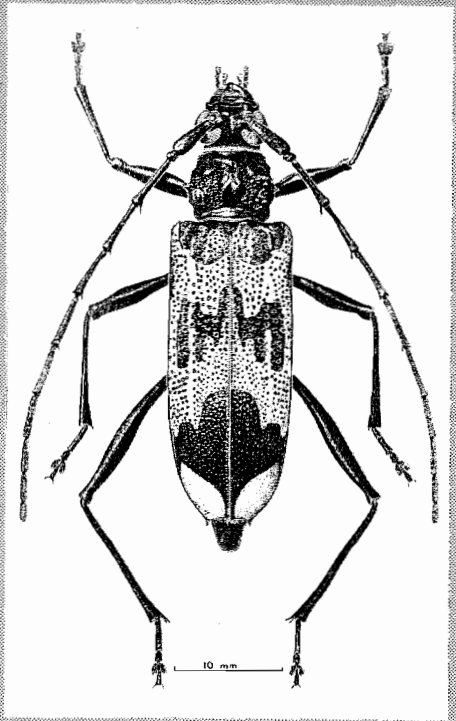
312-1988

Blinded by the lines...



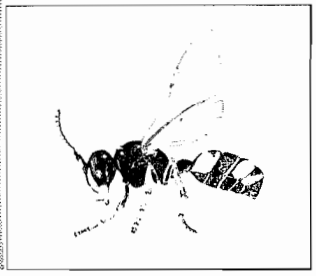
What can it all mean? CoResearch *received this photograph anonymously. Obviously the logo-shuttered glasses have affected this lady's ability to apply straight lines to the cake. But who is she and what is she trying to say? Surely it can't be that CSIRO is trying to have its cake and eat it too. A FREE mention in* CoResearch *to the person who has the answer.*

Amateur biological drawings displayed at Ento



The Division of Entomology last month displayed entries in the Australian Entomological Society's annual Biological Illustration Competition. It is a condition of entry that the competitors be amateur, and in fact many entrants are students. The winning entry, pictured left, was by Mr E Turak from New South Wales, who won $300. The second prize entry, pictured below, was by Mr Michael Lewis who won $100. The Society is a non-profit association which aims to advance and disseminate entomological knowledge, particularly relating to Australian fauna. It was formed in 1965 and now has about 730 members of whom three quarters are professional and one quarter amateur.

Photos of the drawings were taken by John Green at the Division of Entomology.



Letters **Cont. from p.2**

Dear Editor,

Let's celebrate! The magic wand has been found, the tool to solve all problems of industrial relations. Workers rejoice! Shangri-la is close. Happy faces all around, even on Karl Marx's face a faint smile. The magic wand is called Performance Review and Development and it works like this: watch a video (an excellent soporific), fill in a form, have a chat with your supervisor, retire to your ivory tower or dark corner. This process will be repeated 12 months later, perhaps with some refinements. And there is some added fun: you may, if you wish, burn part one of the form and even a TV-type rating system has been suggested. At last bliss on the shop floor.

The PRD program is ludicrous and smacks of school exams and buck-passing. The inventor of this procedure is some charlatan such as an industrial psychologist or a failed sociologist or a management consultant or a so-called human material expert, all of them notorious manipulators of statistics, jargon and several other pseudo-scientific methods such as opinion polling.

The claims made in the accompanying pamphlet as to the benefits of this program are fanciful to say the least. I would describe them as preposterous. To make myself clearer I maintain the following:

(a) *No* benefits will flow from PRD.

(b) The worker's understanding of the job and his/her performance will *not* be enhanced by the program.

(c) The program does *not* encourage open communication between worker and supervisor.

(d) Job satisfaction and morale will *not* improve.

(e) The program will in *no* way help the Organisation's planning and performance.

(f) The program is a red herring to divert from managerial failings and incompetence.

(g) The program is a thinly disguised stick. The onus is as usual on the worker to show that he/she is worth his/her salt.

Dear manager/manageress, there are simpler, more effective and more conducive ways to assess staff performance and to reach the Organisation's goals while maintaining a harmonious working climate. They include:

(a) Careful study and discussion of quarterly and progress reports. They contain the *objectives* and show the *progress* that has been made.

(b) *Regular* and *open* exchange of ideas, thoughts, personal matters, etc., between worker and supervisor.

(c) The *Chief* should occasionally appear on the shop floor to discuss matters of concern with his staff.

The PRD program is useless and should be thrown out immediately. There is no point in refining it. Glossy forms and pamphlets are of no value whatsoever in industrial relations. Forms are intimidating and impede open communication. Talk to each other instead. Save some paper, save some toes. Stamp out the PRD filing cabinet.

A final question: Why is senior management so gullible?

Dagwin Elsner
Port Melbourne

BES saves division money

The Division of Water Resources has found a way to save money by establishing a database of its own publications. The easily accessible and inexpensive system is called the Bibliographic Enquiry System (BES).

Data on BES has been downloaded from the AUSTRALIS CSX database of all CSIRO publications, which the Division found was too costly for regular searches of its own publications.

The average search on AUSTRALIS costs at least $10, and when this service was being used a number of times a week, the costs added up.

Ms Sara Monro who works in the Division's liaison office was responsible for establishing BES. With the help of AUSTRALIS officer Virginia Westwood, she has so far downloaded 2700 entries – just about the entire divisional publication list for all its locations.

The Division found Scimate software, produced by the Institute for Scientific Information in the United States, was ideal for the job. This inexpensive and flexible software is user friendly and IBM compatible, and cost about $US300.

In addition, the access time on AUSTRALIS required to download the data cost about $200. However, the money saved in the long run by the Division will easily offset this initial cost.

Apart from allowing ready access to data on Divisional publications, the system also can list a variety of hard copy information held by liaison officer Mr Peter Martin, which he has found useful for answering enquiries from the press and the public over the years.

To load this data on the system (a time consuming task) a library studies student from the Canberra College of Advanced Education helped out.

Other divisions may be interested in establishing their own publications database. Ms Monro (who will be leaving the Division in July) has documented the stages she went through in creating BES, and this information is available to divisions.

In addition, AUSTRALIS is happy to assist divisions wishing to create similar databases.

312-1988

Forage legume

Albizia reveals its qualities – and some surprises

Australia's plant world is full of surprises. Even apparently mundane plants may yield new facts and possibilities when researched.

For instance, a CSIRO scientist in Townsville has uncovered some interesting things about the tree legume *Albizia lebbek*, which abounds in Queensland.

Dr Brian Lowry from the Division of Tropical Animal Production is based at the Davies Laboratory which has a fine specimen of *A. lebbek* (also known as siris), and he became interested in the tree because 'it was there'.

Firstly, it has properties which could make it an important forage plant for graziers; and secondly, Dr Lowry has discovered extraordinary behaviour by black fruit bats (*Pteropus alecto*) feeding on siris.

His work on the forage potential of the tree is another step towards finding a tree legume suitable for northern graziers.

Although some existing forage trees are used in Australia, there have been virtually no deliberate plantings. However, they could be extremely useful, particularly during times when other types of feed for stock are scarce.

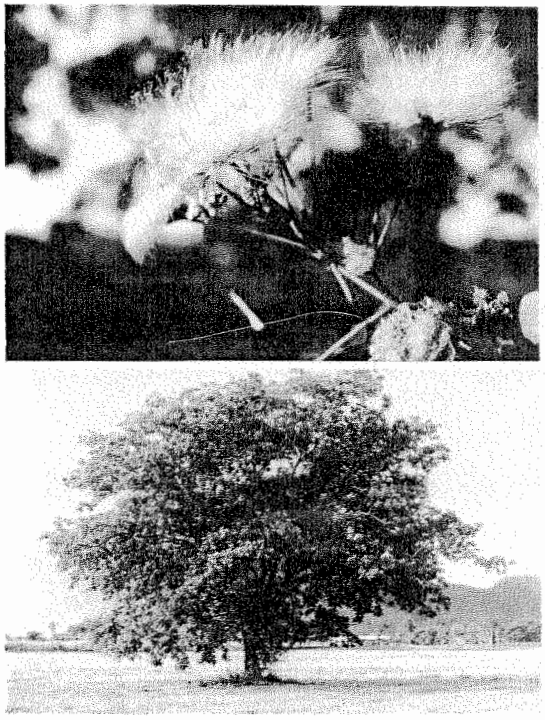
The remarkable thing about siris is that it does not have to be browsed by the animal. During the dry season, the time when supplementary feeding is often necessary, the tree drops leaves, flowers and pods in sequence. All are useful feeds. According to Dr Lowry, the quantity and quality of the flowers, in particular, was quite unexpected and previously unreported.

In addition, it appeared that the tree canopy had a positive effect on grass production at the base of the tree, unlike many other trees which tended to inhibit grass growth.

In the north, pasture improvement has mainly been through the breeding or introduction of grasses and herbaceous legumes. However, a woody legume capable of withstanding seasonal drought as well as providing shade and supplementary feed could be a valuable component to the pasture.

So far, only *Leucaena* has been actively promoted to northern Australian graziers as a browse species. Although the toxicity problem with *Leucaena* has now been solved, it still is somewhat limited in where it can be planted and now also faces attack from a particular bug. *Leucaena* has very great potential but would be used in a very different way from siris.

Dr Lowry conducted experiments on the usefulness of siris on sheep at the Lansdown Research Station not far from the Davies Lab.



Albizia lebbek *shows great promise as a forage legume for northern graziers. It is also consumed in rather an interesting way by black bats. The top picture shows the* A. lebbek *flower, while below is an example of the tree itself in Townsville.*

Merino sheep were kept in metabolism cages and fed siris leaves, pods and flowers alone. They thrived, and appeared to find the food palatable.

Dr Lowry concluded that the tree was well suited to the present pastoral system and once established out of the reach of cattle would require no further attention, would be impossible to overgraze and would be more drought resistant than grasses or herbaceous legumes.

Dry matter production would be independent of grazing as the feed would be supplied through the natural fall of leaves, flowers and fruit. However, cutting green material during a drought or as a high quality feed for weaners would always be an option.

'Results so far are too preliminary to allow economic analysis, though at this stage it seems legitimate to believe that siris offers outstanding prospects for improving animal production in an environmentally benign way,' said Dr Lowry.

His other siris research involved fruit bats, and resulted in the discovery of a unique type of feeding behaviour.

The fruit bat appears to obtain considerable nourishment from siris leaves but makes no attempt to deal with the high fibre content of the leaves. It does this by expelling all the fibre from its mouth once it has extracted the 'goodness'.

Herbivores have various mechanisms in their digestive tracts for dealing with the high fibre content they necessarily have to ingest to get sufficient nutrients, and this involves passing the fibre through the digestive tract. But this little fruit bat neatly avoids having to cope with fibre by not swallowing it in the first place.

Dr Lowry observed black bats feeding on siris leaves during the dry season from mid-April to mid-September, during which time only fully mature leaves were available.

The bats would munch on the leaves, extracting what protein they needed, then expel elongated, fibrous pellets about 17mm long by 11mm wide.

Dr Lowry found that the attraction of siris was its relatively high protein level, especially as the diet of fruit eating bats was chronically lacking in protein.

Although much is known about the selective feeding patterns of various invertebrates, Dr Lowry believed it was the first time such partitioning of leaf material had been observed among higher animals.

Explainers needed for National Science and Technology Centre

CSIRO staff living in Canberra have the opportunity this year to become personally involved with a new educational centre and tourist attraction.

Explainers are now being sought to cope with the extra demand when the popular Questacon 'hands on' science exhibit becomes part of the National Science and Technology Centre which will soon move into its new multi-million dollar home next to the National Library.

The Questacon, Australia's first interactive science centre, has been operated by the Australian National University since 1980. Much its success can be attributed to its explainers, a dedicated team of part-time staff.

The explainers show visitors how the exhibits work, talk informally to visitors about the exhibits, encourage a 'hands on' approach, provide general tourist information about Canberra – in short, they do all they can to ensure visitors enjoy the Questacon as much as possible.

A small honorarium is paid so explainers are not out of pocket, and roster times are arranged to suit individuals – from a few hours a month to several half days a week.

With the expansion of the Questacon when it merges with the National Science and Technology Centre from October, more explainers are needed.

To be an explainer you don't need a formal science background (though it helps). You do need a willingness to share your interest in science and technology with other people.

Explainers have a wide variety of backgrounds and range from full time students (Year 11 and up) to people well past retirement age.

The National Science and Technology Centre is a joint Australia-Japan Bicentennial project, run by the Department of the Arts, Sport, the Environment, Tourism and Territories. In addition to the centre in Canberra, the NSTC will mount a variety of outreach programs. The Shell Questacon Science Circus already takes 50 exhibits and a selection of science demonstration shows to venues around Australia, and further travelling exhibitions and lecture series are planned.

For more information about the Questacon, its explainers and the explainer training program, contact Graeme Potter or Ilze Groves on 062-57 4146; write to the National Science and Technology Centre at PO Box E28, Queen Victoria Terrace, Canberra ACT 2600; or drop in at the Questacon (corner of Donaldson and Elouera Streets, Braddon). It's open from 10.30am until 4.30pm Tuesdays to Fridays and on Sundays.

Technical Tip

The following has been contributed by Bob Smart.

If you have VAX computers running VMS and sharing an ethernet with Unix machines, you will find it very useful to be able to run communications software that will allow you to login and to exchange mail and files between the two. There is commercial TCP/IP software for VMS which will do this, but it is rather expensive. For those prepared to accept lesser performance and rougher documentation there is a cheap version based on software written at Tektronics and subsequently modified and distributed under license from Carnegie-Mellon University. The license entered into by the Division of Information Technology actually allows us to distribute it freely within CSIRO. Any divisions interested in running this software should contact me:

Bob Smart
CSIRO Division of
Information Technology
55 Barry St
Carlton, Vic. 3053
Ph: (03) 347 8644

Dr Boardman
Cont. from p.2

On behalf of the Organisation, I thank him for his important contributions as Director of the Institute of Biological Resources, Associate Member of the Executive and as my deputy during the difficult period of the ASTEC review and the extended period before its recommendations were accepted by government. I am indeed grateful for his strong support.

I also wish to express the Organisation's gratitude to Mr Howard Crozier for his devoted service to CSIRO over many years, and particularly for his sound management of the financial affairs of CSIRO over the past 12 years. We wish him a rewarding retirement.

N Keith Boardman

Superphosphate work earns soils scientist major award

A CSIRO soil scientist in Western Australia has won an international research prize for his work on superphosphate.

Dr Jim Barrow of the Division of Animal Production (based at the Division's Floreat Park minerals unit laboratory) has received his prize from the World Phosphate Institute (IMPHOS). It is only the third time the organisation has conferred such an award since its formation in 1973.

IMPHOS was founded by several phosphate mining companies in Africa, America and Asia, and aims to encourage research into uses of phosphate and to spread information on its uses.

The other two prizes were awarded in past years to a German researcher in phosphate chemistry and to a group at Oxford University studying phosphate uptake by plants.

IMPHOS has awarded its 1987 prize to Dr Barrow for his work on the way phosphate reacts with soil and the effects of this reaction on availability of phosphate to plants.

Dr Barrow started his work on phosphate by asking the question 'why is last year's phosphate no longer as good as it was when it was first applied?'

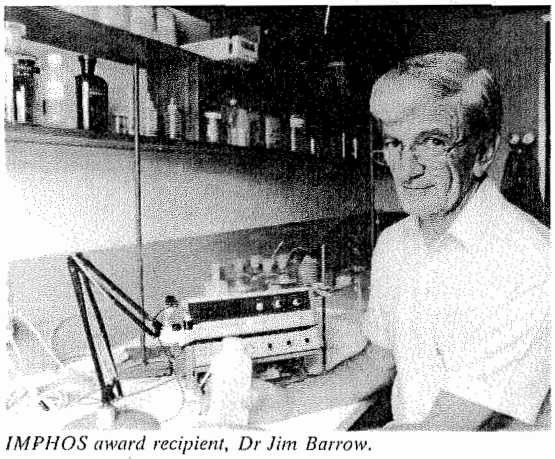
In the course of answering this question he found he had first to answer several others about the reaction of phosphate with soil. He developed a general theory to explain the reaction of phosphate and other nutrients with soil.

According to this theory, phosphate reacts first with the surface of soil particles and then slowly moves into the interior of the particles. The further in it moves, the slower it comes back, so the slower it can be taken up by plants.

Dr Barrow has established an international reputation for his detailed studies on the interaction of phosphorus in soils, and he is equally well qualified in the study of the interaction of ions such as zinc and fluoride with charged surfaces. The culmination of this work was the publication of his book *Reactions with variable-charge soils*.

He has extended his detailed knowledge of soils from the laboratory to the field by demonstrating that two waste products, gypsum from superphosphate manufacture and red mud from the processing of bauxite, can be combined to produce a suitable ameliorant for deep sandy soils.

Dr Barrow received his IMPHOS award at a ceremony in Paris on 4 May.



IMPHOS award recipient, Dr Jim Barrow.

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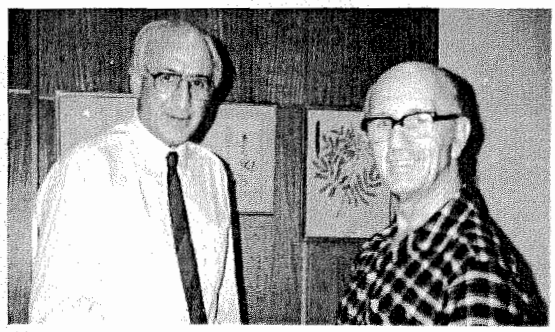
Retirements



Above left, Dr Dennis Minson (officer-in-charge at the Cunningham Laborabory) congratulates Mr Henk Kiers on his 39½ years of service with CSIRO and wishes him well in his retirement.

Technical officer with the Division of Tropical Crops and Pastures, Mr Henk Kiers, has retired from CSIRO after 39½ years.

Mr Kiers started at the Cooper Laboratory in 1948 and was there for 24 years before transferring to the Cunningham Laboratory in 1972.

In latter years at the Cooper and then the Cunningham labs, his activities involved fibre analysis work and *in vitro* digestibility determination.

###

At the time of his retirement on 30 March, Mr Leckie Maclean was the longest serving member of the technical staff at the Division of Wildlife and Ecology. Over a period of 35 years he had worked with at least six project leaders.

Born in Scotland, 'Mac' arrived in Australia as an assisted migrant early in 1949. After working as a station hand for several years, he joined George Dunnet (now Professor of Zoology, Aberdeen) at the Division to assist in field work on the development and use of census techniques for the rabbit. From 1954 to 1956 he worked in Western Australia on the population dynamics of the Rottnest Island quokka and subsequently returned to Canberra to work on the brush-tail possum.

After this he transferred to take charge of the metals workshop until again transferring to assist in ecological studies of the rabbit with Alan Dyce in 1960. By 1962 he was working with Geoff Sharman in projects associated with reproduction in kangaroos and had a major role in building the original system of kangaroo yards. In the late 1960s he worked with Mervyn Griffiths and undertook independent studies on aspects of nutrition and growth of echidnas and continued studies of movements, distribution, longevity and food of the brush-tail possum.

In 1970 he was assigned to work with Penny Woollard and did much of the field work associated with the study of the eastern water rat. His last involvement was with the studies of mouse plagues and the development of improved techniques for their control – a project led by Trevor Redhead.

A time to remember...

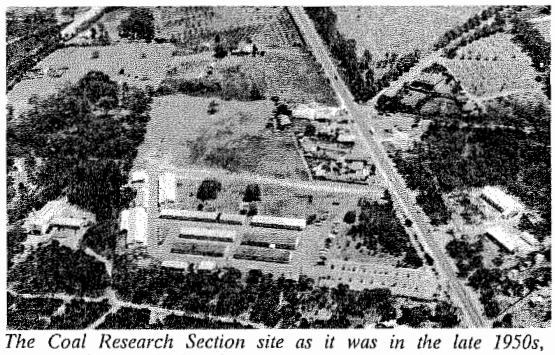
The following item has been contributed by Margaret Brown, who remembers with much affection her early days with CSIRO, and particularly her boss (who died some time ago). These days Margaret works as a secretary at headquarters. She titled her article: 'A few memories of a small part of CSIRO 30 years ago – some nostalgia, this being the year for sentimentality'.

It is exactly 30 years since I, as a young uni drop-out, got my first job – as a TA1 with CSIRO Coal Research Section. I only stayed for two years but oh, how I enjoyed those years.

My boss was a delightful man, Jim Stephens, and he taught me so much about life as well as science, about hard work and about enjoying time spent at work even if things were hectic. With colleagues Reg Coote and Scott Chasterton, I admired Jim's humour and his intelligence.

Jim was a character. He had left his fiancee waiting at the altar in England and fled to New Zealand where for some years he lived under a bridge with a Maori girl and existed on a diet of milk and potatoes gleaned from the adjacent farm. Maybe the weather got to him, I don't know, but he eventually deserted his bridge for an office in Wellington or Auckland. This was cheaper to rent than a flat and he spent his days in the public library and his nights in the office with a plate on the door advertising his services as a consultant physicist. I don't think he had many (if any) clients so he eventually came to Sydney and got a job with CS.

I vividly remember one day gingerly trying to fit some waste paper into an already full garbage tin. I knew that the tin was 90 per cent full of finely ground coal. Jim saw me and said 'not like that' and before I could stop him, he'd stamped on the papers, coal dust had flown up everywhere and Jim was black from head to toe. We laughed for hours at the sight – Jim joining us.



The Coal Research Section site as it was in the late 1950s, intersected by Delhi Road. Margaret worked in the buildings on the far right of the photo. *(Photo from CSIRO Archive)*

Another day I remember Jim was leaving in his lovely Riley when we saw disaster about to strike and frantically started waving arms and heads at him. Jim thought we were just waving good-bye and drove straight over his lovely, brand new brief case.

Other characters at Coal were, of course, the tea ladies – Mrs Theobold and Mrs Cornie. Everyone was on first name terms except for the tea ladies – I guess out of respect, certainly not from lack of friendliness – they were always 'Mrs'. Coal Research was and probably still is divided into two by Delhi Road. Mrs Cornie was our tea lady and her importance was in keeping us informed of happenings across the road – even to the research being done by that other, to us, quite separate, section.

In those days only a few people had cars and our lunchtimes were spent in walks in the cemetery or the crematorium (Coal Research being conveniently placed between the two) or in the summer in swimming in the dirty Lane Cove River..I left in 1960 to get married. Mr Brown, the Chief, wanted me to stay on after marriage, a very unusual thing in those days. But I declined. Jim, Scott and Reg had left and the old place wasn't the same. Particularly without Jim.

312-1988

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CoResearch

No. 313 June 1988 CSIRO's staff newspaper

CSIRO AUSTRALIA

DIVISION OF HORTICULTURAL CSIRO 6 JUL 1988 MERBEIN — LIBRARY

Button on CSIRO

Changed times require better focus on 'front runner' research

CSIRO as a whole is 'inviolate' and will remain a public institution, but some areas of research are going to have to go.

That appears to sum up the view of the Minister for Industry, Technology and Commerce, Senator John Button, who spoke to *CoResearch* earlier this month to answer questions about R&D in Australia.

He said the Government wasn't about to start determining areas where research projects would have to be cut. That job would have to be done by the management of CSIRO, knowing that the amount of money allocated to the Organisation was not going to increase. The slicing up of the pie would be a matter of priority to be determined by management.

'It may well be that there are areas of activity that CSIRO has been traditionally involved in that perhaps it should not be involved in any more,' said Senator Button.

'I have been to some CSIRO establishments and have thought to myself "what is this stuff doing here in the second half of the 20th century? Why isn't this being done in the private sector or in some other government agency?",' he said.

There were some areas of research in the national interest, such as meteorology, he said, which 'are never going to be touched by commerciality'. These needed and would receive continued government funding (although it was up to the management of CSIRO to determine how much they would receive from the CSIRO vote).

'CSIRO is inviolate in terms of its recognised long term benefits – always has been. But I wouldn't want to increase CSIRO funds because I don't think that's where the Australian problem is. The problem is always dopey industries who have relied on CSIRO – have been too cossetted,' he said.

Senator Button said he 'concedes totally' that the acquisition of more industry money for research did not mean less government money was required, because the long term research needed to underpin the work for industry would have to be funded publicly. 'I don't think anyone in government is against that view,' he said.

However, there was an assumption that applied research actually needed to be done across the whole breadth of areas over which long term research had traditionally been carried out.

It comes down to a matter of 'culture', he said. 'The real problem with research in this country is not the public sector but the private sector,' he said.

'Perhaps CSIRO is partly to blame for that – if you have a commitment to a big public sector research organisation, perhaps it has contributed to making the private sector lazy.'

It was necessary to change the culture, or practices, of industry in Australia to get them thinking more about being involved in research, paying for research and using the results of research, not only to their advantage, but ultimately for Australia's benefit as well.

A step in the right direction, he said, had been the 150 per cent research and development tax incentive, which had resulted in a significant growth in private sector R&D.

He said he believed last year the private sector spending on R&D in dollar amounts reached the same level as public sector R&D – about $1.3 billion 'from an appallingly low base'.

The tax incentive will end on 30 June 1991 – 'and not before time', he said. 'In my view by that time it would have achieved some effects in terms of cultural change, changing the mentality of accountants and finance directors in firms, getting them to listen to researchers. That's the important thing.

'By then I think we should be looking at much more targeted research assistance,' he said.

Senator Button said that with properly directed CSIRO research, the sort of benefits historically delivered to the agricultural and mining industries could make other Australian industries viable and prosperous.

'I think there are other areas [apart from agriculture and mining] in which we have to develop a front runner position in terms of state of the art technology.

'This particularly includes the processing of raw materials. CSIRO has done some marvellous things in this area, such as PSZ. Also, the new wool scour facility being built in Victoria is employing CSIRO technology which is different from the technologies elsewhere in the world.

'Those sorts of things are very positive. There are things on the drawing board in certain CSIRO divisions which will have the same result in other areas,' he said.

'I have some sympathy with the chiefs saying they [have a problem with insufficient operating funds]. But from my perspective I think the problem of how you secure and develop CSIRO's future is all part of a big cultural problem in this country concerning science and its relationship with industry.'

Dr Ray Akhurst, a scientist with the Division of Entomology, being interviewed about the Sirex wasp in the Mount Stromlo pine forest near Canberra, by Jeff Waters, a television news reporter with Capital Seven in Canberra. The interview was televised on the evening news bulletin of Wednesday 18 May, in Canberra, Adelaide and Melbourne.

Ambitious CSIRO food show to air on ABC

The most ambitious production ever undertaken by CSIRO's award-winning film and video centre will go to air nationally on the ABC over an eight week period starting on 9 July.

The Good Food Show is an innovative program presented in half hour episodes by one of Australia's top chefs and authorities on nutritionally sound food, Gabriel Gaté. It will provide useful and credible information on choosing and preparing food which both tastes good and also reduces the risk of the so-called 'diseases of affluence'.

Mr Gaté will be joined by multi-media personality and CSIRO scientist Dr David Topping from the Division of Human Nutrition. The Division has had a major input into the program.

The aim of the series is to raise community awareness of the importance of a prudent diet and to draw attention to CSIRO's involvement in the study of human nutrition.

Each program has a different theme, such as: The Great Australian Dish; The Humble Spud; and Vegies — the Pick of the Crop.

The series producer/director is Nick Pitsas from the Film & Video Centre. The executive producer is Nick Alexander.

Other CSIRO crew are chief cameraman Roger Seccombe, chief sound recordist Robert Kerton, production supervisor Malcolm Paterson and production assistant Alice Bugge. Several contract production crew have also been working on the series.

It has been sold to the ABC for $80 000. Mr Alexander said it is expected sales of The Good Food Show videos will net royalties of thousands of dollars.

Gabriel Gaté and David Topping.

5-COR1

From the Chief Executive

A column by Dr Keith Boardman

The Government is giving increased emphasis to national research priorities and criteria for the allocation of research funds. The identification of national research priorities is not an easy task. The process must involve a number of national bodies and inputs from a variety of sources, including researchers, policy makers, industry and community leaders and the users of research results.

The CSIRO Board decided that CSIRO should take a leading role in deciding national research priorities, although it recognised that the immediate task was to determine CSIRO's own priorities to assist in the allocation of resources. An important role for the new Australian Research Council is to advise the Government on national research priorities, particularly in relation to the allocation of research funds to the tertiary education sector. ASTEC, which is currently conducting an enquiry into Australian research requirements to the year 2000 and beyond, also has a responsibility to advise government on national research priorities.

Industry bodies, such as the rural industry research councils, are placing greater emphasis on strategic planning in determining research priorities and allocating research funds.

In deciding national research priorities it is essential that there is effective co-operation between these various bodies to achieve reasonable consensus on those issues of national economic and social importance which should strongly influence research priorities.

At the March meeting of the CSIRO Board, Dr Gregson presented an overview paper on the setting of national research priorities. The overall process involves 'bottom up' and 'top down' chains. The 'bottom up' part flows from the scientists, who are most knowledgeable about the state of science and technology by virtue of their interactions with scientists, nationally and internationally, and the users of research. The breadth of the scientific disciplines in CSIRO, experience in research performance and the commercialisation or transfer of research results, coupled with the diversity of our interactions with industry and community bodies ensures that CSIRO can and must make an important and vital contribution to deciding national research priorities.

In his paper Dr Gregson recognised that the 'top down' part is harder, since it involves a broader picture and looks further ahead. It also must relate to Government policies and the nation's aspirations, economically and socially.

Following Dr Gregson's presentation, the Board decided to establish a sub-committee, comprising Professor Clarke, Dr Gregson, Sir Gustav Nossal and myself to address national research priorities and the criteria for assessing research area and program priorities.

At its first meeting, attended by the Corporate Planner Dr MacRae, the sub-committee accepted a set of criteria for assessing research area and program priorities. These had been agreed at the corporate management workshop at Bateman's Bay in March and are a modification of the criteria set out in the document released by the Executive in 1985 *A Strategy for CSIRO, 1985-1990*.

The sub-committee confirmed that CSIRO must play an important role in determining national research priorities and should take an active part in interacting with relevant ministers and government departments, and public and private sector bodies, including the Australia Research Council and ASTEC.

At its April meeting the CSIRO Board had a very productive meeting with a group from the National Farmers Federation, including the President [now retired] Mr McLachlan. The agenda covered sector advisory mechanisms, the setting of research priorities by the CSIRO Board and the allocation of resources across industry sectors.

K Keith Boardman

Film for CSIRO publications equalling the area of a school football oval is being held by the CSIRO printery, and divisions are being urged to make their claims on it now.

The printery is being closed down and the film for 1600 publications is being dispersed either to divisions or out for recycling to recover the silver.

The publications cover about 20 000 sheets of film. Some of the material is valuable (a divisional bestseller?), however most probably won't be needed again (e.g. annual reports).

Letters have been sent out by Jim Lumbers, with details on how to reclaim the film, and enquires should be directed to the printing centre (03) 418 7333.

Letters to the Editor

Dear Editor,

Michael Jones' letter to the last *CoResearch* would not be worth a reply were it not so irritating.

'My feelings on the logic of logos are well known', states M. Jones. Well, I for one haven't the faintest idea of what Mr Jones' feelings on logos are, but I presume he disapproves of them with the lofty disdain that is obviously his right as a Eminent Scientific Person. I, on the other hand, think the logo is excellent, irrespective of its origin. It is simple, elegant, has a high-tech look and in the careful way it is being used in CSIRO advertisements stands out clearly. As a symbol of our presence and activity the logo will serve us well.

Secondly, he claims that to use -ise instead of -ize on the end of words proves that CSIRO can't spell. The fact is that the -ise ending is a quite acceptable alternative, as the Oxford Dictionary makes perfectly clear. Further, the -ise ending is AGPS style and has been for many years. CSIRO is a federal government body and ought to follow the clear standards set out in the AGPS Style Manual. Every publisher in the world has a house style to which it adheres for simplicity and consistency. So should we.

Peter Martin
Division of Water Resources

Dear Editor,
Broken Hearted

Never in my time has a Balmain Boy failed to splice the mainbrace upon the birth of an heir. At the very least, Mr Wran could have suspended dreary research for an hour of merriment.

I'm leaving. Goodbye everyone. God be with you. God help you indeed.

I've enjoyed working with some of you some of the time. It's rum, bum and 'bacca now.

John J Lenaghan
Corporate Centre

Editor's note: Dear John, please don't leave; your letters have brightened up many a CoResearch.

WOMEN 88 AWARDS

An award scheme has been initiated to give public recognition to the contribution of women to Australian society.

The Women 88 Awards have been established by the Australian Bicentennial Authority and are unlike traditional awards in that they do not have categories like 'top businesswoman' or 'top sportswoman'.

The organisers are looking for nominees from all walks of life, who have consistently shown qualities such as courage, tenacity, leadership, compassion and creativity.

The only qualifications are that the nominee must be alive and a woman who holds Australian citizenship.

Entry forms have been distributed to all divisional information officers, or staff may contact the CSIRO EEO unit manager Ms Clare Keating on (062) 48 4328.

The science of writing a rock opera

No, the CSIRO scientist who wrote a rock opera which has toured the Northern Territory is not a geologist. And there is no truth in the rumour that as a result of the success of the production the Organisation is to start subsidising the Arts in Australia – they are in enough trouble as it is.

Mr Barney Foran, based at the Division of Wildlife & Ecology's Alice Springs laboratory, is an expert in land management science. He has used not only his scientific knowledge but also experience of living in the Northern Territory to create a successful stage production.

It all started at a dinner party four years ago at which Mr Foran dined well but not very wisely. He does remember taking great umbrage at a suggestion to bring a southerner up to the Territory to write a show to mark the Bicentenary.

The good red wine soon had him saying how much he detested cultural imperialism, and that the Territory was 'chock-a-block with talent'.

The upshot was he and a friend, Mr Bob Sharp, combined to write, score and stage *Come Hell or High Water*.

The rock opera toured the Territory earlier this year to good crowds and reviews in the *Sydney Morning Herald*, *The Australian*, the *Adelaide Advertiser*, as well as local newspapers.

Even in the more remote, sparsely populated areas, the production was a hit. At Groote Eylandt 300 people (half the European population) came along for the single performance, while at Elliott, which has a population of 100, 130 people turned up.

Mr Foran said a tour of other states is being planned, probably for next year.

He said he had drawn a lot from his experience in land management research. The theme of the rock opera ranges over a number of subjects including the pastoral industry and Aboriginal land rights.

It centres around the McConnell family in its first days in Central Australia in early 1900s, and two generations later in the 1990s in the Top End of the Territory. The story portrays European and Aboriginal Australians fighting for their place on the land, and seeking to tap its riches.

There were nine actors in the cast, plus six musicians and a number of stage hands. The cost of transporting the company around the Territory (including island hopping aboard a DC3) has meant that so far the show has just broken even, with an injection of finance from the NT Bicentenary Committee. BHP Petroleum has also assisted with funding.

Mr Foran said he had 'high hopes' for the success of the show in other parts of Australia. However, he has not expressed any desire to have the script published in a scientific journal.

Main photo below is from Act 2 of Come Hell or High Water, *showing Sam and Stanley. Inset: Barney Foran.*

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A Matter of Opinion

For this month's point of view column,* CoResearch *set the topic: 'CSIRO and manufacturing industry – substantial support or tinkering at the edges?' Dr Graeme Ogilvie, leader of the arc technics program and Assistant Chief of the Division of Manufacturing Technology, responded with 'A monocular view'.

The Act governing CSIRO states:

"9. The functions of the Organisation are –
(a) to carry out scientific research for any of the following purposes:
(i) assisting Australian Industry"
etc.

Although this part of the Act dates from 1949, in my experience of the physical sciences in CSIRO, no significant attention was given to this 'primary function' (1986 Amendment to the Act) until less than 10 years ago with the establishment of the Division of Manufacturing Technology in 1980. Indeed, the scientists that I knew would have been dismayed by this (but they did not know anything about the the Act). The primary and extractive industries, I am told, were are are very much better served than manufacturing industry and my subsequent comments are directed at the relationship between manufacturing industry and CSIRO.

Even now, very few people in CSIRO understand that research in support of manufacturing industry needs to be conducted on a different basis to research for other industries because of the quite different competitive context. As well, the vast number of products from manufacturing, as compared with the restricted range from the other major Australian industries, means that industry money for a given R&D project for manufacturing tends to be much smaller than for such a project for the extractive industries. These two factors combined with the application of the 'user pays' principle to R&D relevant to manufacturing, have been the root cause for this R&D to be dispersed and small scale.

Very senior people at our corporate centre must find it is very tempting to think that the policies they formulate, their corporate plans and their negotiations with politicians and industry leaders will improve the climate in CSIRO for discovery, invention and innovation. I believe that, in this matter, we will see little change from the impact of our previous HQ where the converse was true. In essence, this belief is based on the fact that, although fewer, the people are still much the same and the corporate centre has not evinced any additional desire to go to divisions in close contact with manufacturing to understand the context and the practice of the establishment of viable industry related R&D. For manufacturing industry the nature of CSIRO support is still 'tinkering at the edges'.

In our Division we distinguish, for convenience from the spectrum of possible CSIRO–manufacturing industry interactions, four categories of agreement:

*consulting (for the 'quick fix');
*contract (when we are prepared to take a subservient role for money);
*collaborative (true partnership); and
*commercial (have technology will sell).

My experience during the establishment and operation of the Division of Manufacturing Technology over eight years has convinced me that the formal collaborative R&D agreement is by far the best framework on which to structure research which is relevant to, supportive of, and precisely targeted at the need for Australian industry to advance ahead of it's competitors. In such an agreement it is necessary to formally specify the inputs (intellectual property, people, equipment, money, etc.), equitably apportion ownership of the outputs (intellectual property, etc.) and clearly identify the rights, duties and responsibilities of both parties. The confusion of HQ thinking about these matters is highlighted by the categorisation, in Canberra, of such an agreement as 'sponsored'! (CSIRO Information Circular No. 87/40 21/9/87).

To stop tinkering at the edges and provide, instead, substantial support for manufacturing industry requires a much wider use of the collaborative R&D agreement – as described above – allied with a change of attitude by CSIRO managers. They have to accept that managers in industry have equally valuable brains, insights, skills and experience for achieving a satisfactory outcome from industrially relevant research. They will also have to accept that such research can be just as fundamental and/or strategic as curiosity motivated research. Above all they should challenge their current models of invention and innovation by examination of examples of successful innovation particularly within CSIRO.

Corporate centre changes

1. Management answers criticisms
2. Board issues statement

Despite apparent cynicism in some parts of CSIRO, there is a strong commitment from management and staff to an effective transformation of the corporate centre, according to the Director of Corporate Services Mr Peter Langhorne.

Mr Langhorne wrote to all CSIRO chiefs last month to answer criticisms about a perceived lack of meaningful change, even though many formerly central responsibilities were being devolved to the institutes and divisions and about 275 staff positions were now being shed.

He also disputed rumours that the loss of jobs was not going to save the Organisation any money because the remaining staff have had their positions considerably upgraded.

Mr Langhorne was concerned that long-held prejudices that apparently existed against the centre were proving rather hard to break down.

However, it was essential, he said, for the people working in the corporate centre to be aware that they were contributing to the goals of the Organisation by helping to facilitate the work of researchers, and this was difficult when they were so often maligned.

Research objectives

'CSIRO is made up of various disciplines, all of whom are contributing to the research objectives. For the system to work everyone needs to accept the contribution of all,' said Mr Langhorne.

'Just as the research scientists are needed to add value to the Organisation, other staff are also needed to add value.'

Mr Langhorne told chiefs that in the corporate services area much of the activity concerned operational work such as accounts reconciliation, personnel practices, etc, being automated, devolved or ceased, with consequent abolition of positions. Where work at a higher level was being devolved, senior management positions had been created in the institutes. Where appropriate this would be reflected in changed profiles in divisions.

Under the new arrangements, institutes and divisions were responsible for managing their own resources and wouldn't be required to continually refer matters to the corporate centre. This meant things would happen faster than before, when criticism of the slowness of headquarters processes was often valid.

Among the corporate centre's roles would be those functions better organised centrally, such as strategic planning, research policy, audit, legal and legislative affairs, a national employee development program, and industrial relations, and these matters were being dealt with now, said Mr Langhorne.

On the question of the salary profile of the corporate centre, Mr Langhorne said 'if we had simply cut out the functions (and subsequent positions) as recommended by the review without any structural change, then the corporate centre average salary per person would have been about $30 000 post-PCEK.

'The average salary under the new structure remains at about $30 000 per person. The changes in senior positions reflect the move to significantly enhanced policy development, co-ordination and advising role as proposed by the PCEK review,' said Mr Langhorne.

'Overall the number of SES positions in the corporate centre is the same as pre-PCEK. ASO6 to ASO8 and equivalent SSO positions have reduced from 155...to 130.'

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The CSIRO Board recently met with the Consultative Council to discuss staff issues, and as a result decided to submit a statement to *CoResearch* to be passed on to readers:

'The Board is aware that a lot of staff are concerned about the effects of the recent structural changes. When coupled with declining budgets and uncertainties about support for particular research programs, it's not surprising staff morale has been affected. The Board hopes staff will now be able to look ahead to the positive outcomes resulting from the change.

'The effectiveness of the changes will be assessed by the Board by a number of indicators. For example, because the new divisional groupings are designed to enhance collaboration between divisions, the Board will be expecting to see an increased level of interaction. Because the new institute structures have given greater responsibility to line managers, while a smaller Canberra-based administration has changed its functions from those of a controlling headquarters to corporate facilitation, the Board will be looking for evidence of an improved spirit of co-operation between staff in these areas.

'If the Organisation is to receive positive support from government and the community, it must do more than be a centre of scientific excellence: it must be well managed, efficient, competently administered and able to sell itself. It must now become known for excellence in all its activities. This commitment to excellence will require a team approach that recognises the integral role all staff have to play in meeting CSIRO's primary research responsibilities.

'As part of this, an employee development strategy is being created to help all staff gain the skills they need. In line with the new organisational philosophy, training programs are being developed not only for senior scientists and managers but for administrators, receptionists and information officers who are at the fore of public communication; for craftsmen and women, technical staff, librarians and other service personnel.

'For its part, the Board is actively encouraging this new team approach. In addition to training and development the Board is examining other issues such as employee participation, performance pay schemes, collaboration with academic institutes, recruitment policies and the provision of work-based childcare facilities to improve the quality of working life.

'Collectively and individually, Board members are endeavouring to ensure viable levels of government support for CSIRO. They are conveying to Ministers and senior officials their views on CSIRO's key role in Australia's future economic development. To help in this regard, a list of CSIRO's research that shows good benefit to cost ratios is being prepared. In the long term the Board is keen to see these assessments for the majority of research projects, even though it recognises that benefits may sometimes be hard to quantify.

'However the Board wishes to allay the concerns of research teams doing projects of national and community importance that do not have direct commercial or economic benefits. The Board is aware of CSIRO's clear responsibilities in these areas and will decide on the balance of such activities across the Organisation's total research effort.

'The Board gives a high priority to communication and to keeping abreast of all activities in CSIRO. Along with other issues, the Board is actively monitoring the effects of the restructuring and is receiving monthly briefings from the Implementation Task Force.

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Maximising nitrogen fixation in legume crops

More than two thirds of the agriculture of South East Asia is performed by smallhold or subsistence farmers, many of whom have holdings not much larger than an average Australian house block.

Millions of farmers work the land, and most plant one or more of the many varieties of legume, for food, fuel, or a range of other uses.

The ability of legumes to fix atmospheric nitrogen in the soil makes them valuable in any agricultural system, whether they are the principal crop or used for preparing the soil for other crops through crop rotation. This enrichment of the soil can save on costly nitrogen fertiliser and enhance the protein content of food crops.

However, inefficient management and lack of information about leguminous crops means the potential for nitrogen fixation is not always realised. In fact, legumes actually remove nitrogen from the soil under certain circumstances.

At present production of food legumes (e.g. mungbean, soybean, peanut and cowpea) in Thailand totals just under one million hectares per year, and around 1.7 ha in Indonesia, with a combined production value of about $A600 million.

However, low yields mean the countries are forced to import legumes, particularly soybean and peanut, to meet demand. The import bill ran to over A$440M in 1984.

Government agencies in Thailand and Indonesia have identified food legume production as a priority for research, and ACIAR has already funded a number of experimental programs to investigate these crops. One, conducted by scientists from the Division of Plant Industry between 1984 and 1987, established methodologies for measuring biological nitrogen fixation, specifically for soybean and peanut grown in the interrow space in Malaysian rubber plantations, and ricebean intercropped with maize in Thailand.

Now these scientists (Dr Fraser Bergersen and Dr Mark Peoples) have secured another ACIAR grant to carry out research which will put these methodologies into practice in legume crops in Malaysia, Thailand and Indonesia.

It is intended that the work will enable the development of more efficient management protocols for maximising nitrogen fixation and therefore minimising the need for expensive nitrogen fertilisers which are beyond the means of the small farmer.

Another benefit will be a contribution to improvement of protein nutrition in developing countries. People in these countries derive considerably more protein from plant than animal sources compared with people in developed nations.

The work will have application not just in South East Asia, but also in Africa, the Pacific and Australia. It is the policy of the Division of Plant Industry that any work done by its scientists must align with its research objectives within Australian.

The CSIRO scientists will work in collaboration with colleagues in South East Asia, who will subsequently be able to pass knowledge on to other scientists and to farmers. 'Hands on' training of staff involved in the projects in all three countries will take place during the project, to allow greater dissemination of the project's techniques and findings. At present, Dr Peoples is working on a handbook intended for scientists in South East Asia which will put into practical terms the results of the research from the original project.

In the new project, the researchers will have contact with another CSIRO legume project in Thailand, run by Dr Bob Lawn from the Division of Tropical Crops and Pastures who is investigating the breeding of better adapted strains of soy and mungbeans for the tropics (see separate story).

The work in South East Asia will be backed up by research to be conducted at the Division's Canberra laboratory. This work will be concerned with the more basic aspects of the project, including the measurement of nitrogen fixation using the isotope ^{15}N. Analysis of the levels of ^{15}N in legumes can indicate how much of their nitrogen came from the air and how much from the soil.

Another technique is also under investigation, in which sap from the plant's nutrient transport system (the xylem) is analysed for nitrogen assimilated from the air and from the soil.

Development and calibration of such nitrogen fixation measurement techniques for field use in developing countries is one of the aims of the research.

The new project will study not only nitrogen fixation in food crops, but also forage crops in Indonesia, such as *Leucaena* (a potentially important forage crop in Australia), *Stylosanthes* (already well established in Australia's semi-arid tropics) and *Albizia*, in association with Dr Brian Palmer from the Division of Tropical Crops and Pastures.

Legumes are grown between rows of corn to enrich the soil. Pictured with a crop of corn with legumes are Benjavan and Knok Rerkasen who are associated with the legume project.

Part one in a series outlining some of CSIRO's work overse connections i

CSIRO has long-standing and extensive research and development links with South East Asia, traditionally relating to agriculture and food science and mostly funded by the Australian Centre for International Agricultural Research (ACIAR) or the Australian International Development Assistance Bureau (AIDAB). One of the earliest and strongest links was established by Dr Alex Buchanan of the Division of Dairy Research (later the Division of Food Research), who played a pivotal role in improving food technology in the ASEAN region, starting from the 1960s, and who was a leading figure in the ASEAN sub-committee on protein. In more recent times, a project conducted by the Division of Human Nutrition for the Palm Oil Research Institute of Malaysia, called The Effects of Palm Oil Dietary Supplements on the Susceptibility of the Heart to Arhythmia, will produce published results later this year. In between there have been numerous projects, most co-ordinated through CSIRO's Centre for International Research Co-operation (CIRC). Others have been organised directly by the divisions involved. To outline them all in this feature would be impossible. Mention should be made, though, of a major one completed recently at Ciawi near Bogor in Indonesia. This was CSIRO's longest running and largest development assistance program, and involved improving animal husbandry practices. It led to the establishment of a permanent laboratory staffed by Indonesians who had been recruited and trained by CSIRO. It began in 1974 and ended in December 1986. The principal aim was to assist small-holders in improving meat and egg production. Many benefits have flowed from this major project, which was backed by AIDAB.

From the early 1980s the traditional role of assisting South East Asian agriculture and food technology started to expand to encompass a wider range of activities. These included the metrology project (see separate story), and the broader goal of upgrading the management capabilities of ASEAN scientists. To this end a CIRC/CSIRO Management of Research and Development program was run between 1984 and 1986, involving training for ASEAN scientists both in Australia and in their own countries. This was

Better grain storage for the tropics

Protecting stored grain from infestation by insects is particularly difficult in the tropics because of the high heat and humidity and often fairly basic storage facilities.

These factors contribute to the proliferation of insects and micro-organisms which can cause heavy losses of stored commodities.

The diet of people living in South East Asia tends to be substantially dependent on non-meat foods, and in many places grains such as rice are a staple. Methods which ensure uncontaminated storage of such important food sources therefore are of concern to these countries.

Equally important are the export crops which naturally need to be kept in the best condition possible.

Usually grains in South East Asia are kept bagged in uncovered stacks in warehouses. Reliable insect control is difficult and often expensive, mainly involving several fumigations and regular spraying with insecticides.

The two fumigants commonly used — methyl bromide and phosphine — are often inadequately used and possibly hard to obtain.

A CSIRO/ACIAR research project which started in 1983 in several South East Asian countries has been successful in demonstrating the effectiveness of a cheap and easy alternative method.

Mr Peter Annis of the Stored Grain Research Laboratory at the Division of Entomology in Canberra, in association with researchers in the Philippines, Malaysia and Thailand, has applied a technique first tested in Australia to the problems of infestation and reinfestation in stored grain.

Using a combination of carbon dioxide and PVC sheeting, the scientists have shown that the grain may be stored safely under a range of conditions.

An initial experiment involved high grade coffee beans in Papua New Guinea, which were sealed within the plastic then subjected to gassing with carbon dioxide. This experiment was successful.

Subsequently, experiments were carried out on rice and corn stacks, also successfully.

More than 55 trials have been held, each of three to 12 months duration. It was shown that with properly sealed stacks, application of carbon dioxide killed all the insects in the stack and controlled reinfestation for the whole storage period, with no apparent quality deterioration.

is. Our next feature later in the year will examine CSIRO's the Pacific.

run with the co-operation of a number of CSIRO divisions, and resulted in valuable relationships being established between CSIRO scientists and colleagues in South East Asia. Training is an important element in CSIRO's links with South East Asia, and this activity is carried out in many disciplines.

Some major projects are not limited to South East Asia, but have been carried out in many other countries. Among these is CSIRO's involvement in the international quest to eliminate iodine deficiency disorders (IDD). Iodine deficiency can result in goitre or severe brain disabilities. Another is AIDAB's 'Seeds of Australian Trees' project (see story) which aims to improve living standards in many countries by providing more trees for shelter, firewood, etc.

A new approach to science and technology links with South East Asia is being undertaken through the Scientific Industry Steering Committee (SISC), run by the Department of Industry, Technology and Commerce, but including a number of CSIRO scientists such as Dr John Lowke and Dr Ken McCracken. This committee aims to pave the way for small Australian companies to establish relations with South East Asia, based on research and unique technologies. There are four main thrusts: biotechnology, remote sensing, electronic instruments and materials. In the past there has been some reluctance among Australian companies to share new technologies with South East Asia, because of the perceived danger of the products being made much more cheaply and therefore robbing the Australian companies of their market. However, Dr Lowke said the thrust now was to negotiate a stake in any venture formed in South East Asia to take up Australian technology.

For instance, there is significant interest in Indonesia to form collaborations with Australian companies to establish small plants to manufacture manganese steel using arc processing. Also, Indonesia is interested in the CSIRO product Scrimber, to make beams from cheap, fast growing trees.

This feature aims to give a brief glimpse of some of the work being done in conjunction with ASEAN scientists and technical staff to boost scientific knowledge and improve standards of living in South East Asia.

Centre takes our 'outstanding' plants to developing countries

In forestry, as in agriculture, a small fraction of the world's plants are outstandingly successful in cultivation. Australia, fortunately, is the natural home of many such tree species.

Australian species make up over 40 per cent of the world's tropical forest plantation resource. There are currently more than six million ha of *Eucalyptus* plantations in the world and at least a million ha of *Acacia* and *Casuarina* species.

These genera contain more than 1400 species adapted to a very wide range of tropical and temperate environments; their full potential is likely to be greater than their present extensive use indicates. Many early attempts to cultivate these species were marred by a lack of understanding of the ecology and genetics of candidate species and poor quality seed.

The Australian Tree Seed Centre of the Division of Forestry and Forest Products has played a major role in fostering the best use of Australian trees by maintaining a supply of high quality, source identified seed for international and Australian projects.

The AIDAB-funded 'Seeds of Australian Trees' (SAT) project supports the Centre to distribute seed to recipients in developing countries in Asia, Africa and the Pacific. This project also provides technical advice, expert advisory visits and training in tree seed handling. Over the past five years more than 8000 seedlots have been distributed.

A focus of the Centre's work is South East Asia. Advisory visits have been undertaken to Indonesia, Thailand, Malaysia and the Philippines.

Some of the seed has been supplied to ACIAR, which, together with the Royal Forest Department, Thailand, is screening lesser-known Australian species in eight trials across Thailand. Seed has also recently been supplied to a new ACIAR/CALM (Department of Conservation and Land Management, WA) project in the eastern province of Nusa Tenggara Timur, Indonesia. In this province there are major problems of soil erosion, localised fuelwood and forage shortages and a rapidly diminishing sandalwood resource.

The project aims to identify the most suitable species for fuelwood and forage production, find solutions to problems of sandalwood regeneration and improve the research capabilities of collaborating Indonesian researchers.

A recent review of the SAT project indicated the financial internal rate of return for the project (plus expenditure by seed recipients) exceeded 40 per cent. The project's net present value was about $325 million.

Australian expenditure on the project has been about half a million dollars.

This small project has been unusually rewarding for both recipients and Australia. For recipients it has provided the essential basis for enduring local production of key goods and services. For Australia it has generated widespread goodwill in more than 50 countries, provided the basis of a modest seed export trade and contributed to an increased knowledge of Australia's tree resources.

Standards of measurement

The Division of Applied Physics has been involved in a project to establish and maintain standards of measurement in the Asia/Pacific region — the Asia/Pacific Metrology Program. Sixteen other countries apart from Australia also participate.

An effective national measurement system is a prerequisite for any developing country wishing to introduce modern technology.

Correct measurements are important to the industrial, social and economic wellbeing of a country, contribute to the welfare of its people and help bridge international trade barriers.

CSIRO is well-placed to offer assistance in metrology because of its long-standing experience in the field.

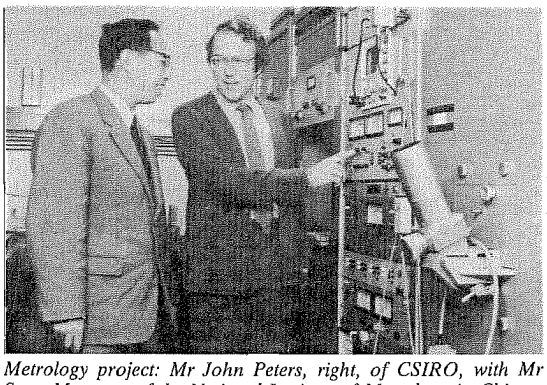
The AIDAB-funded project involved giving advice on national standards and measurement systems, calibration of national primary standards, training of scientific staff from the countries in Australia and intercomparison of travelling standards to evaluate national calibration capabilities.

In September 1982 CSIRO hosted a regional workshop on metrology for developing countries, which involved intensive training in measuring length, mass, temperature and alternating and direct current electricity.

Metrologists involved in establishing physical standards in the region benefited from access to personnel and instruments in the Division of Applied Physics.

Another service the Division has provided is participation in an intercomparison exercise to ensure the measurement competence of laboratories by comparing calibrations performed on the same instrument. Of the 11 intercomparisons performed by the metrology program, the Division has undertaken six — acoustics, AC voltage and current, DC voltage, microwave attenuation, photometry and temperature.

Sealing down the plastic (see story, left).



Metrology project: Mr John Peters, right, of CSIRO, with Mr Song Menzong of the National Institute of Metrology in China.

Good results from soy & mungbean project

A useful technique for screening soybean lines for resistance to an economically expensive disease is one of the positive results from a project being conducted in Thailand by researchers from the Division of Tropical Crops and Pastures.

Dr Bob Lawn and Dr Bruce Imrie have being conducting the project, in conjunction with colleagues in Thailand, for two and a half years. The project will conclude in December this year.

The major aim has been to boost development of both soy and mungbeans in the tropics by identifying the most suitable cultivars for the conditions. At present, countries in South East Asia import a considerable amount of soybean.

The disease, bacterial pustule, can cause losses of up to 40 per cent in wet season soybean crops. The screening procedure has been based on the reaction of individual leaflets to exposure to the disease. The leaf surface is punctured with a grid of bacterium-coated needles which produce symptoms of the disease on leaflets grown in petri dishes. The technique is reliable, rapid, easy to do and non-destructive.

Soy and mungbeans are variously grown as early rainy season, late rainy season or dry season crops, in diverse regions throughout Thailand and they encounter a wide range of environments, particularly in relation to climate and soils.

A major part of the the first two years of the project has been aimed at understanding the regional and seasonal components of adaptation of these two crops, and two sets of multilocational studies for each crop have been undertaken.

The studies have revealed substantial seasonal and regional effects on the performance of both soy and mungbeans in Thailand. For instance there is clear evidence that low temperatures affect growth and development of both crops in the dry season.

As part of the project's agronomic research, studies have been conducted into the ability of soybeans to grow on saturated soils to better integrate grain legume farming with the traditional rice-based agriculture. Work conducted earlier in subtropical Australia had shown that soybeans grow and yield well in saturated soils.

Experiments at two sites showed encouraging results, with the Thai cultivars growing well in the saturated soils. The next phase of the work will be to investigate the potential application in rice-based cropping systems. This work will eventually be extended to Thai farmers.

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Political & public debate

Putting science on the agenda

*Richard Eckersley**

Watching the CSIRO film and video centre's excellent film, *Mysteries of the Leeuwin*, on ABC TV recently (if you missed it, it was all about ocean currents, rock lobsters, tuna and scientists), I was struck by the difference between the scientists' world and mine, even though we work for the same organisation.

The film captured the fascination of research, and the devotion of scientists to their research. Silly of me, I thought, to expect them to take much notice of the public affairs and political aspects of science and technology in Australia. If I were there, on board the Franklin on the high seas, delving into the mysteries of the Leeuwin Current, I wouldn't give a hoot either.

The issue was at the back of my mind as I watched the film because the week before, at ANZAAS, I had complained that scientists in Australia still adopted a 'cargo cult' approach to public communication of science – a belief that some day, somehow, they will miraculously attract front-page, prime-time coverage of their achievements, and that, as a result, their funding problems will be over.

This attitude, I said, was preventing them from recognising what had already been achieved in improving public understanding of science in recent years, why it had been achieved, and what remained to be done.

In particular, scientists had not yet recognised the time, effort and planning that was required, nor the political aspects of public communication, which required that their communication efforts went well beyond talking about specific research achievements.

As I said, who can blame them, when you see how absorbed they are in their work? Yet it is important that the scientific community appreciate the full dimensions of the issue of science's place in national affairs, even if most responsibility, in terms of the political debate about science, lies with chiefs, institute directors and, especially, the Chief Executive and the Board.

I'll give three examples of what I am on about. **Figure 1** shows the average number of stories a month run in metropolitan newspapers that were based on Newsfile, a package of research stories sent to the media each month. Coverage dropped by about half over the five years to 1982, when Newsfile was dropped.

Figure 2, based on coverage of Newsfile and news releases in 1982, but only of news releases after that, shows a tripling in coverage.

The decline in coverage coincided with a decline in CSIRO's image in the media; the rise in coverage coincides with an improvement in that image.

What caused the rather dramatic shift in coverage? The reason is an unprecedented, but still inadequate, level of recognition of the importance of science and technology to Australia's well-being. This was achieved not by putting out more information about research achievements and new inventions, but by making a public and political issue of S&T.

While there are several reasons for this development, notably Australia's changed economic fortunes and Barry Jones' tireless advocacy, I believe the evidence, as well as the way the media operate, support the view that the trigger for this heightened media interest in S&T was the campaign by scientists in the wake of the 1984 Budget cuts.

CSIRO played the leading role in this effort, its activities involving the former Chairman, Dr Paul Wild, chiefs and research staff (who marched on Parliament House). And the present Chief Executive, Dr Boardman, has played a central role in maintaining media interest in S&T as a policy issue, particularly the low level of business R&D in Australia.

The impact of this development is suggested by the trend in coverage of CSIRO in *The Australian Financial Review*, shown in **Figure 3**. The initial rise in 1983 was due to improving contact with the paper. But there was not enough intrinsic interest in S&T to sustain the rise. It began to rise again once interest in S&T in general had escalated.

This general trend shows up clearly in **Figures 4 and 5. Figure 4** shows a sharp rise in 1984 in general S&T stories – CSIRO, funding, S&T policy etc – after which coverage steadied at a level about three times higher than previously. **Figure 5**, based on coverage in key newspapers of all types of S&T stories – policy, new inventions, scientific discoveries etc – also shows a big jump in 1984, with coverage continuing to increase.

In other words, scientists established a political and economic context for S&T in which they were seen to be important. As a result, all S&T stories, including research achievements, are attracting better coverage.

This coverage has, in turn, encouraged greater government activity, stimulated industry interest in R&D, and improved public support for S&T.

The second example I want to give is of more direct relevance to scientists engaged in research because it involves research rather than a question of S&T policy. Again the initiative came from scientists, and again it involves making an issue of things, setting research firmly in the context of why it matters and what needs to be done.

The example is the Greenhouse Project, a joint exercise between the CSIRO Division of Atmospheric Research and the Commission for the Future. It has required a lot of hard work and planning. But it has generated enormous media and public interest in the consequences of rising levels of carbon dioxide and other greenhouse gases in the atmosphere. What's more, it has brought together scientists and people from all the relevant industry and community sectors to consider and plan for the climatic and other changes we face.

My third example is one where CSIRO has not put in the sort of effort it could have to attract attention and generate activity. It is land degradation in Australia.

In presenting the first series of *Heartlands* on ABC TV several years ago, Dean Graetz of the CSIRO Division of Wildlife and Ecology, did a magnificent job of relating the research findings of CSIRO and others to the huge problem that Australia faces, and, everyone agrees, is not doing nearly enough about.

But because it was not part of a carefully thought-out, sustained strategy, the considerable public impact of *Heartlands* soon faded, overwhelmed by the scores of other issues clamouring for public attention.

Issues like land degradation can bubble away for years, even decades, without ever reaching the critical 'temperature' necessary to set off a sustained political reaction. The first two examples show clearly that scientists can be successful in 'raising the heat' on such issues, if they are prepared to put in the effort; the third example is one where, despite some excellent individual efforts, they have failed to take up the challenge.

While many scientists may not be able to relate these sorts of issues to the research they are doing, many more could be doing so than are. Public communication means more than boasting about research achievements.

At the level of S&T policy, it means effectively countering the ideological excesses of economic rationalism and heeding legitimate calls for change. At the level of research, whether it relates to innovation in manufacturing industry or the development of sustainable land use practices, it means forcing issues on to people's agendas of priorities and concerns, be they politicians, businessmen or the public, so that the research is put to the best possible use.

The importance of doing this goes well beyond the well-being of science in Australia. Our awareness of many of the major threats and challenges facing this country (and the world) comes from science. How we meet those threats and challenges will also depend critically on science.

Despite this, and for all that has been achieved in recent years, science remains peripheral to political and public debate in Australia.

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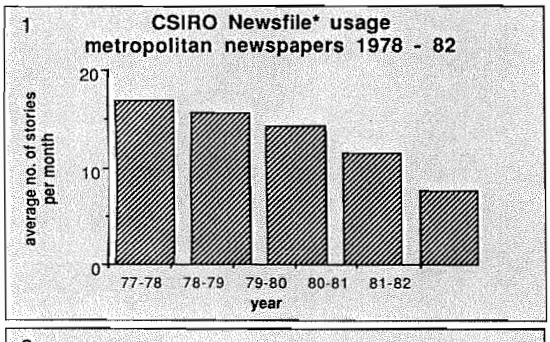
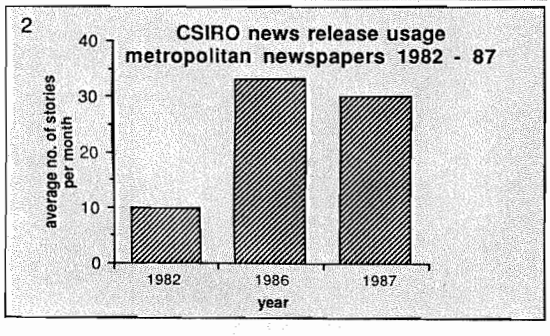
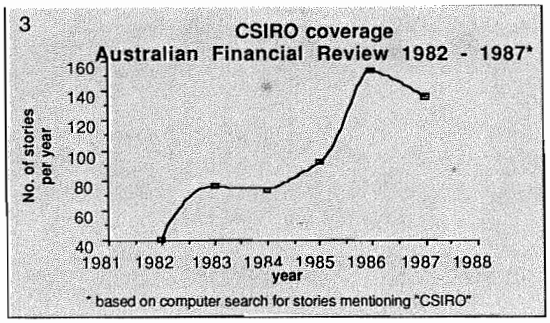
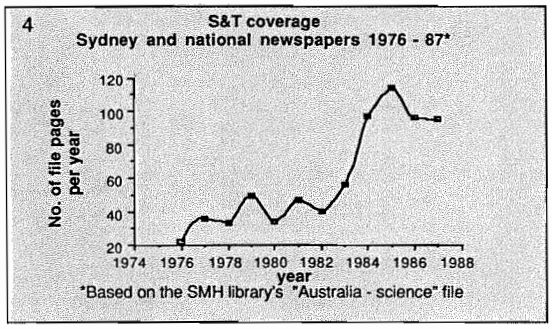
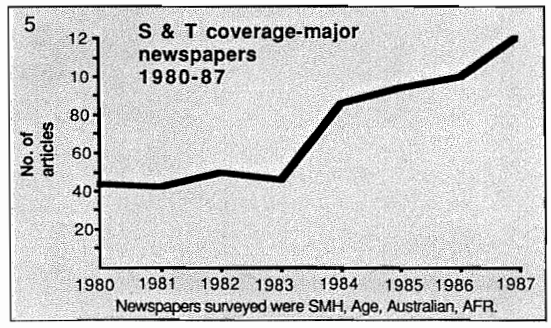
Richard Eckersley is the principal issue analyst in the Office of the Chief Executive, and was formerly CSIRO's senior media liaison officer. He has just spent a year on secondment to the Commission for the Future, studying Australian attitudes to science and technology.











CSIRO brings new technology to an old profession

In the mud and grease and smell of a fishing fleet home base, high technology is starting to get a foothold.

The Division of Fisheries is using satellite imagery to assist a major Tasmanian fishing company, Australian Fisheries Development which operates Spring Bay Fisheries.

The fishing fleet's base seems far removed from the world of satellite technology and from the scientific laboratory. This is what CSIRO is all about – making science work in the real world of industry.

Mr Brian Booth, with his father Mr Thornton Booth, runs the jack mackerel fishery out of Triabunna on Tasmania's east coast. The company has shown the foresight to get involved in this new technology which makes an old profession even more efficient.

Mr Booth junior says the satellite data supplied by the CSIRO Division of Fisheries has been very useful in enabling him to send his boats to the best places to bring in their jack mackerel.

The Division receives data via the Division of Oceanography's rooftop antenna from the US polar orbiting NOAA 9 and 10 satellites. Computer manipulation of the data enables the precise determination of sea surface temperature.

Australian Fisheries Development calls its operation at Triabunna 'a Tasmanian success story of the 1980s'. In the few years since March 1985 it has capitalised on an almost totally neglected resource, turning it into what it claims is Australia's biggest fishery.

The jack mackerel caught off Triabunna isn't for human consumption. One of its major uses is as fish meal, a large part of which goes to the burgeoning salmon and trout farming industries. The meal is also used as an adjunct for feeding broilers and pigs.

All the fish caught by the fleet is processed on a specialist factory barge docked at Triabunna. This processes 40 000 tonnes of the fish each year.

Data is supplied by the Division to the company as often as possible. When *CoResearch* visited Triabunna, no data had been received for 12 days, but this was because of unfavourable weather conditions.

Data is either provided on a disk which is physically taken to Triabunna, or it is relayed down the phone line (this latter a technique developed by the Division of Oceanography).

The image is then displayed on the screen and further enhanced. What appears is a false colour image of major sea surface temperature zones in the ocean around Tasmania.

Jack mackerel surface school at specific temperatures. By studying the temperature data, it is possible to go to the places where it is most likely schools of the fish will be found.

The company owns three fishing boats and has four on charter. They use the 'purse seine' method of fishing. This involves dropping a net like a curtain in a circle behind the boat. The bottom rim of the net is then drawn together, enclosing the fish above. For this type of fishing it is necessary to find schools of fish near the surface.

Apart from satellite date from CSIRO which is already being put into practice by the company, a totally different instrument which was tested on the COSSA F27 earlier this year could also take its place among the tools available to Australia's fishing industry (see separate story about plans to start an Australian industry based on this equipment).

The Side Looking Airborne Radar (SLAR) showed excellent results which even impressed the extremely sceptical fishermen at Triabunna.

Like all major Australian fishing companies, Spring Bay Fisheries employs a spotter who looks for schools of fish from a light aircraft. This method has worked reasonably well for quite a few years, but it necessarily has limitations.

The human eye can only see a short distance and it is particularly limited in bad weather or poor light. However, the SLAR overcomes all these problems and can 'see' up to 40km on each side of an aircraft.

The resulting reading shows up on the on-board video display terminal. Once all the 'noise', radar shadows and other extraneous images are either removed or ignored, it is quite possible even for a novice to pick out the small blobs which represent surface schooling fish.

It is then necessary, once the plane moves closer to the blobs, for the visual spotter to identify the species of fish and whether there is any depth to the school or whether it is just a few fish making a helluva splash on the surface.

This is why the visual spotter can never be replaced by SLAR – no instrument can match the human expertise in determining the nature of the school.

Dr Graham Harris predicts that the next decade will be an important period for ocean remote sensing.

For instance, colour scanning will be possible with the launch of the SEAWIF satellite in 1991 (see separate story).

Dr Harris said that up until now much of the remotely sensed ocean data has been obtained from experimental satellites, which have proved that much valuable scientific and commercial knowledge can be gained from orbital altitudes.

Now a number of projects expected to start in the early 1990s will aim to provide oceanographers and fisheries scientists with operational satellites.

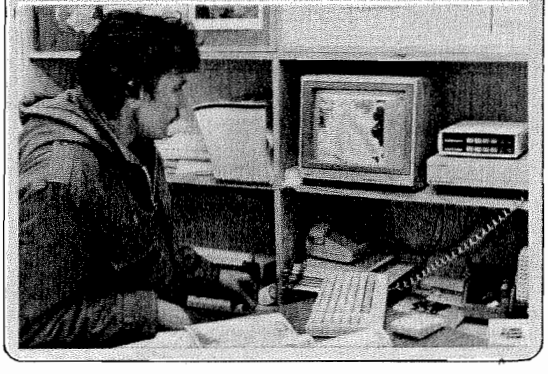
Already remote sensing, originally using airborne instrumentation and later satellite data, has revolutionised many aspects of oceanographic and fisheries science and applications.

CSIRO used airborne data to assist New South Wales tuna fisheries as long ago as the early 1970s.

CSIRO's expertise in this area therefore has a long history, and also some very talented scientists applying their minds to the subject.

'We have a group now that is world class in processing ocean colour imagery, in interpreting thermal and colour imagery for fisheries applications, and in terms of the tactical assistance we can give to the fishing industry,' said Dr Harris.

'I don't think there is another group in the world that does what we do.'



Photo, left, shows Spring Bay Fisheries' fleet engineer Ian McDonald examining sea surface temperature data supplied by the Division of Fisheries.
Photo: Thor Carter

SLAR – A new industry for Australia?

The Division of Fisheries is in at the start of a fledging Australian industry manufacturing radar – specifically the Side Looking Airborne Radar (SLAR).

Dr Graham Harris who heads the Division's remote sensing group believes CSIRO is better placed than any organisation in the world to see this type of project through.

In fact he's tired of saying to people who express surprise that the Division is a major participant in the deal that this is exactly what CSIRO is supposed to be doing. (COSSA is handling the negotiations, and already has secured commission for the Division on sales of SLAR from Australia).

He firmly believes that no other country in the world has a single government agency like CSIRO which has sufficient flexibility to see research through from the basic stage to the point where commercial manufacture is possible.

'Generally what happens in other countries is that you have two or three government agencies involved, and the neat ideas fall down because you've either got rival agencies or one is funded in a particular way to do one job and one is funded another way to do another job.

'It's very difficult to get these things all the way from a good idea through the science, down through the applications and into industry,' he said.

'CSIRO seems, certainly from our Division's perspective, to have a unique role.'

SLAR is manufactured by Ericsson, the huge Swedish telecommunications company which already has particularly close ties with Australia and operates a major factory in Melbourne.

The SLAR, which would be manufactured in Australia, would incorporate improved design features devised by Dr Harris' group. For instance, Dr Vincent Lyne has written special computer enhancement software to produce a better image than the radar now produces, to find weaker targets.

SLAR proved in March it could do all the remote sensing group thought it could and more. SLAR itself has been around a few years, originally designed as a search and rescue aid and for detecting oil spills. It also can pick up illegal vessels and therefore assist in protecting the coastline, and it has a range of applications involving land use, defence, mining and even tracking locust swarms.

Therefore, it seems likely that government agencies as well as private companies could find a use for SLAR. It is envisaged that eventually the instrument will be sold worldwide from Melbourne.

Fisheries applications are new uses for the instrument. Only one SLAR is now being used in the pursuit of schools of fish – in the Seychelles, which ironically exports fish to Australia to make up the shortfall in Australia's fish catch.

Apart from a two kilometre blind spot under the aircraft, the radar 'sees' for a total of 80km.

Several fishing industry representatives took a ride in the F27 SLAR proving flights. One was Mr Kevin Williams of WW Fisheries Consultants, who flew in the plane off the South Australian coast.

He said although he would like more Australian trials of SLAR, his early impressions were that it had promise.

While it would probably prove to be a worthwhile adjunct to visual spotting, he said companies buying it would have to make a commercial decision about whether they could afford the asking price. He thought perhaps leasing could be the answer for some companies.

Although there were quotas on the catch of bluefin tuna in Australian waters (around 11 500 tonnes this year) and therefore the fleets did not wish to increase the size of their catch, the instrument could certainly make the companies more efficient by directing them quickly to the schools.

The tuna fishing season lasts only about three months, therefore in the off season it would make sense for fishing companies which own SLAR to lease it out for other purposes.

Because of its many uses, SLAR looks set to become a valuable manufacturing and export product for Australia.

Ericsson is rather a quite giant. It is an acknowledged world leader in telecommunications, but probably few Australians realise that every time they use the phone, this Swedish company has made connection to the other end possible.

Remote sensing continued over page

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Assistance to the fishing industry is proceeding on another front at the Division.

Dr John Parslow, who is a member of Dr Graham Harris' remote sensing group, is involved in research to make optimum use of ocean colour data.

There is currently no satellite which provides really useful data on ocean colour, and won't be until 1991 when the SEAWIF satellite is launched.

However, Dr Parslow is engaged in analysing the vast amount of data received from Nimbus 7 which was launched in 1978 and surpassed expectations by lasting until 1986.

Nimbus 7 had a sensor on it called a Coastal Zone Colour Scanner (CZCS) which was specially designed for measuring the light emitted by water.

Fishermen and fisheries scientists have been aware for many years that the colour of the ocean in different areas can indicate the presence or otherwise of algae and other planktonic organisms, and therefore the likely presence of schools of fish.

Analysis of the data has yielded some important results. For instance, the data has shown that not all thermal fronts are highly productive areas. This fact points to the desirability of using both thermal and colour data as complementary tools for predicting where the best catches are. On a larger scale, the complementary use of thermal and colour imagery gives a greater insight into the processes at work in our oceans.

Australia was not prepared for the mass of ocean colour data which came from Nimbus 7, but has since been able to get access to achival data from NASA. In the future satellites will be more commercial and it will be to the Division's advantage to be fully involved in scientific research on ocean colour from the start.

But things will be different with the launch of the new sea satellite in 1991.

For instance, one of the ways the Division is preparing for the surge of information which will be available from SEAWIF is through the use of an airborne colour scanner.

A scanner, which has been designed and built at the Laboratories by Mr Steve Walker, is now being fine tuned. Its development is a joint project between COSSA, the Division of Oceanography and the Division of Fisheries. Already the scanner has had some early trials, and looks very promising.

Animal welfare lobby group holds first agm

The Australian Federation for the Welfare of Animals, a lobby group initiated by a CSIRO scientist two years ago, appears to be flourishing.

Dr George Alexander from the Division of Animal Production did much of the leg work to get the Federation up and running in 1986 (see *CoResearch* No. 294, August 1986). It was incorporated in December last year and held its first annual general meeting in Canberra last month.

AFWA was set up with the stated intention of providing a focus for 'the many people in the community who oppose the extreme views of animal liberation'.

It aims to promote high standards of animal care among those groups which use animals for education, recreation, experimentation and/or livelihood and has attracted the interest and membership of a wide range of groups which have contact with animals. These include various breed societies, university departments (such as the University of Queensland), the Australian Wool Corporation, zoos, farmers and horse groups as well as scientists.

Now it has 80 member groups — representing an aggregate of more than 250 000 people (although some individuals are represented in more than one group). Its first council comprises senior representatives from a range of sectors: e.g. the secretary of the Australian Veterinary Association, the head of the Queensland University Department of Physiology, the president of the Australian Horse Council, the president of the Agricultural Society Council and others.

Dr Alexander said the Federation had strong support from the Director of the CSIRO Institute of Animal Products and Processing, Dr Alan Donald, and from his own Chief, Dr Trevor Scott. However, it did not have official CSIRO recognition.

He said he believed in the past four or five years, CSIRO (and other) researchers working with animals now gave a lot more thought to designing animal experiments. There was also a new generation of people coming from the universities, he said, who had been trained to accept the need to care for the animals which they needed for research.

Mining industry benefits from invention

The officer-in-charge of the Port Melbourne laboratory of the Division of Mineral and Process Engineering, Dr Ralph Holmes, has been honoured for work of direct benefit to the mining industry.

Dr Ralph Holmes

Dr Holmes has won the Australasian Institute of Mining and Metallurgy's Mineral Industry Operating Technique Award, given in recognition of his research and development of an on-line analyser for determining the iron content in a moving stream of iron ore, and for bringing to fruition a practical and operational control tool.

The on-stream iron ore analyser, called IRONSCAN, has been developed in collaboration with Hamersley Iron, and has potential to improve export quality control of iron ore.

Following initial trials at Port Melbourne, an industrial version was manufactured by Mineral Control Instrumentation in Adelaide, which is now licensed to produce the analyser commercially.

IRONSCAN is able to provide rapid information on ore grades, and can be used to monitor ore grade during shiploading operations. This allows the detection of variations from target grades before loading is complete, enabling corrective action.

Perhaps the greatest potential for IRONSCAN is at the mine, particularly at the primary crusher where conventional sampling and analysis is very expensive and sometimes impossible.

If trials are successful, IRONSCAN would provide timely information on ore grade, enabling grade controllers to make more effective use of available high and low grade ore throughout the orebody, thereby extending the life of the resource.

Retirements

Mr Alec Kurylowicz has retired from the Gungahlin site in Canberra after 30 years with CSIRO. Alec was born in Poland and migrated to Australia after the war. From 1950 to 1958 he worked in the plant workshop of the Department of Works in Canberra, then joined CSIRO in 1958 as a laboratory craftsman attached to the Site Services Garage at Black Mountain. He remained there for the next 20 years before transferring to Gungahlin in 1978 to take over the garage. At Gungahlin Alec was responsible for the operation of the garage-workshop which included the maintenance of the vehicle fleet, motor cycles, tractors, mowers and various farm implements. This often proved a difficult task for one man in a workshop which lacked adequate equipment, a situation highlighted in the institute review of garage services and the consequent decision to centre all CSIRO vehicle servicing in Canberra at one central garage. Alec will be remembered for his bright and breezy nature and his desire to demonstrate his current activities to those whose business took them past his workshop.

###

The Division of Water Resources has lost one of its most capable scientists to private industry. **Dr Adrian Peck** has joined the groundwater consulting firm Rockwater Pty Ltd after 31 years with CSIRO. Adrian joined the agricultural physics section of the Division of Plant Industry at Deniliquin as a TO in 1957, led and developed the soil physics/hydrology group of the Division of Soils in Perth during the 1970s and was instrumental in drawing together the research on water resources in CSIRO, initially in the Division of Groundwater Research and finally in the Division of Water Resources, where he was Acting Chief during its first year. Adrian has an international reputation as an outstanding research scientist in both fundamental and applied soil physics and hydrology. His knowledge has been applied to activities ranging from the development of an osmotic tensiometer to the use of historic data sets in modelling the effects of clearing forest on stream salinity. He was at the forefront of the theoretical studies of spatial variability in soils and aquifer systems. He received numerous invitations from academic institutes in the United States and Australia, led working groups on study tours to China and Thailand, convened the AWRC Groundwater Research Needs Committee and was a consultant in several states to committees developing strategies to manage salinity problems. Adrian's scientific leadership spawned many projects and encouraged many young scientists. He is author of 57 research papers as well as many book chapters and reviews.

###

After 26 years with CSIRO, **Mr Salvatore 'Tony' Gambale** has retired from the Division of Wildlife and Ecology. Born in Italy, Tony was awarded the Diploma of Land Surveyor before migrating to Australia in 1962. He joined Wildlife as a labourer in August of that year. In this role he has assisted with building extensions, the erection of animal yards and enclosures, fencing and general maintenance. In 1964 he transferred to a TA1 position and initially assisted with field and laboratory studies of wild rabbits with emphasis on relationships between the glandular system, behaviour and health. By 1966, his interest and enthusiasm had assisted his reclassification to TAIII as he expanded his responsibilities for studies of rabbit behaviour. In 1974 he became a TOII based on his planning and conduct of ingenious experimental studies relating to the role of olfaction in the behaviour of rabbits. Later, Tony transferred to the house-mouse program led by Dr Trevor Redhead where his work involved examination of the role of pheromones in mouse populations. His contribution to the program was cut short by ill-health and he retired earlier this year.

Mountaineers safe and well

Dr John Finnigan and his party of intrepid mountaineers have returned safely from their attempt on Baruntse in Nepal (see CoResearch No.s. 310 and 312) thinner and somewhat disappointed at being defeated by the weather so close to their goal.

CoResearch will have a feature on their experiences in the next issue.

A feature on the ANZAAS Congress, and a story on the changes at CIRC, scheduled for this issue have been held over because of space constraints.

Entries are pouring in for the* CoResearch *Great Citation Classic Competition. The winning division will be announced in the next issue.

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

CoResearch
No.314 July 1988 CSIRO's staff newspaper
CSIRO AUSTRALIA

Vaccine work

Basic research leads to major breakthroughs in control of two rural scourges

In yet another triumph resulting from long term research in CSIRO, the Division of Tropical Animal Production, together with project partners Biotechnology Australia Pty Ltd, have unveiled their plans to put a cattle tick vaccine on the market within three years.

Over 100 invited guests attended a briefing in Brisbane last month, following the commercial protection of the work by publication of international patents.

Once again, it has been demonstrated that to achieve real and lasting benefits for Australia, CSIRO must be allowed to continue its basic research. The work on the cattle tick is based on research which started more than 20 years ago in the Division.

The outcome is likely to be a major weapon against the $150 million per year cattle tick problem in Australia. Our cattle will be healthier and their products worth more once cattle ticks can be brought under control.

And yet the research has so far, since this current project began in 1981, cost no more than $3 million – a minuscule amount compared with the potential return.

Apart from the market in Australia, a major export market for the vaccine is available in Latin America, where current losses due to the tick problem amount to about $1 billion per year.

Early work at the Division had started with basic research into the biology and mechanisms of the parasite and later concentrated on studying the natural immunity of cattle exposed to the tick in the field. Now the approach has progressed to the use of sophisticated biotechnological procedures to combat the problem.

A really effective cattle tick vaccine had to await the development of genetic engineering techniques which offer the possibility of an exceptionally pure product, cheaply and easily available.

The cattle tick *Boophilus microplus* is the most serious external parasite of cattle in Australia, with one third of the country's cattle afflicted.

In addition to the direct effects on cattle of an infestation of cattle ticks – i.e. reduction in the animal's appetite and anaemia due to the parasite sucking blood – the tick also transmits parasites that cause tick fever (babesiosis – see later in story).

The Division has given high priority to the development of a vaccine against cattle ticks, and a team of scientists now headed by Dr Peter Willadsen has worked on this current project since 1981. Other avenues of tick control such as new acaricides have also comprised a major part of the Division's research program.

Following on from work conducted by Dr John Roberts on natural immunity begun in the 1960s, another scientist, Dr Tony Johnston (now retired from the Division), studied the work and decided to test a theory.

This was that it may be possible to stimulate immunity in the animal by injecting tick tissues that were not normally in contact with the host but which would be exposed to and possibly damaged by antibodies produced by the host in response to the vaccination.

This inspired theory was proved in 1983. Cattle were made immune to the gut cells of ticks – essentially making the cattle 'toxic' to the ticks feeding on them.

When ticks were placed on treated cattle, there was massive destruction of the ticks' gut tissues as a result of antibodies absorbed by the tick when feeding on blood.

This startling concept is now nearing commercial reality – a result of painstaking research, a certain element of good luck, deduction based on earlier work and the successful genetic engineering of the purified protein by Biotechnology Australia.

A complementary and equally important project is the development, now well advanced, of a genetically engineered vaccine against tick fever (babesiosis) which is a protozoan blood disease transmitted by the cattle tick (which could be described as the cattle equivalent of malaria).

Dr Ian Wright and his team* have built on years of basic research, working in collaboration with partners CSL and Coopers Animal Health, to produce the elements of a commercial vaccine.

This vaccine could be complementary to Dr Willadsen's anti-cattle tick vaccine because the predicted success rate of the latter could actually increase the prevalence of tick fever.

One way this would occur is through the removal of natural immunity passed from the cow to her calf. If this immunity is absent as a result of reduced tick fever transmissions because of lower numbers of ticks and the calf is subsequently exposed to ticks, it will be a prime candidate for the often-fatal tick fever.

Dr Wright said there would be a market for such a vaccine in Australia, but the biggest demand would be in South America for cattle, and for sheep in the Middle East.

Like the cattle tick vaccine, the financial return on this work is expected to far exceed the cost input of about $600 000 per year.

Cont. on p.3

Members of the tick vaccine team, photographed at the briefing in Brisbane last month, left to right, Dr David Kemp, Ms Joanne Gough, Mr Alan Donaldson, Ms Janine Nielsen, Mr George Riding and Dr Peter Willadsen. The remaining member of the group, Dr Ross Tellam, was absent.

Another python muscles in – and can't get out

Greedy pythons appear to be making the life of CSIRO staff working in the tropics rather interesting of late.

First there was the scientifically incompetent serpent which devoured the prize stud mouse specially bred by Dr Martin Sillence at the Tropical Cattle Research Centre in Rockhampton (see *CoResearch* April 1988).

Immediately after reading that article, Mike Nicholas, a technical officer at the Division of Tropical Crops and Pastures in Katherine, had to go to the stockyards and cattle weighing crush at his site. There he noticed an enormous python.

Mike saw a rather large bulge in the middle of the snake, so obviously it had recently dined rather well on some morsel in the yards. Mike said the reptile's girth was about as thick as a human thigh, and it was about 2–2½ metres long.

'In your last snake story the culprit had devoured an experimental animal. Perhaps this malfeasant was waiting for one of our experimental cattle!' said Mike.

From the Chief Executive

A column by Dr Keith Boardman

The bicentennial conference on Anglo-Australian science held at the Royal Institution in London earlier this year included a paper on the development of radio astronomy in Australia. It was given, however, not by an Australian but by an American radio astronomer from the University of Washington in Seattle.

Professor Sullivan gave an outstanding account of the development of radio astronomy in Australia and as I listened to his talk, I wondered how he was so well informed in Australian radio astronomy. It transpired that he had spent part of his sabbatical at the Division of Radiophysics where he consulted extensively the Division's archives.

Professor Sullivan told me that he found the archives at the Division in excellent condition and containing excellent information. This was in distinct contrast, he said, to the amount and quality of archival material available for most other radio astronomy groups around the world.

CSIRO archives were the prime source for Professor Schedvin's research into the history of CSIR and CSIRO. At the launching of his book *Shaping Science and Industry*, Professor Schedvin paid tribute to the CSIRO archivist, Colin Smith, who has built up the CSIRO Archive into a valuable resource for historians and has ensured the preservation of vital and irreplaceable records of Australian science.

The April 1988 *CoResearch* explained how the Archive culls the enormous quantities of records generated; renders records of enduring value 'safe, retrievable and available'; and assists hundreds of users.

Colin reminds me, however, that his section of four has managed to deal with only 20 per cent of the estimated total quantity of valuable documentation in CSIRO and that we have already lost a lot. He cites the case of a scientist who escorted him proudly to the basement where he stored his records of several decades of nationally important experiments – only to discover that they had fallen victim to a general 'chuckout' a few weeks earlier.

Consideration is being given to how we can enhance and improve our procedures and training, to prevent such dissipation of irreplaceable resources and better meet our obligations under the Archives Act. In the meantime, however, it is up to everybody to do what he or she can to help.

A major point of danger is the disposal of office papers incidental to retirements, removals and reorganisations – particularly where senior officers are involved. The archivist has a handout which provides guidelines. More strictly personal papers are dealt with in a pamphlet available from the Academy of Science, which collects such material. Regarding central registry files, the Australian Archives' General Disposal Schedules are broadly applicable. Advice and help in their use is available from both Australian Archives and the CSIRO archivist.

It is also possible to improve storage conditions of non-current correspondence, data, photographs, minutes and the like. Too often, these are condemned to cellars or attics which may be damp, dirty, fire prone or rat infested. Instead, they should have the safest storage – at the expense, if necessary, of such replaceable assets as stationery and reprints.

Some people think archives are irrelevant to CSIRO's purposes. However, they underestimate the amount of backreference that occurs and the public education and public relations value of encouraging research into science history and policy. Keeping archives fosters wisdom and generates corporate pride. And the cost is miniscule compared with the cost of making records in the first place.

However, it is not simply a matter of keeping records. We need our archivists to expedite timely, orderly and efficient destruction of ephemeral and duplicatory material.

I conclude by quoting an editorial in an American scientific journal:

'Records, letters, photos, original manuscripts, notebooks, tools – these represent a living process and are a heritage not to be squandered or dissipated during financial exigency...

'Discarded items are gone forever...faithful recordings, if preserved, form the basis for perspective in any analysis of progress.'

M Keith Boardman

Many divisions have not yet replied to a call for information about their scientists who have 'Citation Classics' (see* CoResearch *May 1988). Please send in the information as soon as possible for publication in the near future.

Letters to the Editor

Dear Editor,

'PR' vs. behaviour

At some speed the Organisation has embarked on change to the extent of changing its ethos. Without a clear understanding of the depth of managerial skills required for successful implementation, this change will result in mediocrity and the loss of staff commitment and morale. There has been recent talk of 'drawing the curtains back and letting the light of public scrutiny burst upon the internal operations of CSIRO'. It is not an original thought, but the most appropriate place for the light to commence (and flow from) is within. Implementation of the recommendations of the review on internal communication of 1985 could only assist.

It is regrettable that the pertinent aspects of the significant and wholescale elevations of administrative positions of the corporate centre could not be communicated to create acceptance and commitment to the new structures. The inconsistent approach applied to the subsequent appointments is of further concern.

The renewed emphasis on selling corporate ideas, outward thinking and image is of little substance if decisions cannot be justified by reasons rather than sold as PR after events.

With the closure of the RAOs, devolution and the dumping down of the administrative systems and procedures, the Organisation is left with six independent institutes and a corporate centre of decreased relevance and doubtful history. At a time of increasing scrutiny of the taxpayer's dollar, to have a corporate centre that cannot be seen to demonstrate either administrative credibility or integrity invites concern over our Organisation's vision and future.

It is behaviour that changes attitudes.

D Richmond
AAHL

Dear Editor,

I would like to put pen to paper regarding a proposal by Jim Lumbers to scale down the technical enquiry service. The proposal is to set up a central service, and train receptionists at all CSIRO locations to handle enquiries.

CSIRO Communication – Strategy or Opportunism

The failure to re-appoint a regional information manager in Queensland following the secondment of Ian Sutherland to the office of the CSIRO Board deserves criticism. Ian was the last of the RIMs to be appointed across Australia. There appears to be no strategic logic in the fact that Queensland did not receive an RIM until after the Northern Territory, the total population of which, after all, scarcely equals a Brisbane suburb. The decision, of course, was opportunism. In Queensland the RAO manager was also State committee secretary, and RIMs originally were appointed to carry this function as well as their information role. Therefore Queensland had to wait until an RAO manager retired before an RIM could be appointed!

Now it appears that Queensland is the first State to lose an RIM position, and we should ask why when PCEK has apparently recommended that the State information officer network be maintained.

There is a proposal from within the information services unit to abolish the State information network and replace it with a single technical inquiry referral service. The proposal advocates the notion that receptionists be trained to 'attain an advanced level of knowledge about CSIRO and high skills in handling telephone inquiries'.

What then is wrong with this proposal?

. It represents the transfer of yet another headquarters function to divisions without recompense. Chiefs are unlikely to be receptive to proposals that add to the workload of existing staff;

. it represents yet another example of 'top-down' thinking without consultation with divisions;

. receptionists are (at least at our locations) already fully employed on clerical duties in addition to operating switchboards;

. more than half of all inquiries received here are referred to other locations, often non-CSIRO. Although this can be achieved in part by directories, professional expertise in information handling and technical knowledge (i.e. some science training), is usually required for this to be effective. Receptionists are unlikely to have this background;

. the ability to represent CSIRO at trade fairs, exhibits or special functions will be reduced. These are important means of reaching rural consumers. Ian Sutherland and I regularly co-ordinated exhibits at the Farmfest Field Days, and second largest agricultural field day event after Orange.

My feeling is that CSIRO is lacking a communication strategy that I can perceive is operating in practice. This proposal to gut the State information network, coupled with the recent cessation of communication grants, is simply closing off options and opportunities for information officers at divisional level to operate.

Geoff Adams
Senior Information Officer
Div. of Trop. Crops & Pastures

Dear Editor,

In the May issue (No. 312), the question of the oldest living CSIR officer was discussed.

I believe that Mr W A Empey must be very close to holding that record. He lives at West Ryde NSW, and retired from the CSIRO Division of Food Preservation in 1961. He is now 92 years of age.

The Divisional records show that he was appointed as 'assistant investigator' in January or February 1927 to meat investigations conducted at the Biochemistry Department of Melbourne University under associate Professor W J Young. The overall direction of the studies was provided by the Australian National Research Council, but the funds were entirely from CSIR, which, at the time, 'farmed out' a good deal of the work in which they were interested.

On p.32 of the Second Annual Report of CSIR (1927-1928), Mr Empey is given official listing. He transferred to the CSIR Food Preservation Section in 1931.

J R Vickery
(Chief, Division of Food Preservation, 1940-1967)

Dear Editor,

On page five of the May issue of *CoResearch* there was an article about the Bicentennial Exhibition in which there was a comment about the lack, in the display, of an explanation for the acronym CSIRO.

I would like to offer the design [see below] as a suitable sign to overcome this lack. If viewed in poor light or from a distance, it is particularly appropriate since it gives a much better impression of the current mode of operation of the Organisation.

Would you please pass it on to the person in charge of the Bicentenial Exhibition for his or her consideration. Alternatively could I suggest you publish it in *CoResearch* as the first entry in a competition to find a suitable poster for the Exhibition.

T E Bellas
Division of Entomology

Commonwealth
Scientific &
Industrial
Research
Organisation

Dear Editor,

Through your Letters column, I'd like to say goodbye to all my friends in CSIRO. I'd like to publicly acknowledge the help and support given to me over the years by my former

Cont. on p.4

314-1988

Scaled down role for CIRC

CSIRO's Centre for International Research Co-Operation (CIRC) is losing half its staff and will scale down its operations to fulfil a purely 'corporate' role.

This means that functions perceived as not belonging to the corporate centre will be hived off, to be carried out at the discretion of the new CSIRO institutes and divisions.

CIRC was reviewed, along with the corporate centre, by Pappas, Carter, Evans and Koop, and it received a 'service level two' designation, meaning a reduction in staff (from nine to seven) and services.

However, there was a caveat: further determinations concerning CIRC's functions had to be made by the institute directors in conjunction with the Director of Corporate Services, Mr Peter Langhorne. CIRC ended up with a total of five staff.

The option chosen by institute directors will see a much smaller CIRC operating out of headquarters, and most likely a separate commercial consulting venture (the latter was originally mooted last year — see *CoResearch* No. 307, November 1987).

Under this option, CIRC will continue to be the corporate entity responsible for the co-ordination and promotion of international activities within CSIRO, except any commercial projects which would be transferred to a commercial entity. Therefore, CIRC would only be involved in activities of national interest.

Officer-in-charge of CIRC, Dr Barry Filshie, has been critical of the way the decisions were made. He said he wasn't given full opportunity to participate in discussion on the paper which he put up to the Executive Committee which contained two options for CIRC's future. He wasn't present during the latter part of the discussions.

He was also critical of the PCEK review which examined certain aspects of CIRC's operation but did not look at the 'customers' and their needs.

'I said that repeatedly during the review and was never given a satisfactory explanation. They never went outside the Organisation for comments on CIRC's performance and the need for CIRC and what level of service was required.

'From the very limited survey that was done within the Organisation the general feeling was that what we did do, we did well, but for whatever reason they decided that many of our functions were not appropriate for the corporate level and they should be farmed out to the divisions, but little thought has been given to the way in which those activities are going to be taken over by the institutes and divisions.

'My fear is that they are not going to be done properly from an organisation-wide perspective, and the international reputation of the CSIRO will suffer as a result,' he said.

'We think we have been put through the mill and it's a disproportionate cut,' said Dr Filshie. 'I'm still reeling from it.

'The service level two decision wasn't a surprise. The surprise came from the decision of the institutes. We weren't being asked for a staffing level cut from the institutes, all we were asking them to do was to determine our functions but they recommended a cut too, beyond what was being recommended by the PCEK review.

'Just how we are going to cope I don't know because the workload is going to be extremely high,' he said.

Dr Filshie also is concerned about the possible confusion arising from having CIRC and a separate commercial consulting wing, and about the Organisation becoming aggressively commercial.

'I don't think the Organisation ought to be setting aside more than a certain proportion of its resources in this area. Mostly it doesn't involve research — it's technology transfer.

'We have a limited obligation to engage in the international consulting work, but our obligations really are with Australian industry. There is a great danger that, if it is on a commercial scale and the money starts rolling in, it will become an end in itself and our priorities will get out of order,' he said.

Travelling exhibition

Women in science show to hit the road this year

DID YOU KNOW:

. that proportionately there were more women in science and technology endeavours between 1900 and 1910 than during the 1960s?

. that women were doing carpentry during the 1920s?

. that almost equal numbers of women and men graduated with a BSc in 1946?

These facts are among those unearthed by the Women in Science Enquiry Network (WISENET), which is taking its show on the road later this year in a travelling exhibition.

A group of WISENET members from South Australia, Victoria and New South Wales has been successful in obtaining funding from the Australian Bicentennial Authority and the SA Institute of Technology for an exhibition on the history of women in science and technology.

Called *A History for the Future*, the exhibition is intended to increase awareness of the knowledge and experience of women in science and technology and engender greater confidence among women about their roles as decision makers on technical issues.

The group also hopes to encourage women and girls to consider studying for scientific, engineering or technical careers.

There will be seven themes: office technology; women on the land; women in industry; women and the environment; women and health; food for thought; and women and education.

Thought provoking

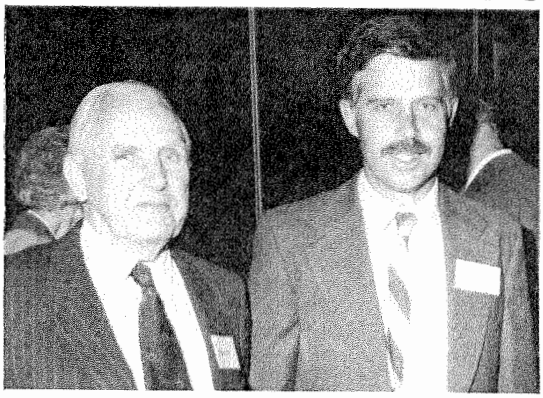
By making the exhibition interactive, fun, instructive and thought provoking, WISENET is hoping to reach a large audience of both women and men.

The show will travel for one year from November, through SA, NSW and Victoria.

The exhibition committee is now seeking input from women and men from a wide range of backgrounds, both scientific and non-scientific. The project co-ordinator is organising 'reference groups' or 'reference people' to assist in suggesting names of interesting women to be interviewed, provide information on relevant photos/journals/articles and provide feedback on material prepared for exhibition.

For more details contact Ms Virginia Westwood, CSIRO Information Services Unit, PO Box 89, East Melbourne, VIC, 3002. PH: 03-418 7335.

McLennan Medal nominations



Sir Ian McLennan, left, with first Medal winner Dr Brian Sowerby

Nominations for the 1988 Sir Ian McLennan Achievement for Industry Award close at the end of next month (August).

The criteria for selection are based on practical achievement resulting from CSIRO work which has assisted an industry or a private or public enterprise.

The first winner was Dr Brian Sowerby who invented Coalscan, followed by Mr John Coleman for his waxed cardboard box manufacturing process, and joint winners in 1987 – Dr Albert Rovira for work on cereal cyst nematode and Dr Hari Sinha for his contribution to the establishment of the world's largest zircon processing plant.

The award was established in 1985 by the CSIRO Advisory Council, and was named in honour of leading Australian industrialist Sir Ian McLennan, to recognise his contributions to the application of science and technology for Australia's industrial development. Sir Ian was Chairman of BHP for many years and later Chairman of the ANZ Banking Group and of Elders IXL.

Nominations may be from any individual or organisation outside CSIRO or, within CSIRO, from individuals, chiefs or directors nominating an achievement in their area of responsibility. Where teams are involved, the team leader would generally be nominated for the award itself, with the team receiving recognition on the accompanying plaque.

For further details about nominations, contact Mrs Margaret Brown, PO Box 225 Dickson ACT 2602. PH: 062-48 4484, FAX: 062-48 4641.

Another sales milestone

Once again, sales of CSIRO publications have showed a marked increase.

According to publications and sales manager Mr Jeff Prentice, the target of $1.3 million for the financial year ending 31 May 1988 has been reached.

This includes $902 636.56 for the Australian Journals of Scientific Research, for which the targeted figure was $800 000.

Mr Prentice said the CSIRO Bookshop had been the focal point for much of CSIRO's marketing and sales activities for books and journals over the past 12 months, and this had meant an overall increase of $300 000 in revenue compared to 1986/87.

With continued expansion of marketing and sales under the Editorial Services Unit, the target figure for 1988/89 could exceed $1.5 million.

Tick research

Cont. from p.1

The initial research in both projects was partly funded by the Australian Meat Research Committee (now the AMRDC). Since 1985 the tick vaccine project has received a biotechnology grant from the Industry Research and Development Board of the Commonwealth Department of Industry, Technology and Commerce.

*Dr Wright's team has comprised Dr Brian Goodger, Dr Jim Aylward, Dr Peter Riddles, Dr Kevin Gale, Dr Brian Dalrymple, Mr Graham Leatch, Mr Kurt Rode-Bramanis, Mr David Waltisbuhl, Ms Ingrid Abetz, Ms Margaret Commins, Ms Chris Dimmock and Ms Wendy Smith. Division Chief Dr Dave Mahoney was involved in much of the early work into babesiosis and the vaccine feasibility study.

Letters
Cont. from p.2

supervisors, Michael Dack and Robert Lehane. And I'd like to thank all members of the ROTF [Redeployment and Outplacement Task Force], who have mastered the subtle art of protecting the interests of both the Organisation and the employee.

The times are a-changin', but the happy memories remain.

Elizabeth Odgers
Public Affairs

Dear Editor,

Would the real new logo stand up

Have you noticed the new corporate logo yet? No, not the over-priced, uninspired logo discussed regularly in this column that was supposed to unite the Organisation. This one appears to be unique to professional appointment advertisements and to some 'tender' type adverts. Rather than being new, it is a stretched (or is it sagging) version of the much-debated symbol and many of the adverts actually have both the official logo and the stretched version. I must add that it certainly makes CSIRO positions prominent! Could it be the work of an advertising agent?

In these austere times at the laboratory bench, I question the cost/value of these additional stretched logos that account for 14 per cent of each ad. In *The Australian* of 2 July 1988 there were six such advertisements with a total length of 1.73m! Could you imagine 1.73m of stretched CSIRO logo winding through the pages of this reliable source of information on comings and goings within the Organisation? On two facing pages alone, there was 1.22m of logo. But now try to imagine the cost of it. An enquiry to the Canberra office of *The Australian* revealed that these ads cost $26.90 per cm, not allowing for any corporate rate that we may enjoy. So on 2 July alone we 'invested' $652 in stretched logos – while the accepted (?) logo was already displayed elsewhere in each ad. Can we afford such prominence? Can *CoResearch* afford 14 per cent extra space for me to have an imposing stretched logo down the side of this offering?

For $642, we could employ an STO or, dare I say it, an ASO6, for a week. Just think who/how many we could employ with all the savings from such ads in all the major cities. Fortunately I have not seen our 'new' logo in *Nature* yet.

Stuart Craig
Division of Plant Industry

Oops! A feed horn bites the ice

Communications between Australia and our Antarctic territories are becoming far more effective and efficient thanks to new technology – but an old-fashioned accident nearly put this process back a few years.

However, a spirit of co-operation and some painstaking work put the project back on its feet.

During the 1987/88 summer season at the Casey Base in the Antarctic, OTC's Vista installation team accidentally dropped the corrugated feed-horn of the new 7.3m antenna. This was 20 February and the team called it 'Black Saturday'.

The antenna was being installed to made possible the reception and transmission of TV images and to give access to computers, through INTELSAT.

The accident represented a major disaster as no spare was available on site and it was not possible to transport another unit from Australia.

A frantic call was made to Mr Ron Lukin, OTC manager for the project, and a team of experts including Dr Bruce Thomas, a senior principal research scientist at the Division of Radiophysics met at the new Sydney Satellite Earth Station at Oxford Falls on the Sunday.

The only spare feed-horn in Australia was brought in from the OTC store, and a lengthy conference took place between Sydney and Casey via telephone. Despite a fracture of the feed-horn near the critical throat region, Casey's senior mechanic John Duncan came to the rescue, and an 'operation' with 'assistance' from Sydney proceeded.

John made a special jig to support the horn and after welding the broken sections, carefully re-machined the internal corrugations near the weld to the exact dimensions of the horn in Sydney.

Following completion of the antenna (mounted inside a radome for weather protection), the mandatory INTELSAT tests were made, which verified the 'operation' to be entirely successful. The official handover of the Casey ANARESAT facility was on schedule on 7 March.

The co-operative spirit between OTC and the Division of Radiophysics has extended over a period of 10 years, initially with earth station antenna upgrades at Ceduna and Moree, and more recently with the design of three 18m antennas for Perth and Sydney.

New instrument

Divisions boost service capabilities to attract more money

In pursuit of substantially more commercial business, two CSIRO divisions have each purchased a sophisticated broadrange analytical instrument which will offer a useful service to a variety of users in industry and research institutions.

The divisions of Tropical Crops and Pastures and Fuel Technology have now each installed an inductively coupled plasma mass spectrometer (ICPMS). These are the first two such instruments to be commissioned in the Organisation.

DTCP has purchased the instrument (costing approximately $380 000) from its own budget and from a special grant from its institute, while DFT (based at Lucas Heights) has combined with three other groups for the purchase. These are the Australian Nuclear Science and Technology Organisation (ANSTO), the Division of Exploration Geoscience and the Office of the Supervising Scientist at Jabiru in the Northern Territory.

The ICPMS, manufactured in the UK by V.G. Isotopes, is capable of very sensitive analysis of almost all elements in the periodic table, and this enables a huge number of uses. For instance, DTCP will use the instrument to provide multielement analyses on a range of biological samples. The Queensland Institute of Technology will also have access to the service to assist in its mining and metallurgical research.

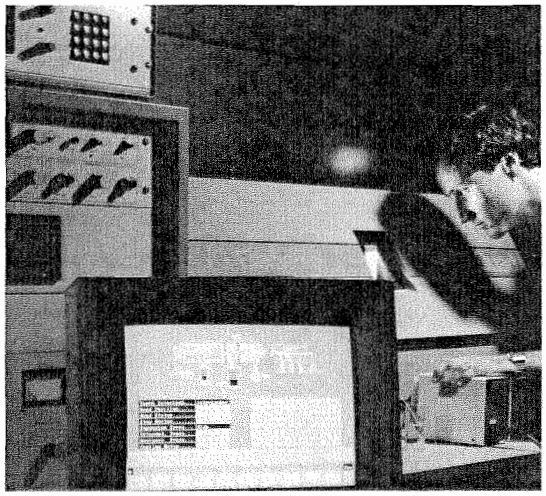
Uses for the instrument at Lucas Heights are many. For instance, scientists from Jabiru will use it to analyse water samples to monitor evidence of pollution from uranium mining. Also, the Water Board is interested in analysis relating to sewerage, particularly in characterising different effluents from different sewerage plants.

It is also expected that the instrument will be of considerable assistance to CSIRO research.

According to Mr Alan Johnson at DTCP, the potential of the instrument is largely untapped. He said it was likely, once the instrument was fully employed, the Division would run at least two eight hour shifts, and possibly three, per day, to get the most out of it.

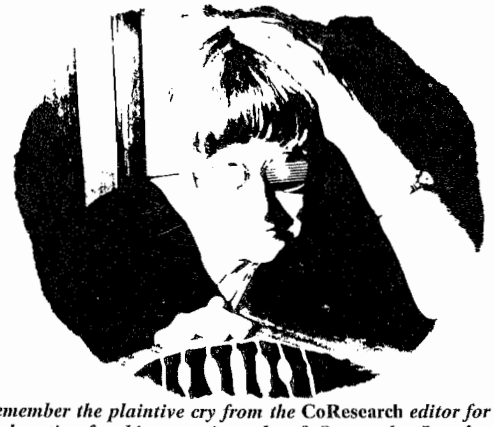
Both divisions plan to actively seek commercial work based on the ICPMS and are preparing brochures which feature the instrument. Both have already received a number of expressions of interest from groups which have heard about its capabilities. Eventually, the instrument is expected to become a significant source of income for both divisions. A scale of charges is yet to be determined.

Scientists in other CSIRO divisions will be encouraged to make use of the ICPMS. For further information, contact either Mr Johnson at DTCP on 07-377 0209 or Mr Les Dale at DFT on 02-543 3855/3287.



The inductively coupled plasma mass spectrometer

Improbable explanation corner



Remember the plaintive cry from the* CoResearch *editor for an explanation for this mysterious photo? One reader, Ian clough, thinks he has the answer:

This is one of the volunteer guinea pigs for the *Numbat Project* recovering from a half-hour session in the 3D-video 'PHYSIOLOTRON'.

Candidates are blindfolded, then strapped to the roof racks of the Division's Falcon station wagon.

Before they have a chance to recover, they are harnessed into the PHYSIOLOTRON, the blindfold is removed, the 3D glasses from the Fujitsu stand at Expo 88 are pegged to their ears and then they are forced to watch a 3D recording of the OIC's 'Gale Force Wind' fishing trip for half an hour.

They are then led away to the decompression chamber to talk to Ralph and Huey about Pavement Pizzas.

After the *technicolour yawn* phase they are fitted with the special RECOVERTRON spectacles and placed in front of a 'LogoScope'.

They are then asked if they see a real cake or a 3D video projection.

Candidates correctly answering the question do not feel the pressing need to find a 3D 'Wet Ones'!

Prospective candidates who wish to undertake this initiation, sorry, investigation, should contact the *Numbat Project* staff at the Division of Geomechanics in Brisbane on (07) 377 0711.

314-1988

The CSIRO printery has closed its doors after 40 years of service to the Organisation. It was a victim of the sweeping changes in the corporate centre precipitated by the Pappas Carter Evans and Koop review.

Printery staff held a 'wake' on 17 June to mark the end on a long and distinguished history. Some of the original staff and others who had worked there during the 40 years of its existence joined with current to staff on a very sad occasion (although people who were there said it was tinged with a certain amount of black humour).

The Chief Executive, Dr Boardman, sent a letter which was read out at the wake.

He said the Organisation had appreciated 'the consistently excellent quality of work and excellent service provided over many years by the CSIRO Printing Centre. The Annual Report is a constant reminder that the Centre could work under extreme pressure to make a superb production – all too often with the barest acknowledgement.

'The decision by the Board to close the Printing Centre was a difficult one. In the final analysis it was made on economic grounds,' he said.

Mr T R Hunter, foundation officer-in-charge of CSIRO's printing and duplicating section which eventually became the printing centre, pictured recounting the main events in the earlier history of the section at the function marking its closure. These events included the planning and printing of CoResearch *No.1.*

Printing service shut-down

Memories – and the future

A printer's personal view

Ralph Judd

By Ralph Judd

The CSIRO printery has finally closed. At this point it is a good time too look back on its history and the Board's decision to close the operation and also to see what employment opportunities have been offered to the staff.

My association with the printery started when I was a school boy in 1950, two years after the operation began at Albert Street.

To get the facts right, I believe the printery really started in Palestine around the early 1940s in the Second Survey Unit. Major Hunter, Major Chamberlain, sergeants, corporals and privates who were responsible for map printing in the Middle East were later to serve CSIRO's printing needs.

I had been in the Cadet Corp at school and I guess one of the pre-requisites for a job with CSIRO's printery at that time was to be able to Order Arms and know what was meant by a four by two.

The talents of this group of craftsmen in leadership and technical skills carried the printery for many years, for they set the standard of quality, resourcefulness and hard work that existed in the older members of the staff.

The printery's mapping work, the use of a 300 line screen for zoology reproduction 25 years ago, Scientific Serials, mathematical typesetting, etc, were examples of the their talents applied at the printery.

Our first change came when we were evicted from Albert Street for one or all of three reasons. Regularly flooding the library, much to Miss Archer's displeasure, Sir Ian's inability to get into the lift because of bales of paper, or the language that flowed from the press room in the basement.

The move to Rokeby Street isolated the printery from the mainstream of CSIRO. Technical positions were dropped for printing craftsmen, and in later years this lower salary structure would in fact prove very costly.

With more space the printing operation expanded. New presses were purchased for 16 page B5 sections. The service to the library in microfilms and prints disappeared as photocopying machines came into use. The addressagraph machine was replaced by computer technology. The multigraph that was used for setting the journal figures was also taken over by computer technology. The art section was diminished and transferred back to Albert St.

Our litho operation was a small part of the printery, but as technology changed, the letterpress operation was to be phased out. A number of problems appeared at this time. The printing industry was changing from letterpress to photolitho. Computer technology would make phototypesetting a very productive tool, and this operation was suited to the cheaper photolitho printing process.

CSIRO's mathematical typesetting operation was highly sophisticated and computer technology was still trying to match monotype (hot metal) setting. Management was aware of the typesetting problems and used CSIRO's resources to develop a suitable computer based system. This system still remains after the printery has closed.

Colour was started to be used in annual reports. The letterpress staff would have to be retrained to handle film, not just single colour but four colour. The older, highly skilled staff were retiring. We realised at this time that the printery had some fundamental problems to overcome, particularly in retraining and equipment for the use of four colour.

Colour films improved in fidelity and scanners and high speed litho presses reduced the cost of printing with large improvements in quality. The printing industry expanded, with greater demands for skilled labour.

Our effort to recruit skilled staff failed because of the low salaries. Obvious problems we faced eight years ago were not given the attention they needed. Production errors were increasing. Staff were leaving for higher salaries in industry. At one point, every printer left within three months, leaving the third year apprentice as the longest serving printer.

It also has to be realised that while the printery offered a quality service, no costing scheme existed. Customers were only charged for material. Our services were abused by unnecessary production volumes, adding to the Organisation's running costs.

Some members of the staff were concerned by the wastage and excessive time taken to produce work. The reviews into the printery and publishing in CSIRO enabled staff to express their concern to senior management.

Colour work was a major problem. The machine required to produce annual reports needed a multi-shift operation. The devaluation of the Australian dollar made it uneconomical for CSIRO to purchase this machine. I feel that there was an argument for a small printing operation in single colour for report work, in conjunction with a user pays costing system.

It is sad to see the printery close but the problems over the past years have been very demoralising and a great strain on loyal staff. Local management has tried to retain an operation that needed major changes.

As the weeks have rolled by to the final closing day, it has been marvellous to see how the staff have been absorbed into the printing industry where their skills will be fully utilised. One older staff member who decided to retire was casually offered three day a week employment servicing processing machines. The deal included job training and the salary was thousands of dollars more than he received from CSIRO.

The staff at the printery have been very disappointed that management has not been able to cope with the changes that were necessary to run an inhouse printing operation.

A print advisory service has been established to replace some of the functions of the CSIRO printing centre which closed on 1 July.

As part of the Editorial Services Unit in East Melbourne, the service has a brief to assist and advise CSIRO institutes and divisions Australia-wide on the use of print media.

Printing and related services that have been carried out by the printing centre must now be purchased from commercial suppliers.

With four staff in Melbourne and one in Sydney, the print advisory group is qualified to purchase print and related services on behalf of institutes/divisions. A network of external contractors is being developed and the collective buying power of the group, quality, service and price advantages will be available throughout CSIRO.

The group offers the following services:

Planning: The responsibility for planning, producing and distributing printed communication is now in the hands of institutes/divisions. To ensure practical, cost-effective print production, it's important to plan and cost all print jobs at the outset. The group will assist any staff member in planning and costing their printing needs.

Costing: The group will suggest production strategies to contain costs and ensure that the printed product achieves an appropriate quality level.

Design: A limited design service is available, but this is intended mainly for front covers, promotional items and saleable publications. The group will arrange freelance design and paste-up if required. It can also assist on questions of CSIRO corporate style as it affects publications.

Production control: Once a job is ready to enter the production cycle, the group will arrange final quotations and place the work with the winning contractor.

Orders: Print purchase orders may be placed by the group on behalf of institutes/divisions. The group will need the relevant cost code and an authority letter/fax from a divisional officer with delegation to authorise expenditure.

Distribution: The group can't physically distribute the finished product itself but will instruct the external printer to bulk deliver the completed job to the institute/division ordering the work or to an external distribution house. Mailing lists and labels are the responsibility of the institute/division, but the group will arrange forwarding of any list held by the Information Services Section at East Melbourne (Elizabeth Westwood, 03-418 7358).

Please contact any member of the Print Advisory Group (listed below) with printing questions and problems. The service is free.

Melbourne office: (Fax: 03-419 0459)

John Best: Manager, print advisory group 03-418 7332
Jim Quinlan: Print advisory officer 03-418 7333
Roy Osborne: Print advisory officer 03-418 7333
Kim Greene: Administration 03-418 7333

Paul Reekie: Manager, ESU 03-418 7324
Kevin Jeans: Monographs/acquisitions editor 03-418 7333

Sydney office:
Print advisory officer (to be appointed)

Print advisory staff are available to visit any CSIRO site to advise on print and design matters, or for discussions in the two print advisory locations. If demand is apparent, a workshop series for CSIRO staff at regional centres on design and print production will be arranged.

The Baruntse expedition

Science and adventure meet in the Himalayas

The Himalayas not only provide numerous challenges for mountain climbers, they have an intrinsic interest for scientists as well.

Dr John Finnigan from the Centre for Environmental Mechanics is both an atmospheric scientist and an avid mountain climber. Earlier this year he was on top of the world, leading a team for an assault on a major peak in the Himalayas, and at the same time observing some scientific principles in action.

The Hongu Valley from where his team made its climb could be described as a great outdoor wind flow laboratory. Basic principles of wind flow can be easily observed.

John is an acknowledged expert on wind flow over hills. He is also a mountaineer with a wealth of experience from countless climbs.

On 23 March he and nine other adventurers set out to climb Baruntse (see *CoResearch* March 1988), which nestles in the immediate vicinity of three of the five highest mountains in the world – the highest, of course, being Mt Everest.

There were six other scientists in his team, including CSIRO staff members Dr Will Steffen, also from Environmental Mechanics and Mr John Armstrong, who is retired from the Division of Plant Industry.

In scenes not at all reminiscent of a divisional seminar, John Finnigan gave impromptu lectures about the spectacular climatic phenomena they witnessed.

Perhaps the most fascinating was the 'competition' between cool air spilling over the edge of a high plateau and the lower, warmer cloudy air.

The upper Hongu Valley, where the group's base camp was located, was a narrow 'v' shape down low while further up glaciation had scoured it into the classic 'u' shape. At the head of the valley was a very broad basin suspended at about 18 000ft above sea level and surrounded by glaciers and snowpeaks – a reservoir of cold air.

During the day the prevailing westerly wind, moist from its passage over the Indian plain, was channelled up the valley. Its presence was marked by a bank of clouds which would advance to cover their upper Hongu camp in the early afternoon. The up-valley flow also kept the cold air above its plateau.

Late in the afternoon, however, when the sun went down in the steep-sided valley, the turbulent mixing which kept the air flow channelled up-valley quickly dropped off and the cold air from the plateau would spill down-valley in a chill 'katabatic wind', pushing back the cloud front.

When the supply of cold air ran out, the katabatic flow would die out and back would come the clouds, often to be greeted with curses by the climbers who had seized the rare windless, sunny moment to have a bath and would be caught naked and covered with soap by the advancing clouds.

Dr Finnigan said he witnessed maybe three or four cycles a day. It's a well known phenomenon, but not usually observed in such a pure sense.

The climbers also saw the classic lens shaped clouds which form over high mountains. These were caused by the atmospheric waves that form as the air is forced over the mountain barrier and were as Will Steffen said 'quite dramatic'.

Evidence of the jet stream was sometimes seen in the form of a plume of cloud blowing off the summit of Mt Everest.

These observations of weather phenomena added another dimension to the excitement of climbing, in what proved to be an eventful trip.

Although they had to turn back only 400ft from the top of Baruntse, they attained the summit ridge at 23 000ft (by way of comparison, Everest is 29 000ft), and returned safely.

Impossible snow conditions at the knife-edged ridge prevented the climbers from reaching their final goal. At one point the lead climbers had to wade through snow that had the consistency of 'a huge pavlova', said John.

The feeling of insecurity that must have presented was matched by the experience of John and Will as they descended.

'We were coming down a steep ridge from just over 22 000ft when a storm started. When the 150km per hour wind gusts hit all we could do was dig our ice axes in and hang on – and we would be flapped about like a flag,' said Will.

'It was very frightening, because if you don't have your axe planted properly you could be swept off the ridge.'

The pair made only one kilometre that day (the rest of the team had descended earlier), and they were forced to stop at the first camp they reached on the route down the mountain.

The nights on the mountain were cold (about -20 degrees Celsius), but Will said in the Himalayas heat is as much a problem as cold.

'On a clear sunny day up on a glacier, the radiation is very intense and you get a lot of reflected radiation from the snow. And at the higher altitude the radiation is particularly intense because of the thin air,' he said.

'We found early on that snow cream wasn't enough – we still got burnt. In the end we simply covered every conceivable part of our bodies.

'Then we would get extremely hot from the radiation even though the air temperature itself was quite low, which meant that as soon as a wind sprang up it would be bitterly cold.'

It wasn't just the heat and cold the team had to cope with. There was the food, and also a major problem with porters.

The high carbohydrate diet included a lot of rice and lentils, potatoes in various forms and chapatis (Indian flat bread).

'When it was fresh and a bit novel it was fine, but after a month and half or two months it got very boring and was difficult for a lot of us to get the stuff down,' said Will.

At high altitude the team had their own pre-packed food which was better, but Will said they used to have fantasies about various types of food which were not available.

'We actually began to crave fats because we were losing body weight at a high rate and burning our own fats. We burnt about 7000-10 000 calories per day but were lucky to put down about 2000-3000 calories.

'We would spend nights dreaming of eating lamb chops and having the fat drip through our beards,' he said.

Most of the mountaineers lost about six kilograms, but John Finnigan lost about 12kg because he also had a viral infection towards the end.

The problem with porters, which caused considerable delays on the march to base camp, probably stemmed from the heightened climbing activity at that time – for instance, there was a major assault on Everest which required a lot of porters.

Most of the team's porters came from the lower regions of Nepal where the trip to base camp began, and the original plan was to employ them only up to the foothills, when the team would take on porters more accustomed to higher altitudes.

But the high altitude porters weren't available so the team was forced to tackle the 18 000ft Mere La (pass), the major obstacle on the trek to base camp, with the low altitude porters. Unfortunately, the weather on the permanently snowbound pass was stormy, and a lot of the porters simply packed up and went home.

'This was quite understandable,' said Will. 'Many of them didn't have shoes and weren't properly equipped. The hardy ones that were left were insufficient to carry the loads – we had only a third of the number we needed, so we had to shuttle the loads across.'

Another disappointment for the team was the necessity to drop the plan to climb Baruntse Nup, a spectacular unclimbed peak just west of Baruntse.

Because of the porter situation, the expedition was already running behind schedule, and Baruntse itself proved more difficult to climb than first thought.

Also, the route the team had planned for climbing Baruntse Nup looked to have a number of dangers which had not been apparent from photographs. An alternate route hastily planned while on Baruntse was also ruled out when one day the team heard an enormous rumble, looked across and saw a huge avalanche sweeping the entire snow slope intended for the assault.

So that peak remains unclimbed, a target for some future expedition.

Despite several disappointments, Will said the expedition was well worthwhile.

'I was happy just getting to 23 000ft,' said Will. Only 18 months ago he suffered a punctured lung and also has had bouts of asthma. The view from that height was worth every laboured breath getting there, he said.

'I recall very well being on the summit ridge at 23 000ft and being able to see a couple of hundred kilometres over the Himalayan range. Baruntse sits right among the giants, which you can almost reach out and touch.

'It was something I will carry with me for the rest of my life,' said Will.

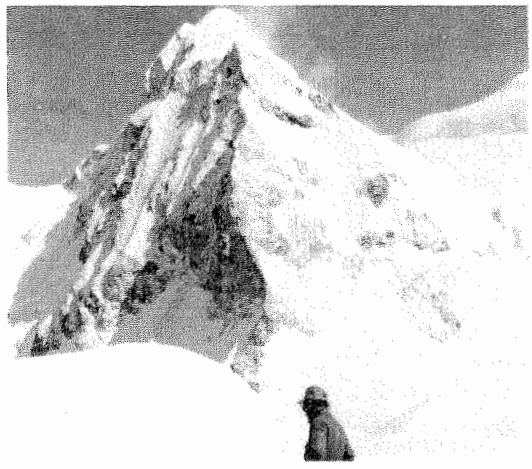
Members of the group funded the expedition themselves, although they had some sponsorship in the form of discounted equipment and services. Will said Singapore Airlines, and particularly the airline's Canberra manager Mr Bob Goddard, were extremely helpful.

'We had an enormous amount of gear to get over there and back, and the airline organised the freighting, with a saving of about $7000-$8000 in charges,' said Will. An article for the inhouse magazine has been promised in return.

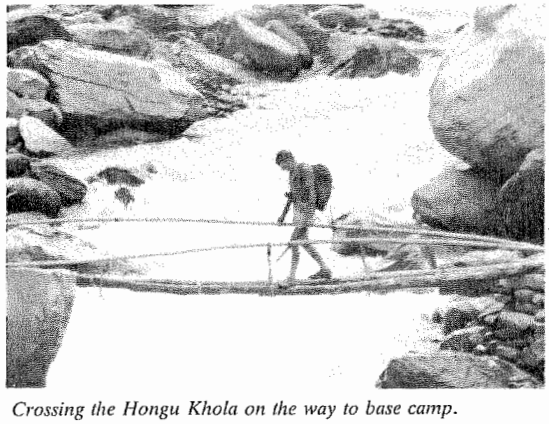
Perhaps mountain climbing doesn't seem a very 'logical' activity because of the inherent danger and discomfort.

'It goes back to the basic human drives of exploration and challenge,' said Will. 'You really have the question in your mind of whether you can do it.

'One of the guys on the expedition put it another way. He said what makes high altitude climbing really interesting is that you could blow up at any time!'



Expedition leader Dr John Finnigan at camp two (20 400ft), with his goal in the background.



Crossing the Hongu Khola on the way to base camp.

The ANZAAS Congress
Survival will depend on adaptation

CoResearch editor, Liz Tynan, attended part of the Centenary ANZAAS Congress in Sydney, and here reports on her impressions, as well as offering a bit of background on the event.

If press coverage is any gauge, the Centenary ANZAAS Congress held in May was a roaring success.

Every day the major metropolitan newspapers devoted space to at least one, and often many, stories emanating from the Congress.

So in this respect at least, the aim of the ANZAAS Congress, to promulgate knowledge about science in the community, was realised. Past congresses have shown that the media gives the event a high profile.

But once again this year the Congress itself did not attract huge numbers of delegates, despite being held in Australia's biggest city and the fact that it was the Centenary year.

There would be no way that the $400 000 cost of staging the event was anywhere near recouped from the (approximately) 1400 delegates who attended.

The funding came from a large number of corporate sponsors, the New South Wales and Federal governments, as well as from the Australian International Development Assistance Bureau which arranged the participation of delegates from less developed countries. Sydney University made a substantial contribution to the running of the event.

Of course, Sydney University was where it all started, in 1888, when it hosted the first Congress of the Australasian Association for the Advancement of Science (AAAS — the New Zealand part was added in 1930).

Back then the Congress was firmly in the physical sciences camp — unlike today — however it did canvass issues of social importance such as public health, particularly Sydney's sewerage system.

As a connection with that Congress 100 years ago, a paper at this year's event dealt with Sydney's sewerage system a century on. Also, an excursion for delegates this year reflected a trip organised in 1888. A plan to have the Congress opened by Lord Carrington (whose namesake opened the original Congress) was thwarted by his NATO responsibilities.

There is no doubt that the role of ANZAAS has changed over the years. Initially, it was vital in the age of very basic communications. 'ANZAAS was set up with the aim of communicating science to the public in an era when the newspapers were fairly limited, when communications were still primitive, there was no television or radio,' said Congress organising secretary Mr Barry O'Rourke.

'The need for scientists to communicate their message is still as important now as it was in 1888, but the means by which it is done are probably going to change in the next 20 years.'

For many years ANZAAS played a major part in advising the government on science policy, and the Congress presented an opportunity to discuss these matters, as well as present the fruits of scientific research.

That role has disappeared, with more sophisticated methods of determining policy. Now the major purpose of the Congress is in bringing scientists from widely different fields together to discuss their work, with particular emphasis on challenges and problems in modern society and how science and technology can help.

But is it just an expensive nosh-up, a way for scientists and those on the fringes of science to spend a week socialising with their peers?

Probably not. My experience of scientists indicates that they often resent time spend away from the lab, and would not so indulge unless they felt it was worthwhile.

There is a growing realisation among Congress organisers that it is increasingly difficult for people to spend an entire working week at a conference.

Mr O'Rourke suggested that a quite different Congress, of only two or three days' duration, probably would be adopted in the future.

Once again this year the debate concerning 'hard' and 'soft' sciences was trotted out, especially when a metropolitan paper ran an editorial on the subject.

Since the late 1960s, when social sciences started to become trendy, they have progressively been incorporated into the ANZAAS program.

Mr Jim Davenport, chairman of the scientific program committee and former chairman of the ANZAAS Council, said from the 1960s onwards a whole range of concerns about the environment, atomic power and weapons, automation and its social effects etc, were emerging in the community. In addition, a greater swing towards the welfare state in Australia brought many social issues into focus.

It was felt that the ANZAAS Congress was a suitable forum to tackle these issues.

'My own view is that is an extremely important part of ANZAAS's function,' said Mr Davenport, 'to bring the social scientists and the natural scientists together because they both have something important to contribute, either allaying fears in the community or allowing the community to understand more about the issues.'

The physical scientists don't all see it that way. Informal discussions with some of the staff or delegates at the Congress revealed stories about certain scientists who will have nothing to do with the ANZAAS Congress because they feel it has been 'devalued' by the addition of social sciences.

Certainly, when one looks at the program and sees subjects such as Folklore in Australia; Happily Ever After: The Family in Australia; Inventing Australian History; and The Social Construction of Gender, it is hardly surprising that some people ask how these are helping to Advance Science.

But both Mr Davenport and Mr O'Rourke are adamant that these and other social sciences topics are just as relevant in the modern world as the work of the physical scientists.

Highly relevant

'We could argue forever about whether they are sciences and what sort of sciences they are,' said Mr O'Rourke. 'The fact is that we are increasingly relying on science in its many forms, and there seems to me to be no really valid reasons for excluding a whole area of research that is highly relevant to society.'

As usual, a number of CSIRO scientists delivered papers (in the 'hard sciences' areas of course). Apart from Chief Executive Dr Keith Boardman who spoke about public sector/private sector research (see May issue of *CoResearch*), these included Dr Graham Harris from the Division of Fisheries, Dr Ken McCracken, Director of COSSA, Dr Geoff Grigg, Chief of the Division of Biotechnology, and Dr Bob Frater, Director of the Institute of Information and Communications Technologies.

There was an interesting program, this year comprising only invited speakers. In the past the organisers put out a call for papers and presented what they received. The concept of a session convenor and papers relating to each other seemed to work well from what I could see.

And what of the sessions themselves? I was only there for one day, and therefore could only sample what was on offer. However, I did go to three sessions and got a reasonable flavour of the proceedings.

It is rather depressing to attend a talk in a large lecture theatre that is not even half full, but that was how it was at the three sessions I attended. With a relatively small number of delegates but with six or more sessions going on simultaneously it was hardly surprising.

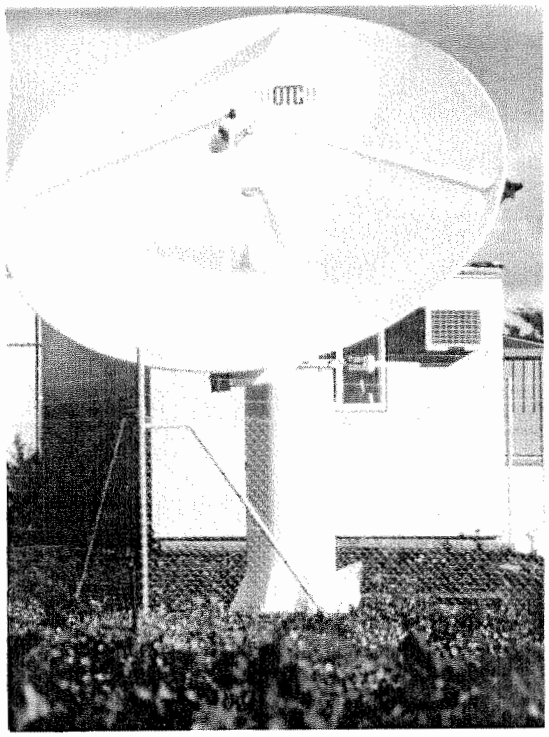
As well as invited speakers, perhaps there should have been invited audiences as well. I heard of one case where two speakers left the conference early and very crestfallen: no-one had turned up to their session.

Perhaps more depressing was the attitude of the audience. At one talk I went to a man read his newspaper through some of the session. People often chattered among themselves, or got up to leave while the lecturer was mid-talk. Many people arrived late.

One of the more strange aspects of the conference was the attendance of a little old lady – she must have been in her 80s – who (at two of the sessions I attended) arrived late and with much rustling of her plastic bag. She then proceeded to ignore the speaker and run through the conference program, apparently marking the speakers she would next go to see but not listen to. She must have flipped through the program 20 times.

She was obviously a member of the public (or just possibly a retired scientist), but the messages just weren't getting through to her. Is this the lot of science communication? Even people who think they want to hear the message lose interest when it is presented to them.

New antenna commissioned



The OTC consortium prototype earth station with its 4.5m Ku-band antenna was officially unveiled on 16 June at the Codan plant in Adelaide.

The prototype marks the first stage of a project which is to lead to further development and production for both INTELSAT Business Service (IBS) and AUSSAT applications.

The earth station was built by a consortium comprising Codan, the CSIRO Division of Radiophysics, the Microwave Technology Development Centre (MITEC) of Queensland University, the Air Navigation Group and Laboratory for Communication Science and Engineering of Sydney University and the South Australian Institute of Technology.

Within the Division of Radiophysics, the antenna group (earth station section) and its research leader, Dr Bruce Thomas, developed an economical, high efficiency 4.5m diameter antenna as part of its role in the consortium.

With the design finalised, the task of implementation of the reflector passed to Sydney University: CSIRO was responsible for the feed design and construction.

Once the completed antenna was assembled, the Division checked the performance characteristics of the prototype against the theoretical design.

Expressions of interest to manufacture and market the antenna are to be called, and Dr Rod Esdaile of the Division of Manufacturing Technology is assisting by optimising the corrugated feed horn for manufacture in industry.

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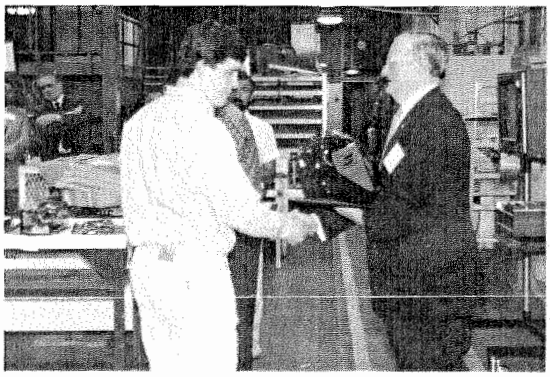
Dr Henzell leaves for Canberra

The Division of Tropical Crops and Pastures officially farewelled former Chief Dr Ted Henzell and his wife Frances at a function on 10 June. Dr Henzell is now Director of the Institute of Plant Production and Processing and is based in Canberra. Shown above is the acting Chief of the Division, Dr Ray Jones, making a presentation to Dr Henzell. The flowers Mrs Henzell is holding were a special thought because, by coincidence, the day for the farewell happened to be the Henzell's wedding anniversary.

Apprenticeship awards



Mr Paul Clune of the Granville College Committee presenting Dean White with his certificate and prize.

Dean White, a third year sheetmetal apprentice at the North Ryde site, has been awarded a certificate for second place in his year in the Sheetmetal Trade Course (stage two) for 1987.

Stathios Karaolis, first year apprentice fitter and machinist at the site, at present in stage three of his trade course, has been awarded third place for his year in the fitting and machining pre-apprenticeship course of 1987.

Both apprentices attend Granville College of TAFE in Sydney's west. Their certificates read 'for dedication to study and outstanding achievement in the course'.

Chief Librarian leaves after 30 years with CSIRO

Mr Peter Dawe has left CSIRO after 15 years as CSIRO's Chief Librarian and a total of 30 years with the Organisation.

He joined the Division of Soils in Adelaide in 1958 as librarian and in 1966 became special projects officer at the CSIRO Central Library in Melbourne.

In 1971 he became CSIRO's Deputy Chief Librarian, and Chief Librarian in 1973.

Mr Dawe has been at the forefront of change in the role of professional librarian from custodian to active purveyor of information. His contribution to librarianship and information services is well known both within CSIRO and in many other areas of the profession, and he has represented CSIRO on many national councils over the years. He is a member of course advisory committees at several schools of information science and was President of the Library Association of Australia in 1987. He was awarded a Fellowship of the Association in 1984.

He has a special interest in the application of technology to libraries, and among connections in this area he has, since 1973, been a member (and first Convenor) of a national working party on systems and communications. With Betty Doubleday, the former Chief Librarian, and others, he pioneered the introduction of computerised systems into CSIRO and Australian library and information services generally.

Internationally, he has been secretary of the Australian National Committee of the International Federation for Documentation since 1971 and has represented Australia at that body's General Assemblies several times.

Within CSIRO, he has always believed in the importance of library and information services in facilitating research, while recognising the need for optimum performance at least cost. He also has excelled in encouraging and facilitating co-operation between libraries and minimising duplication of effort. Among his initiatives on becoming Chief Librarian was to persuade the Executive of the importance of updating the *Scientific Serials of Australian Libraries*, which was achieved in 1975/76.

Of recent note has been the implementation of the on-line library management system for the CSIRO library network – one of the most challenging applications of its kind in the world given the size and spread of the CSIRO system.

Since leaving CSIRO, Mr Dawe has been invited to become a Visiting Fellow at the Royal Melbourne Institute of Technology where he will undertake some lecturing and research within the Department of Information Services.

Retirement

Ms Pat O'Brien, a clerical assistant with CSIRO for 36 years, retired on 1 July. Pat was born and bred in the Griffith area, and after completing a business college course, started work with the then Irrigation Research Laboratory in 1952 as a typist. Colleagues say Pat's involvement in the Griffith Laboratory and community will be sadly missed. She is considering retiring to the Dubbo region to be closer to her family.

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EPA award

The United States Environmental Protection Agency (EPA) has awarded a paper which was co-authored by a young CSIRO scientist.

Dr Peter Nichols, now a research scientist at the Division of Oceanography in Hobart, took part in the research which resulted in the paper while a post-doctoral research fellow at Florida State University.

SIROCREDIT

SIROCREDIT officially opened its new Canberra branch office on 22 June 1988.

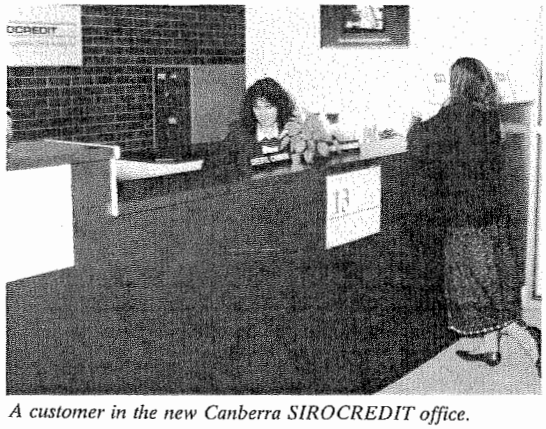
The office is located at Building 4, Division of Plant Industry, CSIRO Black Mountain Laboratories.

The occasion was celebrated by a luncheon held by SIROCREDIT which was attended by 350 CSIRO employees. The response was very pleasing to the management and Board of SIROCREDIT as it reflected its excellent support from and personal association with CSIRO employees in the Canberra region.

SIROCREDIT later held its 31st Annual General Meeting in the Plant Industry conference room. This gave Canberra members of SIROCREDIT the opportunity to review the credit union's performance over the past financial year and to offer suggestions for the direction of the next year.

During 1987/88 SIROCREDIT achieved, on behalf of its membership, the following growth:

Membership increase:	12% to 5894 members
Loan increase:	20% to $36.3 million
Savings increase:	34% to $42.7 million
Liquidity increase:	42% to $9.1 million



A customer in the new Canberra SIROCREDIT office.

AAHL Chief wins top veterinary award

Mr Bill Snowdon

Mr Bill Snowdon, Chief of the Australian Animal Health Laboratory (AAHL) was awarded the Gilruth Prize at the Australian Veterinary Association Annual General Meeting in Canberra on 19 May.

Bill came to CSIRO in 1958 from the Victorian Department of Agriculture where he was engaged in livestock disease investigations for 10 years. In the Division of Animal Health he was engaged in research on virus diseases of livestock and over the past 18 years has has taken a leading role in the establishment of AAHL.

Notwithstanding the controversy that has developed around some of the Laboratory's proposed activities, the award obviously reflects the recognition by the veterinary community of the value of AAHL, as well as Bill's dedication and personal achievement in establishing its reputation as one of the world's leading laboratories in exotic disease diagnosis and animal disease research.

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

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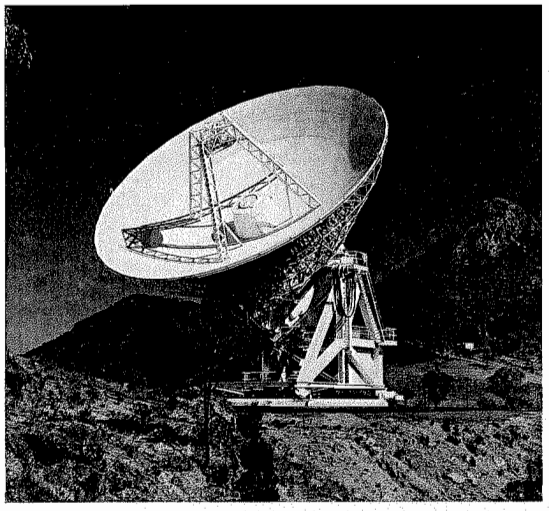
Souvenir Edition

CoResearch

No. 315 August 1988 CSIRO's staff newspaper

CSIRO AUSTRALIA

The Australia Telescope

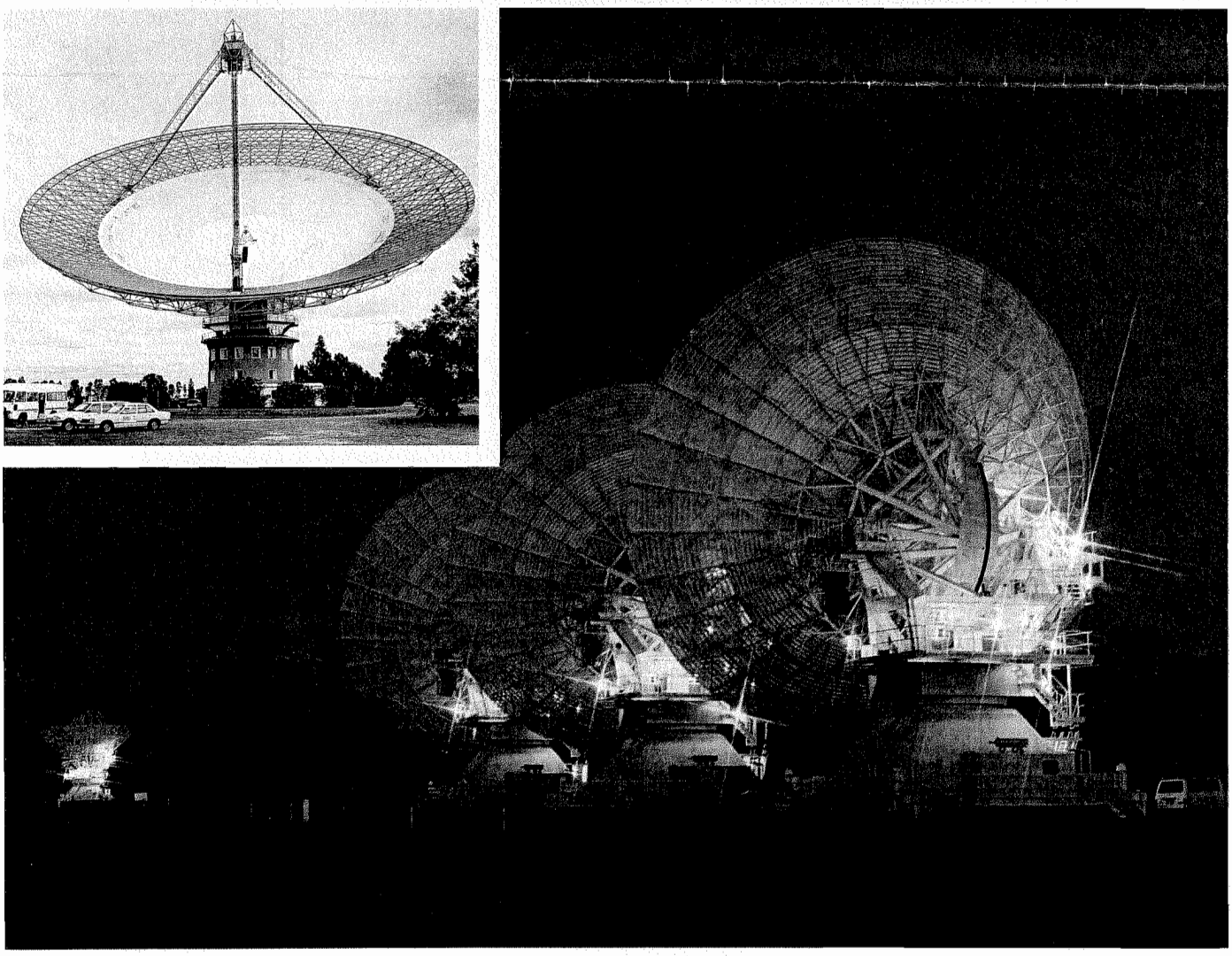


Official opening by
The Hon. R J L Hawke AC QC, Prime Minister of Australia
2 September 1988

The Australia Telescope, Australia's window on the Universe and perhaps the most forward looking of all our Bicentennial projects, is the culmination of years of planning, research and development by CSIRO scientists and engineers, in co-operation with many companies and other researchers. The achievement is a remarkable testament to the high level of skill in this Organisation, with its long and distinguished tradition of research in radiophysics. A special feature on the telescope, its uses, benefits and the people involved in its development, appears on pages 4 and 5 of this issue.

Below, five antennas of the Australia Telescope compact array at Culgoora in New South Wales. Another similar dish is out of sight, six kilometres to the west. Inset below left, the 64m radio telescope operated by the Division of Radiophysics at Parkes. This will form part of the AT long baseline array, as will the antenna above left, the 22m dish at Mopra near Siding Spring.

Photos: John Masterson, Division of Radiophysics



From the Chief Executive

A column by Dr Keith Boardman

At last there appears to be increasing recognition within the business community and the print media of the vital importance of innovative R&D to the process of improving the competence of Australian industry and the competitiveness of Australian products in world markets.

The recent issue of *The Australian Director* was a special edition on technology. In his editorial comment, the President of the Institute of Directors of Australia, Mr Colin Harper, wrote: 'the corporate leaders of our country have the responsibility to use their influence to push our technology base to a point where we are able to compete successfully in the world's marketplace.

'There is no doubt that we have some catching up to do.'

The edition featured my speech to the recent National Conference of the Institute of Directors of Australia as well as highlighting some of CSIRO's greatest achievements and listing some CSIRO products developed in the 1980s and currently exported.

The need to catch up referred to in Mr Harper's editorial is so apparent from the recent analysis of the relative potential of 21 countries by a New York based research group, Strategic Research International. Australia was ranked last because of its heavy reliance on a few commodities for export income, its large trade deficit and its high level international borrowings compared with the economy's size. Australia occupied the number two position for food and energy trade, but rated last when it came to manufactured goods.

However, as I mentioned in my speech to the Institute of Directors, adding value through greater processing of commodities can substantially increase export earnings from the primary sectors and offer the best prospects for reducing our trade deficit in the shorter term. But in the longer term we must diversify our trading base by increased competitiveness in manufactured goods. A survey of recent developments in several industrial nations indicated substantial commitments to increased R&D expenditure but focused primarily on market opportunities.

In his presentation to the CSIRO Board on the strategy for the Institute of Information and Communications Technologies, Dr Frater pointed to the increasing trade gap in the products of the information industries. The gap is now $3.5 billion and could exceed $10 billion in the early 1990s if the present trend is allowed to continue. Australia must produce more of the products of the information industries and this means a considerable investment in what is an R&D intensive industry.

Mr Kerin, Minister for Primary Industries and Energy, attended the July meeting of the CSIRO Board. He expressed the view that the Government should be setting strategic directions for R&D. If this were done it would certainly assist CSIRO in determining the balance of research effort and the allocation of resources. Mr Kerin wants greater cooperation between his department and CSIRO, and to this end liaison committees are being established in the areas of agriculture and natural resource management, energy research and development, minerals research and development, and with the Bureau of Mineral Resources.

###

I am now carrying out performance and development program reviews with the individual institute directors. They are proving to be extremely useful and worthwhile in reviewing the directions and priorities of the institutes and their constituent divisions, as well as the major objectives of the directors over the next 12 months.

Keith Boardman

***Editor's note: An interview with Mr Kerin is scheduled to appear in the September issue of* CoResearch.**

Printing centre equipment auction

Surplus plant and office equipment from the now-defunct CSIRO printing centre will be auctioned on Monday 29 August. The auction will be held at the printing centre site, 19 Rokeby Street Collingwood, Melbourne. Enquires should be directed to Paul Reekie on 03-418 7324.

Letters to the Editor

Dear Editor,
In 'A Matter of Opinion' in the June issue, Dr Graeme Ogilvie presents a sound case for the propositions that:

(i) research support for the manufacturing sector is a special task, qualitatively different from reseach support for other industry sectors and requiring its own approaches; and

(ii) collaborative research is the best vehicle for CSIRO to use to provide that support.

Contrary to Dr Ogilvie's assertion, CSIRO's central management has long been not only aware of (i) but also committed to the flexible approach it implies. This is readily demonstrated by a string of policy statements, annual reports, speeches and other documents issued over the past several years, which would be tedious to name here. More pragmatically, it is confirmed by the continuous provision of additional resources and support, even in times of extreme financial stringency, to Dr Ogilvie's own Division which provides perhaps the ultimate illustration of tailoring reseach delivery services to the needs of individual industries and companies.

Let me now turn to (ii). Although the central CSIRO administration would not dogmatically claim collaborative research agreements to be a magic universal format for delivering CSIRO services to manufacturing companies, there is in fact strong commitment here to such arrangements. Administrative systems and rules have been changed to facilitate collaborative arrangements, while CSIRO can rightly claim to have had a marked influence on the approach adopted in the administration of the 150 per cent tax concession. This approach enables companies' financial inputs into collaborative research arrangements with CSIRO (as well as their input into research contracts *per se*) to be eligible for the concession.

Likewise, our recent representations to the Bureau of Industry Economics have ensured that collaborative arrangements will be given appropriate attention in the Bureau's forthcoming review of the effectiveness of that concession.

Dr Ogilvie objects to the use of the term 'sponsored research' in the heading on CSIRO information circular 87/40 to subsume, *inter alia*, collaborative arrangements. This should cause no heartburn. We do need a general description, and it seems useful to have a term that combines the concepts of financial support and more general support not necessarily having a financial element. If Graeme or anyone else can suggest a better one- or two-word general description to encompass contracted research, collaborative research and the range of arrangements in between, I'll buy him or her a beer!

R W Murnain
Senior Advisory (Commercial)
Corporate Resources Branch

Dear Editor,
I am sorry that the logophilic (sic) Peter Martin thinks I am an 'ESP' (*CoResearch* 313, p.2). Perhaps, for him and others who may have joined the Organization [sic - Ed.] recently, I should have cited my earlier letters to *CoResearch* in a proper manner.

He might like to read my previous correspondence in *CoResearch* 215 p.4, 245 p.2, 258 p.2 and 270 p.2. After that tiresome chore he might contemplate further how best CSIRO and its employees could use our energy. Should we be trying to win Nobel Prizes, getting industrially-relevant research up and running, or designing eye-catching logos? Do we really want the shadow or the substance?

With regard to 'Z', I would refer him to Peter Aukland's letter in *CoResearch* 303 p.2, and to Bob Schoenfeld's brilliant text *The Chemist's English* for a far better defence than mine of its use.

One should ask when making any change (whether for a good reason or not) what is the cost/benefit ratio of rewriting, for example, The CSIRO Act which uses 'Z' in our title? As for spelling styles, why don't we use The Macquarie style of 'Ausglish' (sic) and be at odds with all of the English speaking world?

Our Organization [sic] has been suffering from severe economic restraint for many years but it seems there is no limit to the expenditure of either time or money for the continual redesigning and updating of letterheads, visiting cards, etc. caused by renaming of the divisions and institutes.

Can the financial situation really be taken seriously then? Should we therefore continue to turn off lights or participate in other cost-saving exercises in the light of such profligacy?

It would be unfortunate if scientists became more interested in logophilia than logodaedaly.

M H Jones
Division of Mineral Products

Dear Editor,
Stuart Craig rightly points out the problems with the inadvertent use of a 'stretched logo' [*CoResearch* 314, July 1988].

You can rest assured that the logo will not be used in such a fashion again.

Jenifer North
Manager,
Corporate Communications

Dear Editor,
I read with interest Ralph Judd's article in the July issue of *CoResearch* where he traced the history of CSIRO's printery as he viewed it.

My interest stems from a lengthy period of close involvement in the management of the printery and I shall look back with fond memories of my association with the Unit, valuing highly the many friendships formed.

I should like to take this opportunity to pay my tribute to all the staff for their fine contributions to CSIRO's information services. From my perspective, all four managers over the past 40 years, Tom Hunter, Jack Chamberlain, Paul Lynch and Wayne Matthews, operated effectively in a business-like manner. This was not an easy job, particularly during the past 10 years.

Without wishing to quarrel with Ralph, I believe he was wide of the mark in some of his statements. For example, his statement 'no costing system scheme existed' is quite incorrect. Systems in which I was involved in introducing many years ago priced our publications according to the AGPS costing formula which takes into account labour costs. In the case of work produced

Cont. on p.6

"And under 'Personality', cross out 'Is hostile and aggressive' and write 'Is popular and well-rounded emotionally'."

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A Matter of Opinion

This month's point of view column comes from CSIRO Board member Mr David Hoare. Mr Hoare is Chairman of Bankers Trust Aust. Pty Ltd.

Recent years have witnessed a profound change in the way the world has approached the use of labour and materials, capital and the manufacturing processes. The world has undergone a rapid period of acute structural change, throwing off an old skin and growing a new one with a significant shift away from raw material and muscle power towards skill and knowledge which is likely to tilt the concept of wealth to emphasise in the future the intangible rather than the more tangible.

Despite having almost three-quarters of our labour force employed in services, Australia – although well advanced in a post industrial society form – has been slow comprehending the significance of this development. The changes of recent times will have a substantial consequential impact in the form of widespread and far-reaching change: in political institutions, in the nature of business entities, in what people work at and where and how they do it.

In a technological development sense, and indeed in some other significant ways, Australia is a largely derivative economy. Thus we have little traditional record that will enable us to take a leading position in the growth prospects which modern technological developments offer. The role and position of the public sector in this country deserve special mention in any consideration of these matters.

The Government has positions of control, persuasion or significant influence in some exceptionally vital parts of the economy in a period of significant technological change. It owns telecommunications, it funds the universities and, perhaps most important of all, it owns the premier scientific and industrial research organisation, CSIRO.

The derivative nature of the Australian economy is an inevitable consequence of its size and the nature and composition of its private sector – viz., a smaller scale of operation, often domestically focused.

One of the important matters to be addressed is the method by which Australian corporations can become more competitive internationally through the benefits of industrial research and development often funded in other economics by the cash flows of large and international companies. This is a classic situation for the application of public sector investment through the medium of CSIRO, which can fill the research and development role otherwise left neglected and underdeveloped in the Australian economy.

It is all too frequently forgotten in the many critical examinations of current problems that CSIRO originally was created to provide scientific and research support, not for the secondary and tertiary industries which have emerged in recent times, but to improve and enhance our primary industry pursuits. CSIRO has a brilliant on-going record of sustained and outstanding achievement in support of our primary industries. A challenge for the Organisation is to play out a role of equal success in the years ahead for the country's secondary and tertiary industries while at the same time maintaining the unremitting support for the primary sector. Under no circumstances can there by any diminution of effort of quality in our rural and environmental research. It simply has to be better than ever.

Undoubtedly, the challenges ahead will be met in a different way to those of the past. The problems themselves are different and the world today is very much a more global place than it ever has been before. These challenges will involve equally widespread and comprehensive relationships with industry as those already established with rural producers.

CSIRO cannot simply be reactive in its present situation. There is an important initiative to be exercised, as the Organisation undoubtedly will be a prime mechanism through which research and development priorities in this country will be determined. These are heavy responsibilities and will fully test the scientific and research management skills of the Organisation.

These responsibilities have significant implications for CSIRO and its people. More than ever must the Organisation be an

Cont. on p.6

Qantas adds sponsorship to cloud seeding project

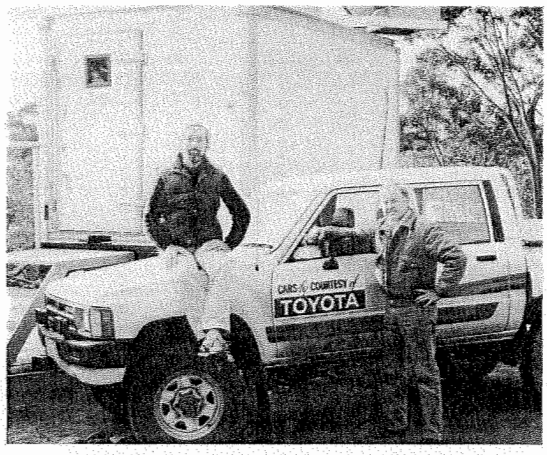
The Flying Kangaroo has come to the aid of science. Qantas, our national carrier, has added its substantial sponsorship to a project being carried out by the Division of Atmospheric Research.

Qantas is providing airfares worth about $12 500 to enable scientists to travel between the United States and Australia for participation in a major consultancy and research program in weather modification.

Toyota also has become involved, proving that divisions needn't seek support for their research only from the obvious industry or government sources.

The company is providing two four-wheel-drive vehicles for two months for scientists operating a crucial instrument in the mountains in rather difficult conditions. The offer is worth about $7500. Operational support has been rather hard to come by of late, especially in the environmental divisions, so it has been gratefully received by the scientists.

The Division has been contracted by the Melbourne Metropolitan Board of Works (MMBW) as a consultant. The MMBW wants to test the feasibility of seeding cold season storm clouds to boost rainfall in the Thomson Reservoir catchment area near Mt Baw Baw in Victoria.



Pictured above, the Desert Research Institute radiometer flown out from the United States for the Australian Winter Storms Experiment by Qantas, and one of the two four wheel drive vehicles provided by Toyota Motor Sales to Arlen Huggins, left, and Richard Smith of DRI.
Photo: David Whillas

Alongside this work, the Division also is conducting 'The Australian Winter Storms Experiment', using a sophisticated steerable, microwave radiometer (one of only three in the world) from the United States to detect and measure liquid water in clouds.

The experiment also uses the Division's lidar (light detection and ranging) instrument and is intended to lead to expanded opportunities for cloud seeding in the MMBW project. Of particular interest from the scientific viewpoint is how Mt Baw Baw and similar orographic (mountainous) features lead to additional supercooled liquid water beyond that detectable with an aircraft.

The five-year consultancy with the MMBW is valued at about $800 000, or about 20 per cent of the total MMBW expenditure on its project. In addition, the MMBW is contributing to the cost of the Winter Storms experiment, which will finish at the end of this month (August).

Both Qantas and Toyota have become involved, not because there will be financial gain for them, but more in a 'public spirited' sense, according to project leader and cloud physicist Dr Alex Long.

Of course, increased knowledge about the nature of clouds and weather in general ultimately will benefit airlines. One safety problem of concern is the tendency of ice to form on the wings of aircraft under certain circumstances. This was tragically demonstrated with the crash of an Air Florida 737 in Washington DC several years ago.

The current experiment could contribute to understanding more about this phenomenon, however Dr Long points out that the project is not aimed at direct examination of this problem.

So far, four US scientists have been brought to Australia using the tickets donated by Qantas: Mr Arlen Huggins and Mr Richard Smith from the Desert Research Institute, Dr Jorgen Jensen from the National Centre for Atmospheric Research and Dr Roger Reinking who is involved in US Government weather modification programs.

Cont. on p.6

Staff views on planning issues being sought

By Don MacRae, Corporate Planner

The Chief Executive's column in the June issue of *CoResearch* considered CSIRO's role in determining national research priorities. Dr Boardman pinpointed the need for CSIRO to take a leading role in the planning of national research priorities and in the establishment of the criteria for their determination.

Staff in the Corporate Planning Office are now co-ordinating preparation of the Corporate Plan for 1988-1991, which will emphasise these roles.

As part of this co-ordinating process, we are keen to obtain and foster exchanges of staff views on planning issues throughout the drafting process and in relation to planning in general.

To facilitate this exchange of views, staff are asked to use the electronic communication system KEYLINK T, either directly or through their divisional secretary. The Corporate Planner's bulletin board on the CSIRO KEYLINK account contains information on a draft mission statement for CSIRO and research evaluation criteria, together with specific requests for comment. It is proposed that an early draft of the Corporate Plan will be accessible for comment by this means in the near future.

As a means of promoting a dialogue on planning issues, we propose synthesising your suggestions and reporting the results in *CoResearch*, as well as facilitating exchanges of views by KEYLINK.

Note 1: CSIRO now has a corporate account with Telecom's electronic mail/bulletin board service KEYLINK T. This service is available to anyone in CSIRO with a terminal capable of accessing the AUSTPAC network. For registration as a KEYLINK T user, or for information on this system, contact Jenny North, Manager, Corporate Communications, on 062-48 4545.

Note 2: KEYLINK is used to provide timely summaries of the draft minutes of the Board and Executive Committee meeting each month.

Note 3: Corporate Planning Office staff: Robin Lansdown, Don MacRae, Anne McKenna, Malcolm Robertson and Garrett Upstill.

Made in Australia, to prob

AT brings us the Universe, for both science and industry to benefit

The $50 million Australia Telescope is a powerful instrument to probe the cosmos to the farthest reaches of the Universe.

It also has captured the involvement of many Australian engineering and communications companies, with benefits for both science and industry.

The telescope, a Bicentenary project to be commissioned on 2 September, has enabled some of Australia's top scientists and engineers to advance their high tech skills.

The Division of Radiophysics, increasingly and forcefully an industry-oriented division, has had responsibility in CSIRO for managing the project, and has worked closely with Australian companies in its development (see separate story).

The Division has a long and distinguished record as a world leader in radio astronomy, dating from the immediate post-World War II era. From these beginnings the Division has established expertise in satellite and earth station communications, antenna design, signal processing and other areas of growing importance in a high tech world.

Radiophysics will host the AT as a national facility available to Australian and overseas astronomers. Proposals for observations will be considered on merit.

The telescope will be given a warm welcome by the international radio astronomy community. Although the northern hemisphere boasts some excellent radio astronomy facilities, they just can't 'see' many of the southern phenomena which will come within the range of the AT.

For Australian astronomers, for the first time a world class long baseline telescope will be available to them in their own backyard. While the Parkes radio telescope has enabled outstanding research since it came into operation in 1961, it doesn't have the ability to discern fine detail which will be a major feature of the AT.

The AT will be tuned to the most important radio astronomy wavelengths, initially between 20cm and 3cm and eventually between 90cm and 2.6mm.

As befits a Bicentenary project, 80 per cent Australian content was a target in construction of the AT. The project has given local manufacturing companies several innovative construction techniques, transfer of the latest technology from CSIRO and valuable contracts for supply of components. This work has been timely, with the government backed campaign now underway to stimulate Australia's space-based communications industries.

The AT has the potential for the operation of three types of configuration: the compact array comprising six 22m parabolic antennas at the original radioheliograph site at Culgoora near Narrabri, known as the Paul Wild Observatory; the long baseline array in which the one or more antennas in the compact array are linked with another 22m dish at Mopra and the 64m antenna ('The Grand Old Lady') at Parkes; and the exciting prospect of linking with other antennas in Australia and overseas, and with the two proposed orbiting radio telescopes – RADIOASTRON and QUASAT – scheduled for launch in the 1990s.

Each of these configurations simulates dishes with diameters equivalent to the largest spacing between the antennas. Indeed, once the orbiting instruments are in operation, a 'dish' with a diameter greater than that of the Earth will be possible.

The greater the aperture the finer the detail able to be discerned in detectable distant objects, which emit radio waves of around (a minuscule) 10^{-27} watts.

The compact array antennas working together will 'see' detail 100 times finer than the Parkes telescope is able to do. When the long baseline array is in action, observation of detail 50 times finer again will be possible.

Several large correlators are to be used to process the recorded signals, each instrument based on a Very Large Scale Integrated (VLSI) chip. Each chip, 5mm square, contains 50 000 transistors.

At the Culgoora site, five of the antennas may be moved along a three kilometre east-west track to any of 35 observing stations. The sixth antenna is another three kilometres to the west on a smaller track with only two stations.

With the much greater detail possible with the AT, perhaps some of the mysteries of space will become less mysterious (see separate story on astronomy).

Aust companies prove confidence justified

The Australia Telescope is an important engineering and construction achievement for Australia – not least because of the high level of local content, demonstrating confidence in the capabilities of Australian companies.

About 25 Australian firms have supplied components or services for the AT. The biggest contract, worth $15 million, was let to Evans Deakin Industries in Brisbane for the construction of the seven 22m antennas at Culgoora and Mopra.

Evans Deakin originally had established itself as a ship building company, but through this contract and others has been able to change its direction away from an Australian industry on the way out towards one on the way in. Major international contracts for space-based projects generally only come the way of companies with experience in this area, and the AT has provided the sort of experience likely to put Evans Deakin and other companies up front as future contenders.

An important aspect of the whole project was the appointment of Macdonald Wagner as the project's main consultant engineers. During the course of the project the company provided more than $2 million worth of consulting services and were a major factor in the successful design and completion of the antennas and civil engineering works.

Austek Microsystems in Adelaide provided the Very Large Scale Integration (VLSI) chips, which were originally developed within the Division of Radiophysics. These are used in the correlators which 'make sense' of the incoming signals. The correlators are the heart of the entire AT operation – they must correlate signals from antennas and also provide outputs with a wide range of resolution in frequency.

Several thousand VLSI chips were fabricated for the project by Austek Microsystems. The work was worth about $400 000.

An extensive data reduction centre has been developed at Radiophysics headquarters at Epping for production of images and further image processing. The main processor in this network is a C-210 mini-supercomputer provided by computing company Convex for about $1 million.

The $3.5 million contract for civil works at Culgoora and Mopra was won by Brisbane company Barclay Brothers, while Macdonald Wagner was responsible for the design specifications and supervision of this work.

At Culgoora a three kilometre east-west rail track was laid to position five of the six antennas for various observational requirements. A 9.6m gauge track with 35 stations was constructed, as well as an 80m stretch of track three kilometres away for the sixth antenna. The tracks, requiring exceptionally high precision, were placed with an accuracy of 5mm – a tribute to the construction and supervising companies.

Cont. on p.7

A team effort

Just about everyone at the Division of Radiophysics has been involved in some way with the Australian Telescope project, which has been underway for more than six years.

There are some, though, that have been more involved than others, and in this brief summary we mention some of the key players.

. Dr Bob Frater became Director of the Institute of Information and Communication Technologies on 1 January this year, and was Chief of the Division of Radiophysics between 1981 and 1987. His role in the concept and progress of the AT has been vital, especially his determination to ensure maximum local content. He was chairman of the steering committee which successfully secured government approval and funding for the project, and later project director and chairman of the AT advisory committee. He has also encouraged commercialisation of the spin-offs from the technology related to the development of the Australia Telescope.

. The project manager, Mr John Brooks, was appointed to the position in December 1982, having joined the Division in 1965 to work with the receiver group. Before this he had spent two years at Jodrell Bank in the UK. He became involved in the Interscan project between 1972 and 1976. In 1977 he went to Greenbank in the US to work on the development of a maser receiver. On his return he led the team that built the K-band maser for the Parkes telescope. He was later involved in the refit of that telescope to prepare it for its role in the Giotto mission.

. Dr Dennis Cooper is now Chief of the Division. As antenna manager for the project, he had responsibility for the design and construction of the seven 22m antennas and associated site works. He joined the Division in 1968 and specialised in waveguide propagation in complex structures as used in hybrid mode feeds for antennas. He has had extensive involvement in the development and the international selection process of the Interscan aircraft landing system since 1972. He has had a key role in negotiations for the use of Parkes by the European Space Agency for the Giotto project and NASA for Voyager, as well as in negotiations on the role of the AT in the orbiting radio telescope projects.

. Dr John Whiteoak is project secretary, and has taken part in the various top level management and advisory committees and assisted in overall organisational matters. An observational radio astronomer, since joining the Division in 1965 he has specialised in molecular line astronomy.

. Dr Rick Forster is project scientist with responsibility for monitoring the design and development of the AT to ensure that, as far as possible, the scientific objectives set for the telescope can be achieved. Dr Forster joined the Division in 1981, having spent several years at the Westerbork synthesis telescope in Holland where he assisted in the calibration of its digital line receivers.

. Dr Graeme James played a major role in the electromagnetic design of the AT antennas. He joined the Division in 1976 following a three year post doctoral appointment with the electromagnetics group at Queen Mary College in London. His research activities have included high frequency diffraction phenomena and the design of high performance microwave antennas.

. Mr Mal Sinclair has held the position of section leader for the receivers. During more than 20 years as a leading member of the Division's receiver group, he visited the US where he was responsible for the installation of the cooled microwave amplifiers on the 27 antennas of the Very Large Array radio telescope in New Mexico.

. Section leader for the correlator, Dr Warwick Wilson, returned to the Division in 1984 following secondment to Interscan Australia Pty Ltd in its joint venture with Wilcox Electric in the US to develop Interscan technology.

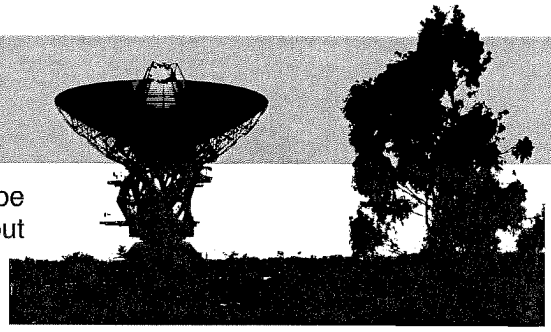
. The computing group has had two leaders. Dr Ron Wand, who left CSIRO in 1986 was the first. He returned to Australia for the AT project, following 12 years in the US, including periods at the MIT Haystack Observatory where he engaged in ionospheric and propagation studies. After his departure, Dr Mike Kesteven became leader. From 1980 to 1983 he was associated with the

Cont. on p.7

315-1988

e the cosmos

The Australia Telescope makes its debut



Innovative methods bring down cost of important components

The Australia Telescope is an expensive project, but it could have been a lot more expensive if it hadn't been for the ingenuity of engineers at the Division of Radiophysics.

Each of the seven new antennas required reflecting panels and feed horns as close to perfect as possible, and perfection costs money and takes time.

But two novel techniques developed at the Division produced the best product for a low cost.

The Division already had considerable experience in the manufacture of accurate panels, having upgraded the Parkes radio telescope to provide for operation at wavelengths 10 times shorter than when it was commissioned in 1961.

However, the AT specifications called for a standard of accuracy not previously attempted in Australia.

The reflector surface of each of the new 22m antennas is made up of six rings of panels, each differently shaped. (The panels in the inner four rings are of solid aluminium whereas the outer panels are perforated to decrease wind resistance.) The standard methods of construction would have required six individually machined moulds at a cost of $60 000 per mould.

But the Division's panel development team of Don Yabsley and Barry Parsons, in conjunction with consulting engineers Macdonald Wagner, came up with a better idea. Their concept was based on a piece of equipment that would look at more home in a medieval torture chamber.

The bed of what looks like thick nails is actually comprised of threaded steel rods, each capped by a tiltable pad and set in a grid above a level base. Using dial gauges, a straight edge and a computer, it is possible to set the 'bed of nails' to the profiles of the required panel. It is then used as a mould on which the panel is assembled.

The panel surface is backed by an aluminium frame, whose ribs are formed on a stretch-bending machine built in the Division's workshop. It takes less than five minutes to bend each of the ribs and the machine incorporates an adjustable form which may be set to suit any of the required rib profiles.

Using these simple techniques the perforated panels were just right, but those made of solid sheets were generally outside the 0.15mm limit wanted in the central part of the dish.

Then Barry Parsons had a classic scientific brainwave in the shower one morning. An old vacuum fan left over from cloud physics days was recommissioned to reduce the air pressure in the enclosed space below the surface sheet. This provided a near perfect method of holding the surface sheet in the right position until the adhesive had set.

The new system sparked interest among companies Johns Perry and Evans Deakin, both of which are now using it.

Manufacture of the two metre by one metre feed horns used a technique also developed at the Division.

These cone-shaped devices (see photo) funnel energy from the reflector panels into a low noise receiver for amplification.

In 1965 the Division pioneered the use of internal corrugations in feed horns to improve operation at the Parkes dish. Corrugated horns are now in common use for satellite communications as well as in radio astronomy.

Each AT antenna required four feed horns – the largest, the two metre one, being the most difficult to machine or cast.

The key was in the use of ordinary roof insulating foam and the concept of forming the corrugations from separate aluminium bands and annular rings. They were assembled using a series of concentric polystyrene disc formers with progressively varying diameter.

After the outside of the structure was coated with fibreglass to tie all the components together, the polystyrene disks were removed.

The weight of the finished product was half the weight of a conventional machined horn, and at $5000, was about one-tenth the cost.

The answers to life, the Universe and everything?

While optical astronomy with its ancient beginnings has captured the imagination of the world since earliest times, radio astronomy is a development of the past four decades.

But in that short time, radio astronomy has made some remarkable discoveries about the mysteries of the Universe. It has also, perhaps, raised more questions than it has so far answered.

Quasars, pulsars, black holes are some of the terms which have entered the language since radio astronomy began probing space. These are among the phenomena to be sought out by the AT.

The telescope will address many of those unanswered questions, with more power and capacity for fine detail than ever available to astronomers in the southern hemisphere.

The telescope has several features which will make it particularly useful for studying southern radio sources:

. Its high dynamic range will enable the detection of weak structures in regions dominated by strong radio emission.

. The extremely fine resolution possible with the AT long baseline array may reveal details in quasar cores and jets which are a thousand times smaller than those to be seen at other wavelengths.

. The wide wavelength range of the AT enables accurate studies of the wavelength dependency of the radio emission, and also the observation of the most important spectral lines emitted by interstellar atoms and molecules.

. The AT's capability for accurately measuring polarisation will enable the study of magnetic fields in our galaxy and others.

Following is a brief checklist of some of the objects to be scrutinised:

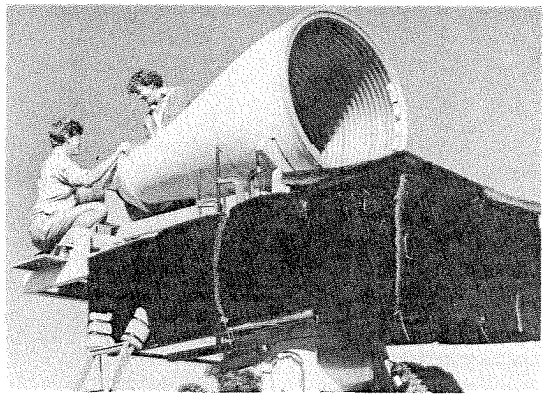
. The centre of our galaxy
Earth is about 30 000 light years from the centre of the Milky Way, our galaxy. We can't see the details because the light emitted is absorbed by interstellar dust. However the centre can be mapped at infrared and radio wavelengths. It is believed there is a black hole at the centre which is powering the strong radio source Sagittarius A and causing unusual motions in surrounding clouds of molecules.

. Supernovae remnants
These are the relics of stars which ended their lives with catastrophic explosions. They emit strongly at radio and X-ray wavelengths, and some are among the brightest objects in the radio sky.

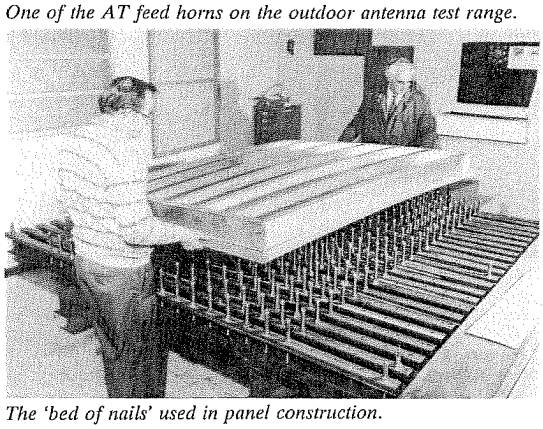
. The Magellanic Clouds
The Large Magellanic Cloud (LMC) at 170 000 light years away is the nearest galaxy to our own. It has a smaller companion slightly further away. Because they are relatively close, the Magellanic Clouds offer a good chance to see what galaxies are made of and how they evolve. They can't be seen from the northern hemisphere but are a prime target for all southern hemisphere telescopes. The LMC is dotted with regions where stars are forming. It also contains pulsars and supernovae remnants. In 1987 a supernova was seen in the LMC – the first since 1885 which could be seen with the naked eye. The debris from this explosion is of major interest to astronomers wanting to learn more about how and why stars explode.

. Black holes
The almost incomprehensible powerhouses inhabiting the centres galaxies including our own are believed to be black holes. The power source is likely to be the enormous gravitational energy – greater than nuclear fusion could produce – released when matter falls towards a massive compact object. It is still just a concept, because no-one has ever seen a black hole.

. Quasars and active galaxies
Quasars ('quasi-stellar objects') are the thought to be the ultra-luminous active nuclei of distant galaxies, many to be found at the limits of the observable Universe. They emit hundreds of times more energy than normal 'quiet' galaxies like our own. Quasars are a window on the early stage of the Universe, as their light which we observe now was actually beamed from them billions of years ago. Most astronomers now accept that the power of a quasar is related to the presence of a black hole at its heart. The nearest quasar is 2100 million light years away. It emits about one million times the radio output of our own galaxy and is 10 000 times stronger in X-rays. A little closer to Earth are the active galaxies. These also produce vast amounts of radio energy – far more than our own galaxy – and have colossal and optically-hidden energy sources at their centres. Many of the nearest and most interesting examples of quasars and active galaxies are observable only from the southern hemisphere.



One of the AT feed horns on the outdoor antenna test range.



The 'bed of nails' used in panel construction.

Cloud seeding
Cont. from p.3

Rainmaking research in CSIRO has a rather interesting history. It started in the late 1940s, following observations by Dr E G (Taffy) Bowen, then Chief of the Division of Radiophysics, of early General Electric experiments in the United States. It was an ideal way to use the expertise in radiophysics developed during the war. (Another spin-off from wartime radiophysics was radio astronomy, in which CSIRO became a world leader).

The experiments had mixed results. The early ones in New England and the Adelaide region were deemed inconclusive, although experiments in the Snowy Mountains area in support of the new hydro-electric scheme showed positive results.

Then came a series of experiments in Tasmania, sponsored by the Hydro-Electric Commission. Both experiments were successful and in the second, a 30 per cent increase in rainfall was achieved in the experiment area. Fairly specific conditions, including adequate super-cooled liquid water, are required for seeding to work, and these were met in Tasmania.

However, an experiment begun in western Victoria in the early 1980s did not have the desired results because of inadequate liquid water.

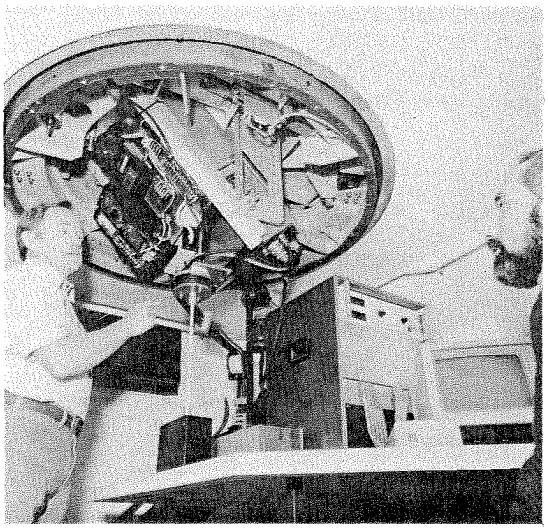
Rainmaking research in CSIRO was terminated in 1983 and the Division of Cloud Physics disbanded – a hasty and unfortunate decision, according to Dr Long.

But the expertise has been redeveloped in the Organisation, partly in response to the need of the MMBW for technical advice when it decided to look into the possibility of boosting the Melbourne water supply and thereby save many millions of dollars.

In support of the scientific experiment the Division has linked closely with the Desert Research Institute, based at the University of Nevada in Reno. The Institute has provided the radiometer to carry out the extensive cloud water measurements. Dr Long himself worked with the Institute for some years. Some support from the US National Science Foundation and Environmental Research Laboratories of the National Oceanic and Atmospheric Administration also has been arranged.

Research into rainmaking has been carried out for some time at Reno. The specific conditions there – proximity to the Sierra Nevada mountains and the low rainfall in the immediate vicinity of Reno – have made the possibility of weather modification extremely tantalising for researchers and water authorities.

Cloud seeding still employs the 'old fashioned' method of going up in an aeroplane and dispensing silver iodide – an effective and relatively cheap chemical. The difference now is the use of sophisticated instruments to remotely sense the requisite super-cooled liquid water and thereby increase the potential of silver iodide to do the job.



Interior view of the DRI radiometer showing antenna ring, receiver and computer. Richard Smith, left, engineered the radiometer and Arlen Huggins is an expert in interpretation of the data.
Photo: David Whillas

A Matter of Opinion
Cont. from p.3

exciting and stimulating place to work – a great deal is expected of it by the rest of the community. This expectation only can be fulfilled through the efforts of CSIRO people. As always, the Organisation is solely dependent on the quality of its people. The achievements of the past reflect the standard of that quality and one must be confident that our people have all the talent and enthusiasm necessary to meet the challenge of change in the years ahead.

IICT at the Technology Exhibition

The new Institute of Information and Communications Technologies presented some of the work of its divisions at the Australian International Technology Exhibition held 7-10 June at Darling Harbour. Staff from four divisions manned the display over the four days.

Letters
Cont. from p.2

through the printery for CSIRO divisions and units, all production costs, other than labour costs, were charged. This totalled more than $300 000 in 1987/88.

In respect of Ralph's comment about wastage, I would be surprised if, overall, this exceeded acceptable industry levels.

Turning to the future, like Ralph I am pleased to know that most of the staff have been able to secure satisfactory employment elsewhere, in which I wish them well.

Geoff Stomann
Information Services Unit

Dear Editor,

A new strategy is being developed for CSIRO's Public Enquiry Servce and a draft is currently being circulated. Recommendations for action based on the strategy will be presented to the Executive Committee before long. Some matters raised by Mr Geoff Adams in his letter to *CoResearch* last month may be addressed now however, and these are:

1. The training of telephonist/receptionists

This matter is totally distinct from any discussion about the future of the regional information managers. A ministerial request was made to the CSIRO Board to improve the training and status of telephonist/receptionists (T/Rs) in CSIRO. The human resources branch has already conducted a two day training seminar in Canberra and the next is expected to take place in Brisbane. Seminars in other capital cities will follow.

The PCEK Report also highlighted the need for an improvement in CSIRO's 'first point of contact' with the public. In order to bring our T/Rs in line with those in industry, where they are regarded as a 'window on the world' and part of a company's public relations team, an effort is being made to upgrade the T/Rs' status and skills.

There has been no suggestion that T/Rs will need to handle technical enquiries, since as Mr Adams rightly says, a technical background is required for this work. The T/Rs are being given some extra training in the handling of *administrative* enquiries on the nature and structure of the Organisation and on the functions of key personnel.

2. Relationships of RIMs with the state advisory committees

It needs to be remembered that there would never have been any RIMs in Brisbane, Hobart, Adelaide or Darwin if the positions had not been half-funded by the state advisory committees, for which the RIMs acted as secretary. The SSOF3 position could not otherwise have been justified on the basis of the number of technical enquiries received per day in these cities.

The number of telephone enquiries for technical information received by the Regional Office in Brisbane where Mr Adams' Division is located has been running at about eight per day, with six to eight letters per week. Previously, when the Brisbane RIM was away these enquiries were referred to the Sydney office *via* the 008 number and the same procedure has been followed since the RIM transferred to Canberra. As far as we know this system incurs no further workload on the Brisbane divisional staff.

3. The public relations component

In trying to develop a strategy to provide a first class responsive public enquiry service there has been no suggestion of 'top down' thinking as claimed. The writer has personally consulted with the senior staff from the Brisbane RAO, Mr Graham Leatch of Tropical Animal Production and, although he does not acknowledge it in his *CoResearch* letter, Mr Geoff Adams himself.

It emerged through these conversations that it is not a person to handle technical enquiries which is needed in Brisbane, so much as an extra pair of hands to help out at Farmfest Field Days, trade fairs and other exhibits.

4. The PCEK Report

The PCEK Report stated that the National Information Network (NIN) should provide a 'first class responsive public enquiry service to industry and the community'. This was the *sufficient* condition for the NIN's survival.

Many of the existing RIMs do show an aptitude for public relations work and meld these activities in with their handling of technical enquiries. Nevertheless, the provision of a first class information service must be the central activity.

The precise details of the resources allocated to each location and the functions performed there will be the consideration of the Executive Committee. Far from making isolated decisions, the ISU will not even be formulating proposals for the Executive Committee without cvareful and extensive consultation with institutes and divisions.

5. Communication *vis a vis* information provisions

Mr Adams talks about the need for a CSIRO communication strategy and this is indeed currently being developed by an Institute's Communication Working Group. The development of corporate services such as NIN will be directed by this strategy.

NIN has been required to develop a *responsive* public enquiry service, which will be a component, but not a primary one, of an active communication strategy.

The process being followed must surely be called 'strategic' rather than 'opportunistic'.

Yvonne B Esplin
Senior Regional Information Manager

Australian cotton for Australian growers

PI revolutionises the industry with new varieties

The successful breeding and commercialising of two new cotton varieties demonstrates the quiet but revolutionary research in CSIRO which has had a major impact on Australian agriculture.

The two varieties, Siokra and Sicala, were developed at the Division of Plant Industry's Cotton Research Unit at Narrabri (see *CoResearch* No. 310, March 1988) and widely released less than three years ago. They now dominate cotton growing in Australia.

The Officer in Charge of the Unit, Dr Norm Thomson and his team* have anxiously awaited results from commercial plantings since the release. Despite some setbacks the new varieties have done remarkably well, even though this season did not favour them as much as the excellent 1987 season when productivity was dramatically boosted among those growers who used Siokra and/or Sicala.

Earlier planting followed by substantially higher rainfall seem to have contributed to the slight drop-off in Siokra productivity this year. An exceptionally cold spell in February also had an adverse effect.

Although this result brings the average down, the overall increase in productivity for growers who have switched to the new varieties is about eight per cent. This represents a larger income for individual growers and ultimately more export dollars.

Grower support is strong and gaining. Siokra and Sicala now account for 73 per cent of forward sales (Siokra: 46 per cent, Sicala: 27 per cent), while the American and formerly dominant Deltapine varieties now account for 27 per cent.

Dr Thomson, a leader in the field of cotton breeding in Australia, is cautious in assessing the monetary advantage of Siokra and Sicala, pointing out that there is room for improvement and more time is needed to assess the true impact of the two varieties.

His Chief, Dr Jim Peacock, does not hold back – he believes the new cotton strains will bring many more millions of dollars to the Australian cotton industry. He said last year the extra yield provided another $20 million for industry, and that figure was on the increase. Yet the research program which developed the cotton cost only $2-$3 million.

Siokra and Sicala have given a greater choice to cotton growers looking for an edge in an increasingly competitive industry which relies mainly on exports. The industry, although it has a history dating back to last century, is not a large one in Australia but it is growing rapidly and now taking on established exporters such as growers in the United States.

Quality and yield are among the deciding factors for the success of an export push such as this, and the two CSIRO varieties, with their strong fibre, disease resistance and other advantages are helping boost this industry.

Siokra particularly is totally different to the Deltapine varieties. It gets its name for its 'okra' shaped leaves, which differ from normal cotton plant leaves in being deeply serrated and narrow lobed. They also hang more vertically than normal leaves.

Although it starts forming flowers slightly later than DP90, its flowers emerge and its small bolls set more rapidly, and it usually is a week to 10 days earlier to harvest and shows tolerance to insect pests such as bollworms and mites and its more open canopy allows better penetration of insecticide sprays. Siokra also recovers from storm and hail damage more rapidly than normal leafed varieties.

Siokra has been bred to be resistant to the 18 common races of bacterial blight. This blight has become more widespread in cotton areas and has caused serious losses of yield in some cases. The near-immunity of Siokra to this disease is one of the factors which has commended Siokra to growers.

Siokra is probably best grown in cool, wet areas, where its yield is up to 20 per cent higher than the Deltapine varieties. It is particularly suitable for growers on the Darling Downs

Because the okra leafed variety is so radical – being the first in the world to incorporate this leaf type in a successful commercial cotton variety – Dr Thomson and his team are still looking at the optimum conditions for growing it to produce the best yield. In many ways Siokra is the vanguard of a new form of cotton plant in Australia, and the scientists are monitoring its commercial progress particularly closely.

'Since much of our promising advanced material also has okra leaf, this knowledge will assume even more importance in the future and enable new okra leaf varieties to quickly take their place commercially,' said Dr Thomson. And in fact new versions of Siokra with substantially increased yield and improved strength are even now superceding the original Siokra.

Sicala complements Siokra, although more of a conventional plant but with Siokra's commercially-important blight resistance.

In common with Deltapine 90, it is a vigorous grower and provides high strength cotton. It is set apart from the American variety by its blight resistance and its improved ability to tolerate and recover from hail damage. This latter feature seems to result from its more open canopy and more supple, less brittle stems – characteristics it shares with Siokra.

*The breeding program which produced Siokra and Sicala has involved a number of people at the Cotton Research Unit. Apart from research leader Dr Norm Thomson, others have included Mr Craig Patrick, Mr Peter Reid, Mr Lindsay Heal and Ms Lisa Davis. The Unit also has close links with the Queensland Department of Primary Industries.

The okra leaf, right, compared with a standard leaf.

Dr John Irwin of the University of Queensland, right, and Mr Terry Woodroffe of the Division of Tropical Crops and Pastures, left, handing over seed of the new lucerne varieties to Keith Seeds representative Mr Burton Allen.

Marketing push for lucernes

Disease and pest resistant lucerne varieties bred by the Division of Tropical Crops and Pastures and the University of Queensland will form the basis of a new marketing push.

A South Australian company, Keith Seeds Pty Ltd, has won a contract to produce and market the varieties.

The new lucernes were bred jointly by Dr Bob Bray from the Division and Dr John Irwin from the University. They are improved versions of the popular Trifecta and Sequel varieties which were bred previously by the Division in collaboration with the Queensland Department of Primary Industries.

Trifecta and Sequel lucernes are in the top five selling varieties in Australia, with more than 300 tonnes and 200 tones respectively sold last year.

The new varieties have been bred to be resistant to *Stemphylium* leaf spot, a major disease of lucerne.

In addition, both are resistant to *Phytophthora* root rot and *Colletotrichum* crown rot, as well as major pests such as spotted lucerne aphid, blue-green aphid and pea aphid.

Seed from the new lines should be on the market in about two years.

Mr Shayne Martens, Managing Director of Keith Seeds, said his company had won the contract from tough competition, after responding to a public call for expressions of interest from CSIRO.

AT companies

Cont. from p.4

Companies which provided components and services worth more than $100 000 were:

. W Chandler for electrical fitting worth about $150 000
. Electronic Development which supplied the RF amplifiers* for $260 000
. Fibrenet, for the optical fibre connectors and splicers*, worth $100 000
. Hawker de Havilland for the pin diode switches* worth $220 000
. Hewlett Packard for $200 000 worth of test equipment*
. Intergraph Corporation for computer aided design (CAD) system* worth $300 000
. Pirelli Cables for a fibre optic cable worth $200 000
. Quality Tool and Die for miscellaneous hardware to the value of $150 000
. Sydney Engineering service for sub-reflectors on the new dishes, worth $100 000
. Thytec Electronics P/L for uninterruptable power supplies worth $150 000

Those companies supplying goods and services of less that $100 000 included: Andrew Antennas, Huber & Suhner (Aust)P/L, MAA Pty Ltd, MIL-COM Associates Inc, Mitec Ltd, Nu-Tech Circuits P/L, Precision Graphics, Printronics Pty Ltd and WAMAC Tool and Manufacturing Pty Ltd.

*(*denotes those components which were imported)*

AT people

Cont. from p.4

planning of the Canadian Long Baseline Array, and joined the AT project in 1983. His professional interests include supernova remnants, radio source variability and interferometry.

. The leader of the signal distribution and monitoring section of the project, Dr Alan Young, joined the project after his return from a stint at the Owens Valley Radio Observatory where he played a major part in the development of the millimetre telescope project.

. Dr Brian Robinson was responsible for initiating a steering committee for the forerunner of the AT and played a significant role in the plan of the AT concept. He was heavily involved in lobbying the government to agree to the construction of the telescope. As chief research scientist at the Division, Dr Robinson directed the research program of the Parkes telescope from 1968 to 1979, and later became responsible for radio astronomy at millimetre wavelengths.

315-1988

Russ Wylie retires

Dr Russ Wylie has retired after 44 years of research and 25 years as an SPRS in what is now the Division of Applied Physics.

Russ gained his bachelors degree in physics from the University of Sydney, his masters degree from the University while with CSIRO and his PhD from the University of Bristol through a CSIRO postgraduate studentship.

His theoretical and experimental research in phase nucleation, the interaction of water vapour with gases, the PVT properties of fluids at very high pressures, convective heat and mass transfer and psychrometry have been punctuated by his development of basic measurement methods for temperature, humidity and viscosity, and of specialised instruments for measurements in these areas in CSIRO and industry.

Among the latter have been an airborne hygrometer for the investigation of the so-called anomalous propagation of radar when it was discovered in the early 1940s, which was later used in cloud physics studies by the Division of Radiophysics, field instruments for the routine measurement of the moisture content of the earth rolled to form the wall of the Adaminaby dam (now the Eucumbene dam), apparatus for the introduction of hypothermia in Australia for adult patients (with Mr A F A Harper), and a differential psychrometer later adopted by other divisions for transpiration studies in plant and animal physiology.

His research contributed to the physics of rainmaking, to a knowledge of the properties of water vapour in compressed gases and of gasses compressed to liquid-like densities and to an understanding of convective heat and mass transfer from surfaces immersed in fluid streams.

For many years Russ was the leader of the Division's fluid physics group. His fundamental studies in psychrometry resulted in the first accurate agreement of theory and experiment in that field and culminated in his development of a type of psychrometer which was adopted by the World Meterological Organisation in 1977 as the international standard for meteorological humidity measurement.

Russ is a world leader in the fields of psychrometry and hygrometry generally, and throughout the major centres of research for hygrometry or the properties of water vapour, he is well known either personally or by way of his many publications.

Russ will continue some of his work in the Division as an Honorary Research Fellow.

Correction

***CoResearch* apologises to members of the Division of Animal Production's tick vaccine group, whose photograph in the last issue was wrongly captioned. The names should read: Dr David Kemp, Mr Roger Pearson, Mr Robert McKenna, Ms Joanne Gough, Mr Alan Donaldson, Ms Janine Nielsen, Mr George Riding and Dr Peter Willadsen.**

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

More leisurely pace for Margaret

After 42 years of service with CSIRO, starting during the Chairmanship of Sir David Rivett, Margaret Allan has retired from East Melbourne to assume a more leisurely pace.

Margaret joined head office in Melbourne in 1946 as personal assistant to the Chief Architect Rex Ferguson. The architect's office eventually developed into the buildings and property section, and Margaret became responsible for the day to day administrative activities of the group. Among other things she played a leading role in creating CSIRO's Assets Register.

When part of the buildings section moved to Canberra in the early 1970s, Margaret stayed behind to assist the Melbourne group. This group relocated to 9 Queens Road in 1977.

She returned to 314 Albert Street in 1982 as secretary to Clyde Garrow and, among other things, demonstrated her prowess in responding to the many thousands of enquiries CSIRO receives each year from the public, particularly from school children.

A dinner was one of several happy farewell functions held in Margaret's honour. Her colleagues always will remember her cheerful friendliness and willingness to assist those who needed typing or other work done. We wish her well in her retirement.

Jeff Prentice

Left to right, Allan Cross, who will retire later this year after 41 years with CSIRO, Margaret Allan and Peter Dawe who recently left the Organisation after 15 years as Chief Librarian (see story in July CoResearch*).*

Supervisors take part in development course

Staff travelled from Adelaide, Sydney, Melbourne, Parkes and even Griffith to participate in the employee development unit's 'Developing Effective Supervisors' course run from Sunday 15 to Friday 20 May.

The residential style was particularly valuable as the participants had a variety of backgrounds – administrators, scientists, photographers, laboratory craftsemen and librarians, with a wealth of case studies and experiences to share.

The program was intensive, with sessions each day and evening dealing with leadership, motivation, team building, communication, management of change, negotiation and job instruction techniques. The tower building exercise was a highlight, with the assembly of two incredible structures, demonstrating different leadership styles. The services of Peter Langhorne were employed to present the award for the the best tower.

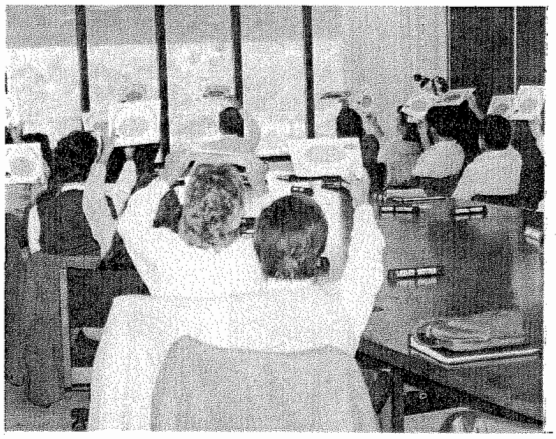
The course also provided a good opportunity, for those who had never visited the corporate centre, to meet key staff and to participate in sessions relating to CSIRO's performance review and development program, industrial relations and equal employment opportunity.

Unfortunately, few accepted Bob Marshall's challenge to climb Mt Ainslie during the recreation break, but all enjoyed the stargazer exercise which was part of an exercise in job instruction techniques. I'm sure the fifth floor conference room has neve seen such a spectacle before or since!

By the end of the week all were very weary but felt much better equipped to deal with the task of supervision. Credit must be given to Bob Marshall and his team for a stimulating and rewarding program.

Similar courses are being held in Sydney, Brisbane, Melbourne, Adelaide and Geelong during 1988.

Philip Kent
Information Services Unit
East Melbourne



Participants in the course learn how to use a star guide during an exercise in job instruction techniques. Photo: Geoff Lane, IMEC North Ryde, a course participant.

Qantas study awards

Applications are now invited for the 1988 Qantas/CSIRO Travel Awards.

The awards enable staff to spend three to six months overseas undertaking studies or training relevant to their work in CSIRO.

All staff other than research staff may apply. Awards are judged in four broad categories: trade, technical, professional (non-research) and administrative services.

As a general rule, the overseas study or training has to offer significant advantages over similar experiences available in Australia.

The closing date for applications is 30 September 1988. Forms and information sheets are being distributed to all divisions and units. More forms and further information are available from Jenifer North, Public Affairs Unit, 062-48 4545.

PI takes out Black Mtn Cup

Lee Belbin from Wildlife & Ecology just beating John I'Ons from the Institute of Plant Production and Processing in the Black Mountain Cup. Lee and John came 18th and 19th respectively.

Another successful SIROCREDIT Black Mountain Cup was run on 15 July.

A small field of 52 negotiated the 5.6km course on the gentle slopes of Black Mountain, with the Cup going to the team from Plant Industry – Allen Miller, Mark Young, Steve Speer and Paul Cavers.

Last year's winners, Forest Research (now Forestry and Forestry Products) came in second ahead of Environmental Mechanics, Plant Industry workshop, Csironet and headquarters.

The individual results were: Allen Miller first (21 min, 5.7 sec), Paul Quilty second (21–9.3) and Mick Crowe third (21–56.6). Other awards went to Anne Gardener, first woman; Ken Old, over 40s; Brian Austin, over 50s; and Keith Perroux, over 60s.

The results could have looked rather different had the fourth member of the Ryde Fun Run's winning team (Mineral Physics) not been delayed, thus missing the start. Perhaps one of the Sydney teams will show us how it's done next year.

315-1988

CoResearch

No. 316 September 1988 CSIRO's staff newspaper

CSIRO AUSTRALIA

Kerin on rural R&D

Adding value is the way to go

Mr John Kerin, Minister for Primary Industries and Energy, has taken steps to establish more formal links between his Department and CSIRO, to have some input into the long term planning of CSIRO's research. A large chunk of CSIRO's research falls into his area of interest, and because of this CoResearch undertook an interview with him recently to canvass his views, as an economic rationalist with a strong interest in seeing that the primary sector gets the best possible research deal.

The development of an efficient manufacturing base in Australia need not be at the expense of the primary industry sector, according to the Minister for Primary Industries and Energy, Mr John Kerin.

Speaking to *CoResearch* last month, Mr Kerin said 'if we can get more efficient manufacturing industries in this country that is no bad thing for primary industries. There is a complementarity in it.'

However, he said he believed the primary industries sector was far better attuned to the need for R&D than the fledgling manufacturing sector. The high level of contributions to the various rural industry research councils indicated the importance placed on research.

'I believe manufacturing industry has fallen well behind in its commitment to research,' he said.

Mr Kerin said he believed the best way to go now was adding value to primary sector products, thus benefitting both sectors – and CSIRO would be important in providing the knowledge to do this profitably.

In line with the Government's general attitude, Mr Kerin said that the major problem lay with the low industry commitment to research, particularly in the manufacturing sector. Much bigger input was needed to meet the exceptionally high costs involved.

'It's a bit like buying jet fighters. If you're going to do quality research in competition with the world you require more sophisticated machinery for your researchers to work with, and it's a labour-intensive job. You need to waste a bit of money to do good research but you certainly need to expend more money if you're going to keep up.'

Mr Kerin did not believe CSIRO necessarily had an automatic right to increased Government funds.

'I've never believed that CSIRO should be any particular sacred cow. I think there's always a need for research to be better structured.' But he said he did believe CSIRO had given good value for money over the years, to the rural sector in particular.

When asked about the perceived decline in fundamental research in CSIRO, Mr Kerin resisted placing research into categories marked 'basic', 'strategic' and 'applied'. 'I think it's unwise to think you should target funds for basic, strategic or applied research in separate boxes because you lose the complementarity, you lose the linkages.

'Ideas and directions will evolve, and you never know whether it's going to be basic research or strategic research. You might be doing very basic research on brain cells and suddenly it becomes strategic when you find a way to cure Alzheimer's disease or something like that.

'I think Government has to put the pressure back on the private sector to get into more quote basic research unquote. We shouldn't accept what some people in the private sector say. I think they should be in it. I know it's difficult, but they should be.'

Mr Kerin said it was a 'cop out' to believe, as many people in Australia did, our manufacturing industry unable to put the results of research to real economic use.

'I think it's a bit of a cop out because it reflects more on the fact that there needs to be some way found to get into the patenting game, the licensing game, the commercialising game – to try to fund the balance whereby you can set up joint ventures etc.

'If Government and business are quite serious about research, there should be a way to address this so we don't lose the benefits of what we actually pioneered so easily as we have in the past.

'It's all there. Surely to God we must have learnt by now, because we are talking about joint ventures in beef and coal and other things in my areas. There are indications that it is not impossible and we should not just take the cop out line.'

Mr Kerin said he was not concerned that much of CSIRO's research fell within his area of interest – i.e. agriculture, minerals and energy – but was not actually within his portfolio.

'I believe it needs to be one step removed in a way. I don't think my Department is any more logical to be the head department [than DITAC]. The science portfolio was the best way to have it, but now... that argument's gone by the by.

Three committees have been established to provide the linkages between the Department and CSIRO, on the clear understanding that they will not interfere in the details of planning future direction.

'I don't want any notion that the Canberra bureaucracy, even with our close links to client groups, will point in the very detailed directions that CSIRO should go. It's got to be strategic.'

Mr Kerin was present at the July CSIRO Board meeting. 'Basically the Board took the view that the research effort in terms of the funds available is being kept up to primary industries,' he said.

'They made some qualifications, as I do, that just because there is a slightly increased emphasis in non-primary industry areas doesn't mean that there are no [resulting] benefits to the primary industries themselves.'

When asked about a specific issue – the greenhouse effect – Mr Kerin said he needed more data before he could make detailed comment.

'I get all sorts of propositions. It's put to me, for example, that because the greenhouse effect is here now, we should go into more nuclear power generation, and I'm trying to address this within my own department. We could also make an argument to say that we should do something about scrubbing the remaining bits of sulphur out of Australia's low sulphur coal and sell that in north Europe because that would make more economic sense for Australia, so I'm looking at that sort of aspect of the greenhouse effect.

As for another pressing problem, soil degradation, Mr Kerin said 'I think the work CSIRO has done [on this] over the years has been enormously beneficial. Again, it's a funding problem, it's a practice problem, it's an attitudinal problem, it's a co-ordination problem, particularly in the states, on increasing money in the national soil conservation program, national afforestation program, the Murray Valley Basin Commission. We are starting to move in this general area and CSIRO's backup is going to be enormous.'

CSIRO's new print advisory group, among those featured in a special report this month on the Information Services Unit. Left to right, Roy Osborne, Jim Quinlan, John Best. Seated, Kim Greene. The ISU feature appears on pp.4 and 5.

Photo: Mark Fergus

The details of this year's CSIRO budget allocation were outlined in the budget report circulated to all staff and won't be repeated here. The main features were: a total government appropriation of $334.2 million, three year funding, retention of external funds and the likelihood of a major capital project at North Ryde.

The Federal Budget

Staff were informed promptly of the major decisions in this year's federal budget through a specially-prepared budget report.

It was the first time a document specifically aimed at presenting the budget decisions to staff had been produced. As expected, it had a mixed reaction, with some welcoming it as an attempt at better internal communication while others finding that it smacked of headquarters propaganda.

The budget itself contained some new initiatives for CSIRO, but does not seem to have been well received by staff in general. It does offer guaranteed three year funding, but some staff appear sceptical about whether the word 'guaranteed' means anything in these turbulent times.

Our appropriation will decrease in real terms over three years, on the basis that more outside funding is expected.

Chief Executive Dr Keith Boardman said 'of course I would have liked more money from appropriation, at least to fund the second tier wage increases which cannot be easily absorbed in the short term.'

However, he said that the Government was facing a huge foreign debt and had indicated that it had no intention of upping our appropriation. It had, though, provided clear incentives for CSIRO to seek external funds, he said.

Many people in the Organisation have not welcomed either the budget or management response to it. For instance, Dr Angus McEwan, Chief of the Division of Oceanography and Chairman of the Committee of Chiefs, sent a letter to the Chairman, Mr Wran, on the subject. Among other things, Dr McEwan referred to funding increases for other Australian research bodies such as the Defence Science and Technology Organisation and the Bureau of Meteorology. Dr McEwan felt CSIRO was being

Cont. on p.6

From the Chief Executive

A column by Dr Keith Boardman

The official opening of the Australia Telescope by the Prime Minister was a grand occasion. Dr Bob Frater, the staff of the Division of Radiophysics and all involved in the construction of the telescope and for arrangements for the opening are to be warmly congratulated.

The Prime Minister referred to the telescope as the state of the art in astronomical technology and a most appropriate achievement with which to celebrate our Bicentenary. He obviously took pride in the fact that the telescope was designed and constructed in Australia, with 80 per cent Australian content.

In my vote of thanks to the Prime Minister, I said the Australia Telescope symbolised the crucial importance of maintaining the balance between Australia's longer term, more basic research – research that is at the leading edge of world science and technology – and the application of that research for the economic development of Australia.

Barry Jones stressed the crucial role of Government in maintaining Australia's core research effort, and warned of the dangers of leaving it to industry. Mr Jones said 'I am an enthusiast for greater interaction between research and industry, but it must be a two way process. It is essential that industry recognises the importance of science and that long term research – perhaps with a 20 year payback – is central to our future'.

The Australia Telescope opening received magnificent coverage on all television networks and in the print media, including souvenir colour supplements in *The Age* and *The Sydney Morning Herald*. I pay tribute to the team from the Division of Radiophysics and Public Affairs for their meticulous planning of the event and thank AUSSAT for provision of the satellite link.

The Organisation also has received a lot of media coverage in the past few weeks on the cut in our appropriation from the federal budget, and its impact on the continued validity of some of our important research projects, as well as the long term economic performance of Australia. The campaign to publicise the adverse effects on CSIRO's programs and the morale of staff culminated in a segment on the ABC's *7.30 Report*, which also dramatically highlighted the decline in Australia's R&D position among the nations of the OECD.

Australia ranks 16th out of 22 OECD countries and last in the group of medium sized economies. To bring Australia up to the average R&D level of these economies we would have to increase its level by 0.7 per cent of GDP, or about $2000 million per annum. R&D levels continue to rise in most OECD countries and the gap between Australia and the more successful countries is widening.

While Australia has increased its R&D expenditure from about 1.0 per cent of GDP to about 1.3 per cent this decade, R&D expenditure in the Netherlands has risen from 2.05 per cent of the GDP to an estimated 2.37 per cent since 1984. The Canadian Prime Minister spoke this year of 'decades of neglect' of R&D in pledging an additional C$1.3 billion for science and technology over the next five years; Canada spent 1.36 per cent of GDP on R&D in 1986.

Australia is suffering from the lack of a forward looking S&T policy and it is becoming urgent that the Government develop an S&T policy as an integral part of its industry policy.

The publicity of the past few weeks should alert the Government to the grave dangers of allowing any further decline the nation's R&D effort and I am now more hopeful for the future.

I realise it is difficult to communicate to the Organisation the processes that lead to budget decisions, particularly as they involve confidential cabinet business. But I can assure staff that the two portfolio Ministers, Senator Button and Mr Jones, and the Chairman and I, together with Peter Langhorne and the Corporate Services staff spent much effort in our attempts to influence the outcome. In the event we were not successful in having reversed a decision from last year that we should lose a further $5 million from our appropriation in 1988/89 because of increased external earnings. We argued strongly for the retention of external earnings without penalty, which is consistent with the ASTEC recommendation and the Government response on that recommendation.

Cont. on p.6

Letters to the Editor

Dear Editor,
Three cheers for Michael Jones, Division of Mineral Products.

He has stated my feelings perfectly in the last three paragraphs of his letter in *CoResearch* 315 p2.

Let's hope there are more CSIRO staff out there who are 'getting industrially relevant research up and running' than those 'designing eye-catching logos'!

Carolyn Zwar
Div. of Forestry
& Forest Products

Dear Editor,
The document *Talking about the Corporate Centre*, that accompanied our July *CoResearch* is a welcome new initiative in communications within CSIRO. However, like other public relations documents, it begs more questions. Perhaps Mr Langhorne could answer the following additional questions?

1. How many positions were reclassified in the formation of the corporate centre from the old headquarters?
2. How were these reclassifications justified?
3. What will be the new average cost per position in the corporate centre compared with the previous cost per position for HQ?

D J Goodchild
Division of Plant Industry

Dear Editor,
The pamphlet on corporate centre staff cuts accompanying the July issue of *CoResearch* raised some additional questions. In the divisions it was always assumed that the thrust of the PCEK recommendations and the consequent decision of the Board was that the *central bureaucracy* (head office) was to be reduced.

The pamphlet states that instructions from the Board were to reduce the October 1987 staff level of 630 to about 360 (45 per cent cut). It also acknowledges that about 140 of the 270 positions to be lost will in fact result from the abolition of the RAO.

However, it is clear that, in addition to abolishing the RAO, other cuts have been made by eliminating sections both geographically and functionally peripheral to the corporate centre. For instance, as reported in the same issue of *CoResearch*, the CSIRO printery has been abolished. The resulting staff losses will apparently also be counted among the reductions in corporate centre numbers.

To allay mistrust, re-establish some level of morale and quash various rumours, it is vital that a *clear* and *detailed* statement is provided on the corporate centre structure and the staff reductions. We need to know what cuts are to be made to the central core of the corporate centre *excluding* those due to abolition or pruning of such peripheral operations as the RAO, the printery and service operations such as the Editorial and Publication Service. It would also be important to have a clear statement on the new structure of the corporate centre, the salaries for mid and upper bracket positions and any fringe benefits associated with these positions.

M D Hatch
Division of Plant Industry

Dear Editor,
The recent *CSIRO Budget Report* was inspiring, and any of your readers who may suggest that it was a complete whitewash are scoundrels. I found the Question Time section particularly heartening. Just imagine how helpful it would have been for the passengers and crew on the Titanic.

The Captain of RMS Titanic answers your questions.

Q: What does the iceberg mean in actual flotation terms – will we be in a sinking-type situation?
A: Table 1 shows that, whereas we previously had 10 intact flotation tanks, providing a certain amount of buoyancy, the close and somewhat intrusive contact with the iceberg has caused an increase in the number of tanks having reduced structural integrity. On the positive side, at least we now know what the future will bring and the stateroom has some rather nice fittings.
Q: Would it be a good idea to radio for help?
A: The shipping company has a clear view of what's best, and we agreed right at the outset to keep radio messages to an absolute minimum. They have every confidence that our minor glacial difficulties will be overcome and that the ship will continue to bring in enormous profits for the company as a whole.
Q: What is the 'efficiency dividend'?
A: Because of the iceberg, some of the flotation tanks now have a seawater content slightly in excess of our requirements, so the shipping company has asked us to deploy large numbers of men to move the excess water to those tanks which at the moment have none – thus increasing our efficiency.
Q: Will the iceberg mean staff reductions?
A: We can take advantage of the iceberg to get the right balance of salary to operating expenses. I hope staff reductions can be met by natural attrition, together with natural submersion.
Q: What about the lifeboats administered by the Captain's Centre?
A: They will still be administered on behalf of the passengers and crew for reasons of economy and used as fuel for important morale-boosting bonfires amidships.
Q: What will happen to passengers and crew who can't meet the 30 per cent target for lifeboats obtained from external sources?
A: The 30 per cent target is not so formidable as you might think. If any rescue ships arrive there should then easily be sufficient lifeboats available to pick up anyone who happens to have survived that long.
Q: Does the decrease in available deck space resulting from our rapid slide into the brine mean that promotions will now depend on the availability of dry areas on which to stand?
A: No, and it never...glug.. glug..gurgle.

W M Lonsdale
Division of Entomology
Darwin

Dear Editor,
Dr Boardman reported in the August issue of *CoResearch* that Mr Kerin, Minister for Primary Industries and Energy, expressed the view that 'the Government should be setting strategic directions for research and development' and that Mr Kerin wants greater cooperation between his Department and CSIRO. On 30 June 1987 CSIRO withdrew its support from the Baaş Becking Geobiological Laboratory which was a joint research facility between CSIRO, the Bureau of Mineral Resources (BMR) and the mineral industry via the the Australian Mineral Industries Research Association Ltd. It was formed in 1966 and over 21 years of its existence, research scientists and technical officers from both CSIRO and BMR gave the Laboratory an enviable national and international reputation for strategic research into the geological, geochemical and biological processes involved in mineral and oil formation. Exploration for Australian minerals was the ultimate target for this research.

In one stroke, by withdrawing its support, CSIRO destroyed 21 years of scientific and technical skills and contacts with the minerals industry which CSIRO and BMR officers together had developed in collaborative and multidisciplinary research. I sincerely believe that none of the Baas Becking Geobiological staff would have resisted changes in research direction to meet new objectives. However, there was no discussion of new research plans. On the closure of the Laboratory some officers left scientific research completely and many others were redeployed to situations which do not make maximal use of skills obtained in the Baas Becking Geobiological Laboratory. The regrettable error

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A Matter of Opinion

This month's point of view column comes from Liz Tynan, Editor of CoResearch.

The comments in this column reflect my concern for CSIRO, which I believe is one of Australia's greatest assets. It is an asset that can only be squandered at Australia's peril.

I recall when I first started with the Organisation three and a half years ago, a visitor (whose name and position escape me) had recently been quoted as saying 'without CSIRO, Australia would be a Third World country'. His words stuck with me, and I have had the privilege to learn in the intervening years just how right he was. But my overwhelming impression, gained by conversations with numerous division chiefs and other members of staff, is that all is not well. I make no claims to being a financial whizz who understands the full implications of the budget allocation and how the cake is split up and where all the money goes. All I know is the reason CSIRO exists – the scientific research – is in trouble, and the people best placed to see this happening are in the divisions.

There has been an exceptionally high level of media coverage lately focusing on the financial difficulties facing CSIRO divisions. Many of these stories have quoted the Chief of the Division of Entomology, Dr Max Whitten. He has been criticised around headquarters by people apparently worried that his outspoken comments will annoy the government and make things even worse for us. There appears to be an attitude among some of put up *and* shut up. But many of Dr Whitten's views are supported by a large number of chiefs, and their views can't be ignored. Indeed, similar comments from several chiefs have appeared in *CoResearch* in various forms for several years at least. Numerous letters to the editors of newspapers, deploring the government cutbacks, suggest that CSIRO does have a wide base of community support, and there is evidence that the message has finally got through to the Government.

My own view is that CSIRO is going through the agonies of death by a thousand cuts. In fact I wonder whether it can continue in its present form for much longer. This may be the hidden agenda, for all I know – to break up CSIRO and divest it of all but its high-tech or manufacturing oriented research, effectively ending up with a 'panel beating shop for industry'. This would be wrong and disastrous and tragic.

To gauge reaction, I have spoken to a number of chiefs since the budget was brought down, but I do not intend singling them out as I have in past issues of *CoResearch*. I apologise to chiefs I haven't had a chance to speak to – there is only one of me and 32 of you, and time, as always, is short. I found after a while that many of the comments from chiefs were very familiar – with a few exceptions, most chiefs agreed that things were crook in divisions.

'Bottomless pit'

I do not believe chiefs any longer have a 'bottomless pit' attitude, if they ever did. They have for the past five years at least had to cut and cut and cut some more. Maybe the bureaucrats are right in saying that cutting the dead wood was necessary and long overdue, but the cuts are biting into the living wood now and life is draining from the tree.

The government policy seems to be to force Australian industry to invest far more money in R&D. I believe, perhaps naively, that taking money away from CSIRO will not necessarily result in industries suddenly rushing to make up the difference. The vacuum created may never be filled. What's more, the withdrawal of support from rural research will not, I believe, have the effect of shifting the emphasis to manufacturing. The development of a viable manuacturing base in Australia must grow from and depend initially at least on our agricultural sector which, like it or not, carries this country at the moment. There is no doubt that we need to diversify our economy so we are not at the mercy of fluctuating international commodity prices, but this must be done by moving a step along from primary production, adding value to our products, thereby boosting the agriculture sector while at the same time building a new sector. I don't believe we can become world leaders in, for example, computer design and manufacture, but perhaps we can in processed foods.

To my mind there are two particularly disturbing aspects about the upheavals in CSIRO's R&D effort. Firstly, in 10 or 20 years time we won't be much use to the industries which we are supposed to be serving if we don't maintain our knowledge base. But this base is being eroded because of the drastic reduction in fundamental and long term strategic research while divisions are forced to grasp at tactical projects just to get the cash. Secondly, the inability to keep or hire top young scientists, who perhaps no longer see CSIRO as a desirable place to work if they can only get tenure for two or three years, and then only on tactical

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New compo scheme
'Clean sheet' to wipe $1M debt for CSIRO

The new Commonwealth worker's compensation and rehabilitation scheme, COMCARE, will wipe out one of CSIRO's major financial commitments and provide improved benefits for staff.

According to the Organisation's Occupational Health and Safety Manager, Mr Gary Knobel, last financial year CSIRO faced a bill of $2 million in compensation payments. (In addition, the indirect costs from lost output, training of replacement staff, etc, increase this figure substantially.)

About half this was for the 112 staff on long term compensation. In order to allow CSIRO (and other government agencies) to start on the new scheme with a 'clean sheet', these payments will be taken over by COMCARE when it starts up on 1 July next year.

COMCARE will essentially limit access to common law for compensation claims, which will result in far fewer of the spectacularly large payments which have been made to individuals in the past. However, it does offer better benefits for all people assessed eligible for compensation (see table).

Under the new arrangements, the COMCARE Commission will decide on an annual premium for each Government department or instrumentality, and this will be taken off the top of the appropriation at the start of the financial year. This will eliminate the present system of CSIRO paying compensation now for cases often dating back years. There has been little financial incentive to reduce the cost of compensation when the costs from earlier years continue to impact significantly on total compensation expenditure, said Mr Knobel. More than half of all compensation payments are for continuing cases compared with a quarter of all cases in 1977/78. Real expenditure has nearly trebled in that time.

Premiums will be calculated broadly on the past compensation record. Using actuarial methods, COMCARE will determine the full future cost of any accident shortly after it occurs, and as a result the cost will be debited against CSIRO's premium costs in that year.

This could mean several million dollars in claims in the one financial year if a number of serious incidents occur, sending the yearly premium up substantially said Mr Knobel. Obviously, the emphasis increasingly will be on minimising workplace risks and therefore the potential for claims.

A large percentage of claims are for back injuries, and seminars on preventing back injury are available on request, he said. Defensive driving courses for staff who use four wheel drive vehicles on field trips are being introduced and site safety committees are being boosted. Seven full time safety officers will be assigned to CSIRO's major sites around Australia.

Details of the arrangements for funding the new premium system within CSIRO are being discussed. One proposal is that in the first three years the financial responsibility be gradually shifted back to divisions via their institutes which eventually would see the premium cost divided between divisions on a performance basis using CSIRO-compiled statistics.

To reduce compensation claims, mandatory rehabilitation provisions are being introduced. These will require CSIRO to prepare a management plan and to set up a system of rehabilitation for staff absent for 28 days as a result of a work related accident or disease.

Information on the new scheme has been sent to each division and further details will be made available as COMCARE comes on stream.

Examples of new entitlements

COMCARE	OLD SCHEME
Weekly benefits	
100% of pre-injury earnings for 45 weeks	equivalent of full sick pay for 26 weeks
After 45 weeks of pre-injury earnings, subject to a ceiling of 150% of average weekly earnings	statutory rate of $192.80 plus $50.50 for dependent spouse and $24 for each dependent child
Lump sums	
Up to $80 000 for permanent impairment of at least 10% of whole person. Special provisions for loss of fingers or toes (less than 10% of whole person).	maximum of $59 980 for specific losses
Up to $30 000 for pain and suffering	no provision for any payment for pain and suffering
Death benefits	
Up to $120 000 payable to dependent spouse/dependent children. Dependency presumed if normally living with deceased	up to $59 980 payable only to a spouse who can prove dependency and/or dependent children
Household and attendant care	
Full reasonable cost of services for up to four weeks after injury	$33.50 for constant help or attendance
Medical costs	
Agreed medical costs paid directly to provider or reimbursed to employee by COMCARE.	reasonable medical costs paid by agencies at the direction of Commissioner

Morale boost from cost benefit report

Dr Max Whitten, Chief of the Division of Entomology, said morale in his Division had been boosted considerably by production of the much-talked about report giving a cost benefit analysis of the work of Entomology.

The report, titled *Entomological Research and Development: a High Yielding, Low Risk Investment*, was produced following a request by the CSIRO Board for information on the management problems facing the Division. In preparing the report, Dr Whitten and his colleagues decided to emphasise the cost benefit angle up front before outlining the obstacles.

In the first section, the report (where possible) puts a dollar value on scientific research done in the Division. The viability of assigning actual value was shown in a more detailed analysis of returns from the Division's research as part of a joint study by the Industries Assistance Commission and CSIRO. This 1976 study found an average internal rate of return of around 19 per cent – a very favourable result.

One of the major claims in this latest report is that the Division, which received less than $10 million government appropriation in 1987/88, generated economic wealth for Australia of at least $50 million and possibly over $100 million during the same period.

This estimate has come from what the Division calls the 'readily quantifiable recent R&D successes', such as:

. improvement of spray systems in Queensland grain sheds, saving $1.5 million per year;

. development of a method for phosphine fumigation of grain bunkers, saving at least $2 million per year;

. biological control of crop and

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Editorial Services Section

Special Feature **Informatio**

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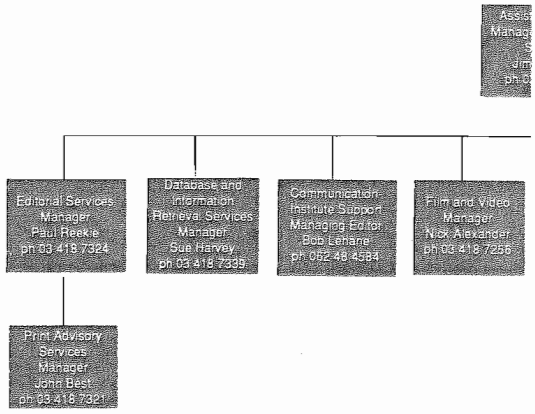


Australian Journals of Scientific Research

In 1988 the fortunes of the Journals have fluctuated like never before. From the uncertainty during the PCEK review to the signing of a five year agreement to continue publication, the lives of the editorial group have not lacked interest.

It is fitting that the 40th anniversary of AJSR has been marked by a new beginning:
. the introduction of modern, attractive cover designs;
. the implementation of the sophisticated TEX typesetting system using Apple Macs and a 600 DPI laser printer;
. the almost troublefree transfer of production and distribution systems from the now defunct inhouse printing unit to external suppliers.

Like the rest of CSIRO, the journals are under immense pressure to increase outside funding. We are lucky to have an excellent product to sell, and will achieve sales of over $1 million this year – about 60 per cent of our funding needs. The three year plan is to achieve full cost recovery.

Not only are the Journals proudly promoting CSIRO and Australian science overseas through subscription sales, CSIRO libraries also derive huge financial benefits through the exchange program:
. the value of overseas journals received is about $700 000.
. over 4200 subscriptions, or more than 32 000 individual items, will be sent out on exchange.

Contacts:
Greg Berry
PH: 03-418 7368
Invertebrate Taxonomy
Australian Wildlife Research
Australian Journal of Zoology
Geoff Forster
03-418 7388
Australian Journal of Agricultural Research
Australian Journal of Soil Research
Ann Grant
03-418 7381
Australian Journal of Marine & Freshwater Research
Reproduction and Development
Roger Hooley
03-418 7389
Australian Journal of Experimental Agriculture
Laurie Martinelli
03-418 7326
Australian Journal of Botany
Australian Systematic Botany
Australian Journal of Plant Physiology
Peter Robertson
03-418 7377
Australian Journal of Physics
John Zdysiewicz
03-418 7317
Australian Journal of Chemistry

CSIRO Bookshop

The major bookshop functions of the ISU – the order processing, customer service, warehousing and distribution – are alive and well. These ISU services have not been terminated. There are plans to offer an even better service to divisions by computerising much of the order processing to better handle ballooning sales projects in 1988/89, such as:

. over $1 million in journal sales
. an estimated $400 000 in book sales

Most sales are handled by mail or active marketing in the book trade. However, the ISU is still planning to improve street access and provide an obvious CSIRO presence on Albert Street.

Contact:
Mirella Cirillo, 03-418 7217

Publications

The book production plans for CSIRO Publications are proceeding with renewed vigour. The editorial services group provides:
. a central source for all CSIRO ISBN numbers;
. free advice and assistance at the concept stage on presentation and target audience;
. support and expert advice to negotiate with co-publishers to maximise royalty returns;
. the ability to manage books through the production process by contracting freelance editors and designers;
. experience and advice on electronic manuscript transfer and desktop publishing.

At present there are over 80 books being considered for publication, ranging from *Soil Structure and Fabric* which is about to be released, to ideas still at the embryo stage. Anyone wishing to write a book is advised to seek our advice without obligation or cost.

Contacts:
Kevin Jeans, 03-418 7208
Paul Reekie 03-418 7324

Marketing

Marketing of journals and books is the vital link in the publishing chain. A new position has been created and is now being advertised for a person to refine existing mailing lists to better target customers, create more and better brochures and catalogues, continue expanding CSIRO products into the Australian book trade and provide display support for divisions at open days and conventions.

The full potential of CSIRO Publications is yet to be realised, but with a concentrated publishing, marketing and distribution system available, editorial services can produce and disseminate the fine work being done by CSIRO.

Better still, books and journals can be sold at a profit to the Organisation. Best yet, the unit intends returning a portion of the revenue to divisions.

Contact:
New appointee, Paul Reekie, 03-418 7324

The Print Advisory Service

This service has been established to assist institutes and divisions Australia-wide. The CSIRO printing centre closed recently and the Organisation's printing requirements must now be purchased from commercial suppliers. The print advisory group with four staff in Melbourne and one to be based in Sydney from next year is well qualified to buy print services on behalf of institutes and divisions, on the basis of substantial experience of the print and graphic design requirements common in scientific and technical publishing.

Purchasing power: it is in the interests of institutes and divisions to buy print through the group wherever practical, to enhance CSIRO's purchasing leverage. A network of suppliers is being developed by the group, and individual companies are monitored for cost, quality and delivery performance. Print purchase orders may be placed by the group on behalf of institutes and divisions: the group will need the relevant cost code and an authority letter/fax from an officer with delegation to authorise expenditure.

John Best, manager
03-418 7321
Jim Quinlan, print advisory officer
03-418 7333
Roy Osborne, print advisory officer
03-418 7333
Kim Greene, administration
03-418 7333
Jeff Prentice, print admin officer, Sydney, 1989
FAX No: 03-417 6125
or 03-419 0459

National Information Network

The corporate centre review gave the National Information Network (NIN) a new and delightfully straightforward brief: to 'run a first class responsive public enquiry service to industry and the general public'.

Just how this was to be achieved was not stated. It has now been set out in a draft strategic report which is being circulated.

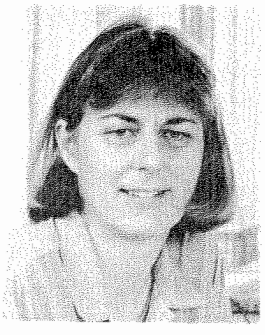
Since NIN is often the first point of contact for outsiders to CSIRO, its role in effective public relations is critical. The regional information managers have a role in ensuring industrial callers are put in contact with the appropriate CSIRO expert as soon as possible, since collaborative or consulting projects may result.

They also play a significant part in the projection of a positive image for CSIRO, especially when handling hundreds of enquiries from the general public each week.

The aim of the network is to provide a professional enquiry service and to continue building up the Organisation's image as an objective and reliable source of information.

As part of this, a 008 (toll free) number has been installed to provide a full time backup to regional services.

Methods used by regional information managers include the normal information handling tools, supported by continual liaison with divisional, institute and corporate staff. This liaison can relieve divisional staff of recurring enquiries and support them through creating effective links with industrial enquirers.



Ms Sue Harvey, Manager, Database and Information Retrieval.
Photo: Mark Fergus

Julie Fitzpatrick and Franz Spranger at work on the Journals of Scientific Research.
Photo: Mark Fergus

Special Feature

Information Services Unit

As a result of the corporate centre review, the Bureau of Information and Public Communication was reduced in size and divided into two parts – the Public Affairs Unit and the Information Services Unit.

***The ISU is responsible for all the service functions of the former Bureau, including library acquisitions, systems, reference and stores; editorial services and print advice; film and video advice, contracting and production; and database development and production. The ISU also manages the National Information Network, the on-line database host AUSTRALIS and the magazines* Ecos, Rural Research *and* Industrial Research News.**

Staffing reductions in the ISU have been quite severe, with more than 35 separations already and at least another 20 planned for the next 18 months. Some functions, such as printing, have completely disappeared. Others. such as monograph acquisitions, have been or will be devolved.

Generally, every area of activity has been closely scrutinised for its value to CSIRO and has been restructured to cut resource requirements to a minimum.

We are confident we can manage within the limits set for us. Groups that have had a few months to settle into their new structures already are attracting favourable comments from divisions for the services they are providing.

However, settling into new structures and developing new systems for interacting with client divisions will take more time. Complex areas like library services can't be expected to be completely sorted out before mid 1989.

A review of site libraries due to start next month will play a critical role. The review will involve research managers, divisional librarians and others from institutes and the corporate centre in a consultative process aimed at establishing the way in which the various elements of the CSIRO library network will interact in future.

The purpose of this feature is to introduce the new groupings within the ISU and to publicise the services and products available.

The ISU exists to serve research. Not only will resources devoted to the unit be wasted if this function is not fulfilled, but divisions failing to take advantage of ISU advisory or contracting services could end up purchasing inferior products at unnecessarily high prices.

Call the ISU if your program, laboratory, division or institute needs to publicise its work, improve its industry or public interface or build up specialist information services. Our level of involvement can vary from providing simple advice over the telephone to managing major contracts.

If one of our inhouse experts can't help you, we certainly will find someone who can.

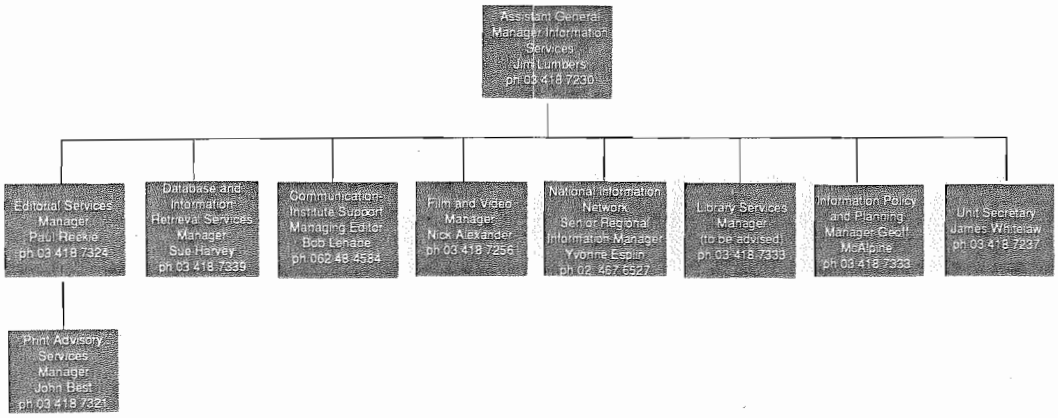
INFORMATION POLICY

Consider drawing on ISU services, also, in areas such as policy and planning for information services. Multiple Federal and State agencies now have responsibilities or ambitions for scientific and technical information, making policy co-ordination a serious problem.

While needing to be seen as active in information dissemination, CSIRO must avoid unnecessarily duplicating the work of others. It also needs to direct its resources into areas of maximum impact where the payoff will contribute to broad corporate goals.

The ISU's central position in CSIRO, practical orientation and knowledge of other public and private sector bodies in relevant areas enables it to provide informed action-oriented advice in information planning or policy development.

James Lumbers



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Sue Harvey, Manager, base and Information eval.

Photo: Mark Fergus

Julie Fitzpatrick and Franz Spranger at work on the Journals of Scientific Research.

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The Video Age

Video, film and television have transformed the way people expect to be informed. For many, the flickering screen has progressively usurped the printed page as their primary source of information and diversion.

To some scientists this is anathema. These media seem to lack linear rationality. They have a fragmentary and discontinuous structure and often a strong emotional component.

It's worth remembering, though, that most of the millions of people who watched 'Life on Earth' on television would never have been motivated to explore its subject through other means. It's irrelevant whether the 'quality' of information transferred through film is comparable with that of the written word – the two media do not (or should not) attempt to do the same thing.

Few would argue with the astonishing capacity of the audio visual media to create awareness, influence attitudes, expand knowledge and emotionally dispose an audience.

In CSIRO the possibilities for video communication are considerable but are rarely exploited by divisions. Much needs to be done to interpret the results of research to end users or to the community at large. A lot more could be done to communicate the value of our research to potential sponsors.

Is the seemingly high cost of video production the problem?

The necessary outlays need not be exorbitant, but funds *do* need to be specifically allocated for video, as for all communication projects. The real questions is, will a video be cost effective in meeting parti-

Cont. on p.6

Communications – Institute Support

The group's name may be unfamiliar but its main products – *Ecos*, *Rural Research* and *Industrial Research News* – are well known both inside CSIRO and outside.

The corporate centre review determined that they should continue, with more emphasis on cost recovery. The name of the group reflects its purpose: to support CSIRO's research effort by providing effective means of communicating research findings.

Readership studies have shown that the three publications are effective. The most recent study of *Ecos* and *Rural Research* concluded that readers had an 'extraordinarily strong attachment' to the magazines, finding them authoritative and useful.

Apart from distribution within CSIRO and, in the case of *Rural Research*, to agriculture department offices, the two magazines are almost entirely on subscription.

Industrial Research News is still free. Whether it, too, should be a subscription publication is under consideration.

To help divisions gain maximum benefit from *Rural Research* and *Ecos* articles, a streamlined system for ordering reprints and extra copies has been introduced. Suggestions about topics which should be covered in the three publications are welcomed.

Database and information retrieval services section

This new section's functions include database production, CSIRO AUSTRALIS (the science & technology on-line host), Search Party, translations and products & services development.

Recently the Executive Committee gave the section 12 months to explore commercialisation of all or some of these activities.

The clientele of AUSTRALIS and Search Party continues to grow, and the demand for database production is more than we can cope with now.

The task ahead is to increase the number of Australians who understand the value of the electronic database as a means of organising information and gaining access to it. Or, to put it more plainly, to expand our market and gain market share.

Translations

CSIRO's three translators produce about one million English words per year from 20 languages. However, the number of translators in CSIRO has declined in recent years and there are no Asian language translators on staff.

The move towards full cost recovery will mean divisions will have to pay for translations. We will also accept some external work at full commercial rates. Depending on demand, it may then be possible

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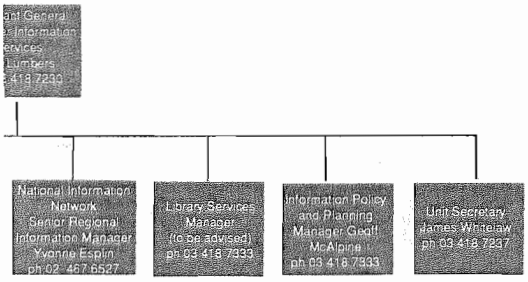

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Cont. on p.6

Library Services

Cataloguing

CSIRO libraries together hold one of the largest collections of scientific and technical literature in the country. Effective use of such material depends on the generation of proper bibliographic information and the production of catalogues and indexes.

The cataloguing section is responsible for all aspects of bibliographic control throughout CSIRO, including planning, implementation and maintenance of the Union Catalogue system.

At present 33 divisional libraries contribute to the on-line database which contains 97 500 bibliographic and 84 000 authority records. These records are shared by all divisional libraries, and this has saved duplication in cataloguing materials.

Other means of increasing efficiency and reducing cataloguing effort are being explored. These include the use of direct electronic file transfer from the National Bibliographic Database or other available databases, and the acquisition of bibliographic records through the publication ordering process.

Acquisitions section

This section carries out all CSIRO serial ordering, spending $4.1 million per year on 12 000 titles.

The group also has expertise in monograph ordering and gifts and exchange. However, following the corporate centre review a major effort is being mounted to devolve these activities.

Central co-ordination of gifts and exchange will remain, but the value of the program to institutes (now being assessed) will determine how large it becomes.

Acquisitions users are enthusiastic about the service:

'ISU Acquisitions takes care of all CSIRO's subscription problems, leaving me with more time to spend with my users.' Carolynn Larsen, Chemicals and Polymers;

'The ISU gets our "too hard" questions such as arranging urgent supply of a European patent.' Bernadette Waugh, WA Laboratories;

'For us, Acquisitions provides the valuable function of the ISU. They excel at tracking down obscure foreign publications.' Patrick Ledwith, Long Pocket Laboratories.

CSIRO Library Network System (CLINES)

The automation of library operations now allows scientists to browse through the collection from their own laboratories.

This on-line public access catalogue facility offered by CLINES is maintained and operated by the ISU in conjunction with the management information services unit at East Melbourne.

The hardware and software for CLINES was bought from Geac Computers in 1986. Since then the central site equipment has been installed and commissioned.

Over 35 divisional libraries are now using the newly-implemented cataloguing software module to update their catalogues via CSIRONET's X 25 packet switching network.

Data for all journal subscriptions in CSIRO is being loaded into the acquisitions module by ISU library staff and will be used to control subscriptions from January 1989 onwards. The circulation module which controls the lending of books, journals and other library material is expected to be implemented by the end of this year and will then be made available to all divisions.

All divisional catalogue records (now over 160 000) in machine readable form are available on-line from any asynchronous terminal or NGEN with dial-up or direct access to CSIRONET, or from any Geac library terminal in CSIRO.

If in doubt ask your divisional librarian or CSIRONET micronode manager. A manual is available in all divisional libraries.

Library collection management

The ISU library collection occupies about 10km of shelf space. A project to rationalise the library store collection will start soon. Material housed at Maribyrnong will be brought back to Rokeby Street before the end of 1988 where a culling program will start to transfer or discard unwanted material.

By mid-1989 we expect to resume accepting retired and under-used material from other CSIRO libraries. Delivery of documents from the library store will be integrated with the despatch of saleable publications, with the aim of improving the speed and efficiency of delivery.

Reference and document supply

The staffing level in this section has decreased significantly over the past few years but the number of inter-library loans, the section's major workload, has remained almost constant at around 6000 a year. Requests from CSIRO libraries are given priority.

Our reference collection is a valuable asset for all CSIRO and our reference and document locations enquiry services must be retained for the efficient operation of other CSIRO libraries. Ordering document copies from overseas suppliers soon will be devolved to site libraries.

A Matter of Opinion

Cont. from p.3

projects, will further decrease the standard of the knowledge base available in years to come. One chief I spoke to said he was about to lose two talented scientists engaged in important work because they had come to the end of their limited tenures and he couldn't afford to reappoint them. This, I'm sure, is a familiar story around other divisions.

In many cases morale, often shaky in recent times, has taken another plunge. According to some chiefs I spoke to, the general feeling often is that the government and CSIRO's top management don't appreciate the work being done by the scientists, even if that work is of the highest scientific standard and with real potential for application. On the other hand, in some divisions the prevailing attitude is 'we'll show the bastards'.

One of the few exceptions to the generally critical comments about the present state of CSIRO was from a division which was starting to get the benefits from royalties. That division was set up with the major aim of working closely with industry. The potential was there from the start for the development of *products* which could be sold to earn hard cash. However, many of our divisions are not in this same position. Because of the nature of the sectors they work in, they often develop *processes* which are not capable of earning royalties as such. Their benefit comes more from saving industries money rather than actually generating revenue for incorporation in a balance sheet. Dr Whitten's Division has attempted the difficult task of putting dollar figures on this sort of work (see separate story).

Something which came to light during my talks with chiefs was the fact that although many of them have achieved or even exceeded the required 30 per cent outside funding, they are still experiencing difficulties in coping with overhead costs. And of course the problem of out of date equipment, despite some capital expenditure allocation in this budget, is putting scientists behind their peers overseas. This problem can only intensify as new technology requires the most up to date equipment to keep up with world trends.

I don't think there is any chief in the Organisation who wants to see the self indulgence of 'science for the sake of science'. They want to work with industry, they want to target their research to tackle pressing problems of industry *sectors* in Australia – often this work is not only rewarding for industry but most satisfying for the scientists. But the Organisation won't be able to fulfil this role if it is brought to its knees by successive budget cuts, loss of top staff, run-down of equipment and internal dissatisfaction.

The opinions expressed in this column are the purely personal views of a concerned observer.

Letters

Cont. from p.2

in closing the Laboratory cannot be reversed but it may be some solace to former members of the Laboratory that Mr Kerin has drawn CSIRO's attention to the area of strategic minerals research where collaboration between Australian Government departments is obviously vital to the national interest. It is a matter of concern that Mr Kerin is offering more vision for Australian scientific research and development than was evident from CSIRO just a year ago.

Graham Skyring
Division of Water Resources

Dear Editor,

HANDLING PUBLIC INQUIRIES IN THE SUNSHINE STATE

I would like to correct some errors of fact and misconceptions in Yvonne Esplin's letter of reply in the August issue of *CoResearch*.

i) Yvonne Esplin's contact with me in relation to her 'consultations' occurred after I had sent my letter to *CoResearch*, hence could not be acknowledged.

ii) Whenever Ian Sutherland was not on duty as Brisbane Regional Information Manager, our number of inquiries increased. I have a letter on file written to Gary Garland (then RAO head) on this subject. No attempt was made to instal the 008 number in place of Ian's number at Brisbane RAO. Both our library and ourselves have had increased numbers of inquiries since Ian's departure.

iii) My argument for restoration of the RIM position is that there is a need for someone preferably with corporate centre back-up to satisfy public inquiries and carry out communication activities in northern Australia in conjunction with divisions. This is more than 'an extra pair of hands to help out at Farmfest Field Days, etc'.

CSIRO is underprepresented in northern Australia, Queensland has more than 16 per cent of the total population but only 8 per cent of total CSIRO staff. Three quarters of CSIRO's staff are located south (and including) the Sydney-Adelaide axis. The figures are even more disproportionate for communication professionals. It has been my experience to date that we have had no benefit from the effort to produce a smaller corporate centre and reallocate resources to divisions or regions.

Geoff Adams
Senior Information Officer
Division Tropical Crops & Pastures

The Video Age/ISU

Cont. from p.5

cular communication objectives?

This is where CSIRO's Film and Video Centre can help. It's always worthwhile enlisting the help of experts when considering the production of a video.

The centre has a small core of highly skilled staff who can:

. advise on the appropriate use of audio visual communication
. arrange for the contracting out of video production
. supervise the performance of external contractors
. undertaken specialised scientific film for research or communication
. advise on technical matters relating to film, video and audio visual production
. produce film and TV programs which interpret the work of CSIRO to a variety of target audiences.

In addition the centre also:

. maintains a central library of film and video masters of all CSIRO programs
. compiles a database of all productions for on-line access, via the AUSTRALIS network
. provides access to CSIRO footage for external media use.

For further information about the service provided by the centre, call Nick Alexander on 03-418 7256.

Translations/ISU

Cont. from p.5

to expand the service to cover Japanese and other Asian languages.

Search Party

For many years we have offered computer database search services from East Melbourne for CSIRO and external clients. Search Party is the new name for this service, which now also offers to supply copies of documents identified in database searches.

The enhanced service has been very successful and has expanded rapidly, with about 70 per cent of our orders coming from business and industry.

CSIRO staff should note that we offer fast service and cover a wide range of Australian and international sources including business databases. Patents is an area of special interest and high demand.

Search Party is aiming to operate on a nett-zero budget this year.

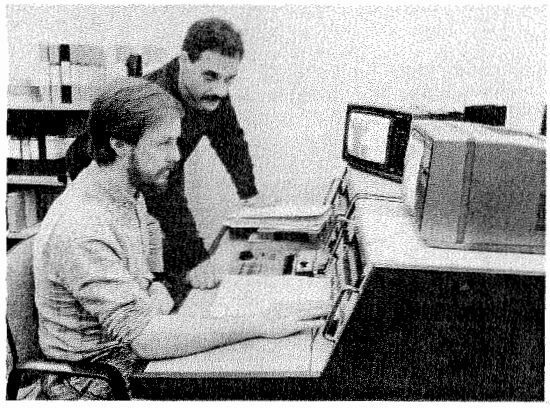
Contact: Penny Braybrook

STN International

STN is a major new international database vendor specialising in scientific and technical information.

Databases of special interest include CAS ONLINE, ICONDA, the new JICST database on Japanese science and technology and the major international databases in other areas of science.

The ISU provides marketing, training and user support services for STN in Australia.



Robert Kerton and Nick Pitsas from the Film and Video Centre during an editing session.

Cost benefit report

Cont. from p.3

pasture lucerne aphids, saving $1.5 million per year;

. commercialised fruit moth control system based on synthetic pheromone, with sales of more than $1 million in the USA in 1987.

The report argues that despite the economic returns from the Division's research, its appropriation funds have been reduced by 15 per cent in real terms over the four years to August 1988 (this figure predates the latest federal budget), and it is facing financial difficulties which simply should not be there given the value of the research.

Despite the Division's success, however, the report warned that important research would have to be curtailed if the situation continued.

Reduced staffing levels (with the associated separation costs) and less appropriation funds had brought the Division to a crisis and Dr Whitten said there was no point denying it. His public statements arose from frustration at the apparent lack of appreciation of the major problems threatening the continuation of economically beneficial research.

Dr Boardman

Cont. from p.2

We were successful, however, in reducing the impact of external earnings on our budgets in the following two financial years, and we now are able to retain all earnings without any further impact on our appropriation. Neither the second tier wage increase nor the efficiency dividends were negotiable.

N Keith Boardman

CSIRO tropical grass

The first ever Australian tropical grass to be registered under the new Plant Variety Act was bred by a CSIRO scientist.

The grass, splenda sectaria (*Setaria sphacelata*), was bred by Dr Bryan Hacker of the Division of Tropical Crops and Pastures.

The seed is to be multiplied and marketed by Primac Seeds of Murwillumbah, mainly for export to South East Asia and the Pacific.

The Budget

Cont. from p.1

singled out for budget cuts.

The letter said rigorous reviews in recent years had led to a reorganised research effort and a strongly integrated structure well suited to the national interest. Despite this, he felt the Government did not support the work of the scientists. Dr McEwan also felt CSIRO's top management had blamed the management skills of division chiefs for budgetary problems instead of more actively lobbying for adequate funding.

• In another budget related development, a dispute arose this month between the OA and management over figures quoted in the budget report.

The OA questioned the appropriation funds quoted for 87/88 (Table 1), saying they hadn't been properly adjusted for inflation and therefore didn't allow a realistic comparison with the allocations for this and the next two years.

However, Mr Bernie Mithen, Assistant General Manager (Finance and Services), said arriving at an adjusted figure was not a matter of simply multiplying the 87/88 figures by the inflation rate.

He said this was because the salary component of running costs (about 70 per cent) is routinely adjusted in the event of wage case decisions, excluding the second tier increase. In comparing the 87/88 and 88/89 budgets, there had been no further wage increase requiring adjustment.

Operating costs (30 per cent of the running cost figure), however, were adjusted according to the inflation allowance estimated by the Government – about seven per cent.

The issue was somewhat clouded by the fact that the original 87/88 appropriation of just over $354 million was reduced during the year by more than $7 million mainly because of a reduction in the employers' contributions to the superannuation scheme.

General Manager Corporate Resources, Mr Ian Farrar, said 'every attempt was made to ensure the comparison between financial years was comparing like with like.'

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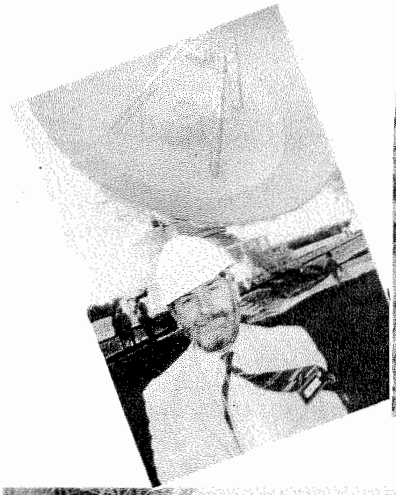
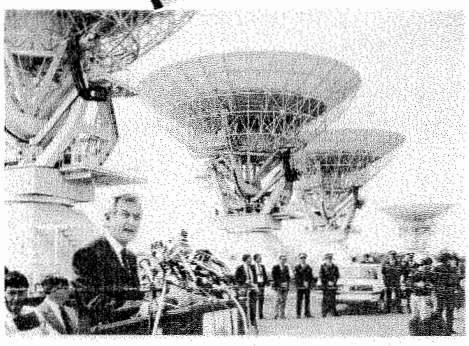
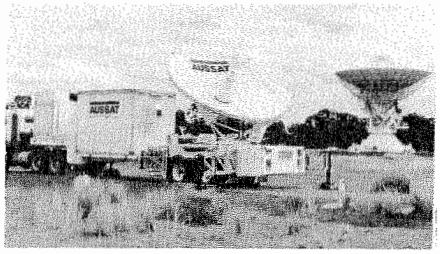
The day Australia turned to the stars...

The day was blustery but otherwise fine on 2 September when the Prime Minister Mr Hawke officially opened our Australia Telescope. It was a memorable occasion, with the band playing, the PM and Science Minister both making stirring speeches about the remarkable achievement of all concerned, speeches also from Mr Wran, Dr Boardman and Dr Frater, green and gold balloons emerging on cue from the stunning white antenna dishes, distinguished scientists mingling with politicians mingling with media representatives, with business people, academics, locals and many others joining in...a day to remember in fact. The PM rode to the ceremony on one of the antennas, and at the end of the formalities three of the 22m dishes 'bowed', releasing the balloons which were quickly carried aloft by the wind. There was no better way to properly mark the start of a new era in Australian radio astronomy.







Top centre, the reason we were there. Top left, Mr Jones and one of his hats. Top right, Mr Hawke and the apparatus of media. Left, the antennas made a great backdrop to the PM and Dr Frater (right). Above, AUSSAT came to the party, in more ways than one.

Left, Dr Paul Wild and Mrs Wild on one of the antennas. The AT compact array is at the Paul Wild Observatory, so named in honour of Dr Wild's contribution to radiophysics and particularly his radio heliograph which previously occupied the site. Above, Mr Hawke's wasn't the only famous face at the opening.

Right, project manager Mr John Brookes, welcomes Mr Hawke to the AT and shows him aboard one of the antennas for the ride to the ceremony. Above, behind the scenes everything went like clockwork.

Above, the inspections of the antennas were very popular. Left and right, congratulations all round to the people involved.

Photos: John Masterson

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Obituary

Sir Leonard Huxley: scientist and educator

Eminent Australian physicist and former CSIRO Executive Member, Sir Leonard Huxley, who died in London earlier this month, will be remembered for many contributions to science and education.

He was Vice-Chancellor of the Australian National University for seven years from 1960, and had established an international reputation as an authority in the fields of electromagnetism and gaseous electronics.

Sir Leonard was born in Tasmania in May 1902. He was awarded a Rhodes Scholarship in 1923, and subsequently two further scholarships while in the UK.

An interesting aspect of his long career was his work during the Second World War. His research in atmospheric phenomena led him to a vital task for the Allied war effort.

It became necessary to teach a vast number of people the use of the new radar technology. Radar is widely acknowledged as one of the greatest factors in saving Great Britain from the fierce German air attack in the Battle of Britain, but it was a new technology with no practitioners before the war.

Sir Leonard (then Dr Huxley) had the task, at the Telecommunications Research Establishment (TRE) on the English east coast, to quickly, effectively and in some secrecy, teach about 7000 military personnel the installation, operation and maintenance of radar.

This technology had been devised only a few years earlier by Dr R A Watson Watt and developed by a small team which included Dr E G 'Taffy' Bowen, who later became Chief of the CSIRO Division of Radiophysics.

Dr Huxley initially undertook this training schedule single-handedly, although later he was assisted by other teachers. The superintendent of the TRE, Dr Rowe, was quoted as saying 'A lasting impression I have of the school in its later years is a picture of a front row of Air Vice Marshals and Air Commodores sitting at the feet of a succession of flannel-bagged lecturers'.

Sir Leonard's involvement in teaching radar techniques followed his early work on the detection of thunderstorms in Australia.

In 1929 he joined the Australian Radio Research Board which had been established by CSIR. Here he researched the origins and nature of 'atmospherics' which caused disturbance in radio communications – disturbances originating from thunderstorms. He and a colleague started their observations while on board the P&O liner which brought them to Australia.

In 1932 he became a lecturer in the Physics Department at University College, Leicester, UK, where he was able to conduct research on electrical breakdown and produced a definitive paper, published just before the war, on electron diffusion and drift.

Immediately after the war, he started researching the so-called 'Luxembourg Effect', in which transmission from one broadcasting station was cross-modulated by another, more powerful, transmitter. Eventually this led to work on gases, particularly the constituents of air, and formed the basis of a program he actively pursued later in his university positions.

He was appointed to the Elder Chair of Physics at the University of Adelaide in 1949, an appointment which marked the beginning of his devotion to university teaching which lasted the rest of his life. From 1960 until his retirement in 1967 he was Vice-Chancellor of the ANU. In retirement, he became a Visiting Fellow in the Research School of Physical Sciences, and later an Honorary Fellow.

Meanwhile, in 1959 Professor F G W White (now Sir Frederick White) became CSIRO Chairman and among the new Executive Members he chose was Sir Leonard.

Professor White had known Dr Huxley for some time by that stage, but strangely, although both physicists with an interest in atmospheric phenomena and subsequently radar, their paths had not crossed in England in the 1930s.

The former CSIRO Chairman describes Sir Leonard as 'an extremely wise and quiet man who was very sane in his judgements'. He was sorry that Sir Leonard was unable to continue for more than a year in his CSIRO position, as he had been appointed ANU Vice-Chancellor.

Apart from his distinguished work as a scientist and educator, Sir Leonard held a number of other professional positions. Among these were: Chairman of the Australian Radio Research Board (his employer in 1929) from 1958 to 1961; Member of the Council of the National Library from 1961 to 1970; Member of the US Education Foundation in Australia 1960-64; first President of the Australian Institute of Physics 1962-1965; and Member of the Council of the Canberra College of Advanced Education 1969-1974.

SIROCREDIT branch manager for NSW

SIROCREDIT has appointed a full time branch manager for New South Wales.

Ms Julie McKinnon has had more than 12 years experience with the largest credit union in Australia, the NSW Teachers Credit Union.

She is now located at the CSIRO North Ryde site in an office of the old National Materials Handling Bureau, and may be contacted via the SIROCREDIT toll free number 008-33 8698, or on 02-887 8248 and Fax 02-887 8249.

Much of Julie's time will be spent visiting divisions throughout NSW, meeting staff individually and conducting information seminars on the range of SIROCREDIT services.

She will act as a focus for all SIROCREDIT's NSW operations, co-ordinating staff members' needs and ensuring prompt processing of deposits, loans, etc.

In addition, Julie will be able to offer the SIROVEST Financial Planning Service to members by programming the investment and retirement seminars for all NSW sites as well as booking individual appointments with SIROCREDIT's licensed consultant in the near future.

Win for CSIRO softball team

CSIRO's B Grade Women's Softball team came from third position to win the 1988 Public Service Competition Grand Final.

In a convincing show, the team defeated Aviation by 20 to 3, before a group of cheering CSIRO supporters.

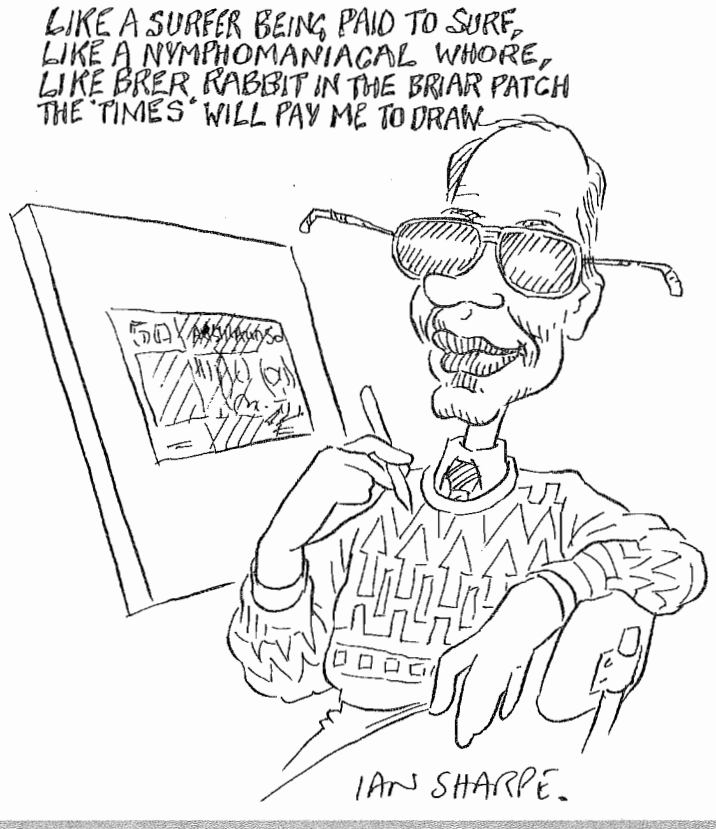
Captained and coached by Helen Hoare, the team has shown consistent form and excellent teamwork throughout the competition. The win was especially sought after as a farewell to stalwarts Jill Colefax and Helen Hoare who will both be leaving HQ shortly.

Players included: Sylvia Allan, Mary Burton, Jill Colefax, Nikki Gordon-Smith, Sharon Gradden, Helen Hoare, Kim McKay, Ann Morant, Helen Petrou and Robyn Ronai.

The win would not have been possible without the help of members of the C grade team who helped throughout the competition when players were scarce.

CSIRO's C grade team was defeated in the grand final by Canberra Hospital. However, considering the many 'first timers', it was a fine achievement for the team to reach the grand final.

Ian gets licence to draw money



One of headquarters' more recognisable figures, Ian Sharpe of the graphic design group, looks a bit like the cat that swallowed the canary these days.

Fortunately for him (but not for the rest of us left behind), he has gone to the* Canberra Times *to spend his time doing what comes naturally to him – drawing. He has been contributing a weekly cartoon to the* Times *for ages, but now he has gone there full time, leaving us to wonder who is going to do the superb caricatures presented to colleagues on their 'retirement' from our part of CSIRO (Ian has been kept awfully busy this year with all the retrenchments).

Ian came to HQ about four and a half years ago, and three years before that he had worked for the Division of Entomology.

As his swansong, he was persuaded to do his own caricature (seen left).

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

CoResearch

No. 317 October 1988 CSIRO's staff newspaper

CSIRO AUSTRALIA

At last, science is entering the Australian political arena. Politicians are starting to see it for the first time as a 'sexy' issue, and recent debates in Parliament on science funding have been heated. This month **CoResearch** *interviewed the new Shadow Minister for Science and Energy, National Party MP for Gippsland Mr Peter McGauran, an ambitious young politician keen to push science to the political forefront. He said he wanted greater public debate and a more sophisticated approach to lobbying by scientists.*

Shadow science minister to push for greater R&D debate

The science lobby, said Mr McGauran, was fragmented and therefore fairly ineffective, contrasting with the highly organised effort by the energy sector. There was a tendency, he said, for scientists to blind politicians and the public with science rather than presenting hard figures on the benefit of research to Australia, and this usually had the effect of switching people off.

He praised Dr Max Whitten's report on the economic return of the work of the Division of Entomology, saying that other divisions would be well advised to prepare similar reports to use as ammunition against those who would argue that CSIRO was spending too much public money for too little return.

He said he would push science and its role in our national development more and more into parliamentary debate, an important step towards making it part of the popular culture.

On 11 October Mr McGauran addressed the House of Representatives, citing what he called the 'devastating' budgetary cutbacks to CSIRO in recent years.

'CSIRO is in a state of crisis. If it is not rescued soon, it will be reduced to a second rate research institute,' he told Parliament. He said the interdepartmental committee set up the day of his address to inquire into Australia's R&D problems was 'Sir Humphrey Appleby gone mad'. In a press statement supportive of CSIRO issued the next day, Mr McGauran concluded by saying 'will the last scientist to leave CSIRO please turn off the bunsen burner'.

Mr McGauran, who has been an MP since March 1983, was given his new position in the reshuffle in September which saw the departure of the former (and equally enthusiastic) science spokesman Mr Warwick Smith from the Shadow Ministry. Mr Smith, who maintains a strong interest in science policy, gave a speech in Parliament on 13 October in support of Australian R&D, and particularly CSIRO. He took the opportunity to mention the display at the House by the Division of Forestry and Forest Products, which attracted the attention of a number of politicians, including Ministers. This was the first time a CSIRO division had mounted such a display, and was indicative of the growing realisation that politicians needed to be convinced of the value of CSIRO's work.

In his interview with *CoResearch*,Mr McGauran rejected the commonly held view that his colleagues in the Liberal Party had no interest in science, and that only the National Party because of its base in the rural community took any real interest. It was never going to be 'the most explosive political issue', he said, but certainly it was 'more potent now that it ever has been'.

Recently, the Opposition leader Mr Howard had released a scathing statement directed at the Government regarding CSIRO. Mr McGauran said there would be more and stronger criticism publicly and in Parliament of Government policies affecting research in the future.

'There is a growing band of Liberals very interested in the direction of science in Australia,' he said. This had been boosted, he said, by the efforts of several prominent science journalists such as Julian Cribb in *The Australian* and Verona Burgess in the *Canberra Times*. Science policy was, if not always on the front page, at least well covered within several major newspapers, and this had not escaped the attention of politicians.

But, he said he was not prepared to 'spend every waking moment exchanging intellectualisms with scientists'. He wanted a good working knowledge of science and to be an advocate for science, without being a psuedo-expert.

The political science debate had to be handled 'shrewdly', he said. 'We must hone the debate to a couple of issues, involving essentially economic benefit, to justify the return on investment.'

Coming from a rural electorate, he said he was well aware of the needs of farmers. They tell him that they want research done in a number of areas, most notably soil degradation/salinity, water conservation, noxious weeds and pasture improvement.

'CSIRO holds a special place in the hearts and minds of the rural community,' said Mr McGauran. 'To them it's a sacred cow'. He said the coalition was commited to ensuring that agricultural research did not suffer as a result of a push for high tech and manufacturing oriented research.

One thing Mr McGauran had noticed was that the Greenhouse Effect was of increasing concern to farmers.

'From a standing start, the issue has gained unparalleled momentum,' he said. Once again, the role of the media in this had been enormous.

So how would CSIRO fare under a coalition government? The Liberal/National science policy has not been released, so the official line is yet to be made public. However, it's understood that science education would be emphasised. It's likely that tertiary institutions similar to the Bond private university on the Gold Coast, with strong science curricula that also fostered greater links with business, would be actively encouraged.

The coalition has made no secret of the fact that it would dismantle Barry Jones' brainchild, the Commission for the Future. It has often described this planning and advisory

Cont. on p.2

Z-Tech opens zirconia plant

Years of research and development by a number of CSIRO scientists in association with industry came to frutition on 18 October with the opening of ICI Australia's Z-Tech zirconia plant at Rockingham, south of Perth.

The $13 million high tech plant incorporates unique production technology developed by CSIRO which is far in advance of that used in other parts of the world. With a production capacity of 700 tonnes per annum, it is the world's largest high purity zirconia plant.

Z-Tech will supply the international market with zirconia powders and chemicals that conform to the exacting standards demanded by the advanced ceramics industry, particularly in engineering and electronics applications.

The leader of the CSIRO team which perfected the high purity process for the plant, Dr Hari Sinha, recently received a promotion, and his story is included as part of the *CoResearch* Promotions feature on pp.4 and 5.

CoResearch about to turn 30

December marks the 30th anniversary of the publication of *CoResearch*.

Collectors of *CoResearch* over the years may be rather confused by the above statement, as issue No. 1 was in fact dated April 1959. However, there was an issue called No. 00, dated December 1958. Unfortunately, I only have a rather faded photocopy of it, and anyone who has an original to spare may wish to donate it to the Editor's reference collection.

That very first issue, No. 00, had as its lead story 'Changes at Fishermen's Bend', and stated that the new Chemical Research Laboratories were 'the new style for the former Division of Industrial Chemistry'. This followed the appointment of Dr (later Sir) Ian Wark as first Director of the new Laboratories.

That same front page carried a story headed 'Two New Chiefs', marking the appointment of Dr A I G Rees and Dr K L Sutherland as Chiefs of the Divisions of Chemical Physics and Physical Chemistry respectively. The story went on 'Quiet spoken, pipe smoker, Dr Lloyd Rees ...' and 'Dr Keith Sutherland, one of CSIRO's bright young men...'. I don't think I would be game to make similar observations in print about anyone these days.

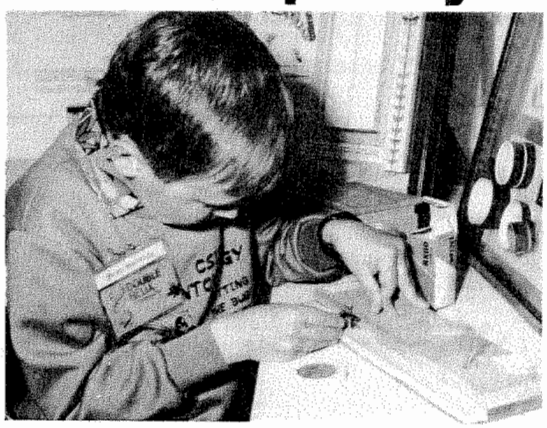
The issue marked No. 1 (April 1959) was, to me, rather poignant, as it showed probably one of the last official photographs taken of the then-Chairman Sir Ian Clunies Ross. Sir Ian died from coronary heart disease on 20 June that year. The photo shows him looking gaunt and ill – nothing like the rather dashing and charismatic man he always appeared to me in earlier photos.

That No.1 issue had a story about Dr Joseph Piddington from the Division of Radiophysics receiving the Syme Prize. If my memory serves me correctly, Dr Piddington was the brilliant scientist behind the development of the lightweight radar vital in General Douglas MacArthur's campaign to retake the Pacific from the Japanese during WWII. Just one of the many eminent people who have appeared in *CoResearch*.

CoResearch has changed a lot since 1958. That is inevitable, considering the vastly different times we live and work in. Now it is perhaps a bit harder hitting and conscious of the wider issues of R&D. Above all, I fervently hope it has cast

Cont. on p.6

Divisional open days



Young Brian Kennedy found the Division of Entomology fascinating. Despite the appalling weather, this year's Canberra open days attracted a good crowd. Photo coverage of the event will appear in the next issue of CoResearch.

Photo:Allan Edward

From the Chief Executive

A column by Dr Keith Boardman

The considerable publicity which followed the further budget cuts for the Organisation this year indicated belated media recognition of the crucial importance of research and development for the future prosperity of Australia. It also demonstrated enormous general support for CSIRO, but particularly from the industries that have benefited so much from the application of CSIRO research.

An editorial in *The Australian* was indeed a reversal of some past criticisms of CSIRO. It stated 'To hammer the research effort so hard conflicts with the Government's policy to promote high technology and value-added exports, particularly in those industries in which Australia already has a natural advantage: minerals and agriculture.

'The effectiveness of our research effort in these industries will have a crucial bearing on the nation's capacity to earn export income and improve its standard of living in the years to come.

'Any flagging of that effort will inevitably be translated into an Australia that lags further and further behind the rest of the world in high technology – and ultimately in the ability to generate wealth.

'Australia can no longer afford to sacrifice the future for the sake of present expediency or indulgence. The Federal Government must cease to bleed the national research effort and immediately reendow it with the resources to ensure Australia enters the next century on a rising plan of industry of prosperity.'

Although there has been a substantial increase in business R&D in Australia in the past few years, the gap between Australia and the leading industrial nations is in fact widening. Those countries with the highest R&D spending are also those that are doing most to further strengthen their R&D. In these countries, there not only is a drive to encourage greater industry R&D activity but also a new emphasis on building up their longer term basic research to provide the foundation for future industrial growth.

I believe there is some recognition in the Government that the cuts to CSIRO's appropriation have gone too far and I am hopeful that there will be an early reconsideration.

There appears to be some lack of understanding of the distribution of the budget among the Institutes. The appropriation budget for running costs was the same in dollars as in the previous year, a real decrease of about 5.5 per cent. Revenue linked to appropriation funding is estimated to increase by $10.6 million in 1988/89, but forward capital commitments exceed the $16.1 million provided in the budget by $7 million. The increase in revenue in 1988/89 is due largely to the payment from the Reserve Bank for CSIRO's contribution to the new plastic bank note.

The Institute of Industrial Technologies received an extra $2 million as part payment for its contribution to the bank note, and further payments will be made over the next two years. The manufacturing industry collaboration scheme was transferred from Sirotech to the Institute of Industrial Technologies and it will now be administered by that Institute. The Institute of Information and Communications Technologies was allocated an extra $1.7 million to establish the Institute headquarters and fund an expanded effort in software engineering. It also received the full year's costs of the growth allocation in the previous year.

The other four Institutes, which account for 74 per cent of CSIRO's research expenditure, are suffering decreases from 4.7 per cent to 5.6 per cent in appropriation funding (real terms). To restore funding to the 87/88 level, $15 million is required.

Over five years, CSIRO has suffered a decline in appropriation of 16.7 per cent in real terms, but a greater decline in research capacity. Imports account for about 11 per cent of annual operating expenditure which means that inflation for CSIRO was substantially above the CPI between 83/84 and 86/87 when the Australian dollar depreciated.

K Keith Boardman

McGauran/Cont. from p.1

body as a waste of money and under the Opposition's policy the Commission would be disbanded.

A coalition government would encourage the development of the proposed Queensland space port, but then this project seems to have fairly broad political support and is generally thought of as a good thing.

Cont. on p.7

Letters to the Editor

Dear Editor,

The furore over the use of anabolic steroids by Olympic athletes has lessons for CSIRO.

Firstly, the drugs clearly do enhance competitive success, by increasing the user's endurance, determination and strength. Secondly, their use is widely condemned as being contrary to sporting ethics.

I am surprised that the use of performance-enhancing drugs has emerged in such a frivolous activity. Competitive success is a more urgent need in the world of commerce, politics and science. In these fields, questions of sportsmanship and fair play do not arise.

A CSIRO division that administered suitably engineered anabolic steroids to its staff, so as to make them more dynamic, mentally agile, motivated and tenacious, would gain an advantage over other divisions in competition for research funds. Such drugs should be allocated to enhance research administration rather than research. The front line of the battle is in negotiations for research funds and in creating a market for science. To enhance competitive success in science as such would have little value. Scientific talent is far in excess of demand.

The Great Council of Chiefs should begin talks immediately on equitable sharing of information on the use of anabolic steroids in competition for funds. I make this modest proposal because divisions with chemical expertise clearly have advantages, including the potential to develop customised drugs inhouse.

Competition for funds and for profits also exists between CSIRO and other research bodies and commercial companies. Some of them already may be using drug-enhanced negotiators to seize larger shares of available funds.

Despite this danger, I believe CSIRO should refrain from using its expertise to gain commercial advantage. In its patriotic duty to ensure research advances Australia, CSIRO should undertake to develop revolutionary new drugs to enhance the performance of our whole scientific-technological-commercial complex. Development and subsequent distribution should be carried out under strict security against international multinational espionage. Such drugs could strike a decisive blow to Australia's life-and-death struggle to stand among the elite affluent and privileged nations of the world.

Garry Speight
Division of Water Resources

Dear Editor,

CSIRO Biometrics Units

I regularly meet people who think that I am still a member of the Division of Mathematics and Statistics, although I was transferred to the INRE Biometrics Units on 1 July. Likewise, several other staff members were transferred to the four Biometrics Units which have been set up to look after the statistical needs of divisions in three institutes, INRE, IPPP and IAPP. So it is disappointing to find that scientists who might benefit from contact with these units are unaware of their existence.

For administrative purposes, each unit is attached to a division, but for obvious practical reasons units serve four geographical areas: one for South Australia, the ACT, Griffith, Deniliquin and Narrabri; one for the rest of NSW, Victoria and Tasmania; and one each for Queensland and Western Australia.

Further information may be obtained from Warren Muller in Canberra 062-46 5822, John Best in Sydney 02-887 8388, Tony Pettitt in Brisbane 07-377 0324 or Richard Litchfield in Perth 09-387 0630.

J T Wood (062-46 5066)

After cycling 14,242km around Australia, Port Fairy and Melbourne cyclists Kevin Lee (left), Brett Nutter, Peter Nelson, Dennis Lemke, Bill McLaren and David Hyland were glad to roll across the "finish line" yesterday.

'Fantastic' marathon ends

Forget the four-wheel-drive, the only way to see Australia is on two wheels.

At least that's the opinion of seven cyclists who finished a marathon around Australia ride yesterday in Port Fairy.

After cycling an incredible 14,242km, the men rolled into [illegible] they forgowned on

tastic trip," Dennis Lemke, grinned.

"The only time we struck rain was for the first 16 days until Cairns and then last night on the way here," he said.

And despite the forewarnings of crocodiles, huge mos[illegible] and [illegible]

Cycling along the Nullabor Plain brought proof of the old adage "It's a small world", as the group met up with fellow Port Fairy cyclist Graham Woodrup, who was preparing for his Perth to Sydney record attempt.

Although at 54 Dennis

Technical officer with the Division of Atmospheric Research's engineering facilities group, Peter Nelson, was one of a group of adventurers who set out earlier this year to ride bicycles around Australia. Here Peter tells the story:

'The 14 242km trip around Australia was described as a fantastic experience. Each one of the seven cyclists did one stage of about 50km cycling per day in relay formation. However, Brett Nutter and myself often did two stages per day and we both covered about 3500km altogether, more than the other cyclists.

'We struck top form while peddling across the Northern Territory and into the northern part of Western Australia between Fitzroy Crossing and Halls Creek. On one 100km stretch I took only two hours and 25 minutes. This was an hour better than my previous fastest 100km back home in Victoria.

'We had tailwinds and unseasonably heavy rains in northern Queensland – the wettest July in over 100 years in some places – and then tailwinds and above normal temperatures all the way to Broome. Between Timber Creek and Broome we endured unusual heatwave conditions with temperatures reaching 36°C (97°F), almost the hottest on record for July for this part of Australia.

From Broome to Port Augusta we experienced headwinds most of the time, but it was still generally warmer than average. It was hard going against strong easterly winds from Perth through Albany to the Nullabor Plain. The last two days we had rain for the first time in 42 days.

'Road surfaces were bitumen and although narrow with sharp edges in places, were quite good to ride on. Motor traffic was generally tolerable except between Wollongong and Newcastle. The toughest hill climbs were from Cann Rver to Batemans Bay and one stretch in the Kimberleys in 35°C heat near Turkey Creek.

'I have been employed at the CSIRO Division of Atmospheric Research for nearly 30 years and for the past 19 I have cycled to and from work on most days, a daily trip of 48km. I am a member of the Blackburn Cycling Club and the Audax (long distance marathon cycling) Club of Australia, as well as a member of two other bicycle touring clubs. Without the substantial amount of cycling I have done, the enjoyment and participation in this bicentenary round Australia bike ride would not have been possible for me.'

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A Matter of Opinion

This month's point of view column comes from Deputy Chief of the Division of Wildlife and Ecology, Dr Joe Landsberg. Dr Landsberg has titled his article:

CSIRO management: a case of culture shock and lack of knowledge?

CSIRO was subjected, last year, to traumatic upheaval aimed at altering the way we operate, at introducing more effective line management, greater accountability, better focused use of resources. In my view, the way the decisions about the changes were made and implemented caused a form of culture shock among many in the Organisation. The reason for this was lack of knowledge about the management of science and scientists, which could – to some extent – have been avoided. Perhaps (if I am even partially right) we can take steps to improve matters.

Let's divide recent history of CSIRO into the ages of certainty and uncertainty. Certainty (too strong a word, but it will serve) was pre-1984, pre-ASTEC. We knew what the Organisation was for – to 'do' science – and we knew that CSIRO was a great Organisation and appreciated as such by the Australian people – and a great many others. Then came the first major budget cuts, scientists were wimps, we published too many esoteric papers and not much of it was useful. The age of uncertainty had arrived. It was perpetuated by the ASTEC report. CSIRO should survive in its present form (this was in question) but should get closer to its customers/clients, make its work more relevant to the Australian community and – more particularly – Australia's economic welfare. The result was the appointment of THE BOARD, followed by the decision to call in McKinseys. Our management was poor and needed fixing, so the experts would tell us how to do it.

Now, accepting all this, why did we not stop and think about what the management of science and scientists entails, about the ethos and the attitudes and the things that motivate scientists? It is astonishing that, in an Organisation dedicated to finding out how things work, filled with people not given to accepting unsupported assertion as fact, we implemented without a study a management scheme proposed by consultants whose experience and expertise lies in the industrial sphere.

It was not the fault of McKinseys. They did the job they were paid for and we accepted their recommendations. In fact, the scheme they proposed may not be that bad – the problems lie with its implementation and with the lack of appreciation of how people function in an organisation like this. Underlying any sort of science is the well-founded belief that, in order to manage, manipulate, control or predict the operation of some system, we have to understand how it works. We assumed that CSIRO works like a commercial company, that people are driven by the same motives and can be managed in the same way. We may have had a nasty suspicion, deep down, that this wasn't so, but we didn't try to find out. We committed ourselves to action on the basis of untested assumptions.

So how does CSIRO work? Well I suggest that, in the age of certainty, most of the scientists were motivated by the idea of science as an international, cosmopolitan, communal activity. They got their job satisfaction from the recognition of their peers in the scientific community; from interaction with the their particular sub-cultures. The belief that there would be spin-off to the benefit of Australia was implicit and there was pride in CSIRO. Performance was assessed on the basis of contributions to science and management was not something anyone worried about. People made their own decisions about the problems of importance and all they had to do was persuade the chief to support them. If he didn't then they could probably bootleg it quietly in a corner without too much fuss. In other words, CSIRO behaved like a series of large university departments and the scientists like academics.

This is obviously an oversimplification, but I would argue that it reflects, in essence, the ethic of the Organisation as it was. It was not ideal, in fact it may have been indefensible as the *modus operandi* of a publicly-funded organisation. However, there are many arguments in favour of the free-wheeling management-free model of science and certainly there is an argument for not throwing it out without examining it and considering ways of adapting or changing without undue disruption. What we have now is the primacy of the commercial objective, science as a production oriented activity, geared to the time scales of the economists who seem to determine the values we currently live by in this country. We have to find 30 per cent of our funds from 'outside' but we don't get it by competing on the basis of scientific excellence and the possibility of doing some exciting research; we solicit funds from niggardly industries who are usually more concerned that

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New DTCP Chief named

Dr Bob Clements has been appointed Chief of the Division of Tropical Crops and Pastures.

Dr Clements, at present acting assistant Chief, is a well known pasture plant breeder with more than 15 years' experience in tropical pasture research. He takes up his new position in November.

His work with CSIRO dates back to 1965/67 when he was an experimental officer with the Plant Industry before becoming a lecturer in the Agronomy Department at Massey University in New Zealand.

In 1973 he joined Tropical Crops and Pastures as a research scientist, becoming an SRS in 1976 and PRS in 1979.

Dr Clements is best known for his part in breeding pasture legumes. He was a member of the joint CSIRO/Queensland Department of Primary Industries team that bred Australia's first multi-disease and pest-resistant lucerne – Trifecta and Sequel.

These varieties are now in the top five selling lucernes in Australia, and their value to Queensland lucerne growers was more than $3 million this year.

Dr Bob Clements

Rivett Medal for Rod Hill

Dr Roderick Hill from the Port Melbourne laboratories of the Division of Mineral Products has been awarded this year's David Rivett Medal.

Dr Hill is one of Australia's foremost crystallographers, and has contributed not only at the fundamental level but also, as a senior member of the research team, through the application of his expertise to an important industrial problem, the improvement of lead-acid battery performance.

A total of 16 nominations were received for this year's Medal, which was for research in the physical sciences. All entries were submitted for examination by a panel of Fellows of the Australian Academy of Science.

The Examiners said 'We were extremely impressed with the credentials of all the candidates proposed for the award and by their contributions in a very wide range of disparate fields spanning the physical sciences and engineering.

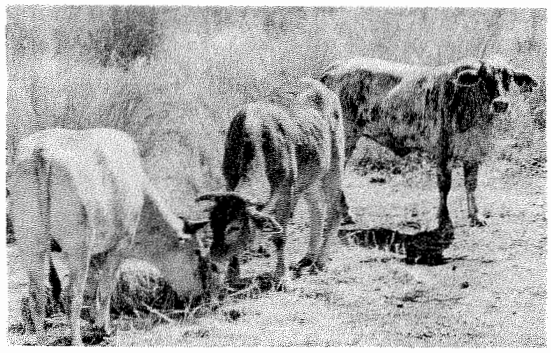
'Such was the quality of the field that if made the final choice a very difficult one and inevitably a number of very impressive candidates just missed out.

'We were particularly pleased by the way many of them, Dr Hill included, had used their firm foundations in basic research...as the platform from which they were able to effectively tackle difficult problems of an applied nature.'

The presentation ceremony will be held in the New Year when Dr Hill returns from overseas.

Dr Hill

Prizewinning steers result from CSIRO research in NT



These are the fine creatures which proved the efficacy of CSIRO research in breeding top-notch beef cattle (see story below).

Research results were put under the scrutiny of the beef industry when technical officer Mike Nicholas from the Division of Tropical Crops and Pastures entered two pens of three steers in the 'Trade Beef' section at the Katherine Show recently.

They carried off the top prizes against some stiff opposition from the big northern stations, with the judge commenting that they 'were ideal animals for trade requirements'.

These animals, and many more like them, are the product of a decade of research at the Division's Katherine Research Station into systems of improving native pastures with legumes and small amounts of superphosphate along with mineral supplements.

The Katherine group has now tried this technique at a moderately large scale to show that the improved pastures are productive in mixed country and the Show result is the 'proof of the pudding', according to Mike.

In the past five years or so, the beef industry in the north west has not been in a position to adopt the technology because of financial problems associated with the disease eradication program. The 'new' industry has new demands, and good beef prices have now created a receptive audience.

The quality of the sale stock has ensured the technology is spreading through the grazier network of stock inspectors, buyers, agents and shows.

Next year Mike reckons he will also enter a pen of steers which have been fed mineral supplements on native pastures. 'The idea is to show the graziers that production is about the same as long as you get the nutrition right,' he said.

Much of this work has been financially supported by the AMLRDC.

Special Feature

Promotions

The latest round of senior promotions reflect the current CSIRO philosophy of recognising not only the advancement of scientific knowledge, but also contributions to industry and outstanding research leadership. The Executive Committee recently approved the promotion of 52 scientists: 37 to SPRS, 11 to CRS1 and four to CRS2. In the past few months there has been considerable development of the SPRS and CRS promotion guidelines. A working party from the Human Resources Branch and the CSIRO Officers Association has now completed the first draft of guidelines incorporating the expanded criteria. Also included in the new guidelines are consideration of contributions to the community. The draft has received enthusiastic support from division chiefs. The Executive Committee hopes to finalise the guidelines this month, and they will be used for this year's classification reviews. The table below shows the principal reasons for approving individual promotions within each classification:

This issue of* CoResearch *features profiles of some of the newly promoted research staff.

Promotion	No.	Nature of Achievement		
		Contributions to science	Contributions to industry	Achievement as research leader
SPRS	11	*		
	10		*	
	10	*	*	
	2	*	*	*
	2		*	*
	1	*		*
	1			*
CRS1	6	*	*	*
	2	*		
	1	*	*	
	1		*	*
	1	*		*
CRS2	2	*	*	*
	1	*	*	
	1	*		

Dr John O'Sullivan
CSIRO Division of Radiophysics

Dr O'Sullivan's promotion from PRS to SPRS took effect on 1 July. His leadership of the rapidly growing signal and imaging technology program and in particular his work on the fast fourier transform (FFT) silicon chip which uses very large scale integration (VLSI) technology, formed the basis of his case for promotion.

The FFT chip has given Australia a lead in the fast-evolving field of signal processing in which minute and/or obscure signals have to be accurately and quickly processed for ready interpretation.

Before joining the Division five years ago, Dr O'Sullivan worked for nine years with the Netherlands Foundation for Radio Astronomy on new receiver systems for the Westerbork radio telescope.

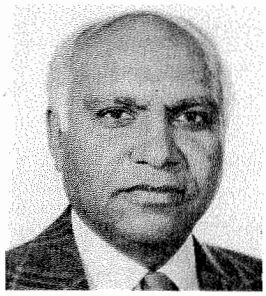
As research leader of the signal and imaging technology team of 17 professionals at the Division of Radiophysics, he has made a major contribution to the commercially viable design of the FFT chip, in conjunction with Austek Microsystems of Adelaide.

The chip was conceived as a way of solving problems in digital signal processing, and it has proved its potential in this area. Fast fourier transform techniques have been around for many years – they basically refer to mathematical processes which convert abstract data into a form relatively easily interpreted by the human mind – but the novel idea of marrying FFT and VLSI is a classic case of scientific creativity.

Since the advent of VLSI, cheap ultrathin calculators, personal computers, digital watches, video games, etc, have all become not only possible but commonplace. Using VLSI fabrication techniques, it is possible to place more than 100 000 devices on a single 1cm square chip.

Combining the compact and fast characteristics of the VLSI chip with the potential of FFT to make complex data more 'user friendly' opens all sorts of possibilities. Dr O'Sullivan said its major uses were in: video and image processing; high quality audio reproduction (e.g. even better compact disks); communications systems; radar and surveillance signal processing; and medical signal processing.

Dr O'Sullivan said although nearly every day someone 'knocks on the door with an idea for a new application', the team has focused on several major areas which look particularly promising. For instance, medical ultrasound imaging is the least invasive and therefore one of the most efficient and effective of medical diagnostic techniques. The medical profession already employs ultrasound in a variety of ways, and



Dr Hari Sinha

Dr John O'Sullivan

now Dr O'Sullivan and his team are examining equipment performance improvements and perhaps other applications. Among these is a new technique to more accurately measure blood velocity in the heart using Doppler ultrasound. This project, and another, have support and funding from an Australian company, and the project is

Cont. on p.6

Dr Hari Sinha
Assistant Chief, Division of Mineral Products

Dr Sinha was promoted from CRS1 to CRS2 on July 1 this year, and shortly afterwards was made Assistant Chief of the Division. His work at the Division, in particular his leadership of a project which has led to the establishment of the world's largest high purity zirconia plant, has been recognised both within and outside the Organisation as outstanding. Last year he received the Australian Ceramic Society (Victorian branch) Ceramic Achievement Award and the Sir Ian McLennan Achievement for Industry Award. He was elected a Fellow of the Australian Academy of Technological Sciences and Engineering in 1986.

Dr Sinha has been with CSIRO for 10 years (he also had an earlier stint in 1964-67). His work has focused on metallurgical development, particularly of ores including ilmenite, bauxite, rock phosphate and zircon. A number of his process inventions have been carried through to pilot plant scale and shown to be commercially feasible.

As leader of the advanced mineral products section, he has recently played a key role not only in research and development but also in obtaining commitment from ICI Australia to build the high purity zirconia plant which is now operating in Western Australia.

Well received

The $13 million plant, at Rockingham near Perth, was officially opened on 18 October by the Western Australian Premier Mr Dowding. When up to full capacity in the next few years it will process 700 tonnes of zirconia powder and zirconium chemicals per annum from Australian mineral sands. A $1 million pilot plant at the divisional site at Port Melbourne will continue operating until December next year, and zirconia products from this small scale operation have already been well received by ceramics manufacturers.

Australia has two major market advantages: the exceptional purity of the zirconia products due to the novel production process developed for the plant by Dr Sinha and his team; and the fact that Australia produces about 60 per cent of the world's supply of mineral sand, so the raw material is readily available.

Until now, most of that sand was exported unprocessed to manufacturers overseas, who added considerable value to it and sold some products back to Australia at a large profit. With our own plant Australia will make the profits.

One of the uses for zirconia powder is in the production of partially stabilised zirconia (PSZ), a remarkable material resulting from a research project in the early 1970s at the (then) Division of Materials Science. The discovery of the transformation toughening process which made PSZ possible is considered to be one of the most significant single events in the science of ceramics.

To comply with the rigorous manufacturing procedures needed to produce PSZ and other advanced ceramic materials for use in electronics, engineering and other areas, the highest quality pure zirconia powder is required, and Dr Sinha and his team succeeded not only in inventing and developing the process, but making it a commercial reality.

In 1985 CSIRO (through Sirotech) established a joint venture company, Z-Tech, with ICI to pursue markets for Australian zirconia products. Z-Tech's role is to penetrate the estimated $200 million per year international market for high grade zirconia powders and chemicals, and it has concentrated its efforts on the biggest potential markets of Japan, the United States and Europe, by establishing three technical and marketing offices.

The co-operative research and development agreement between CSIRO and ICI expires on 4 December this year. The 15 per cent stake which was held by CSIRO in Z-Tech has now been bought by ICI, and under the agreement CSIRO will for the next 15 years receive royalties on sales from the plant. Once full production is achieved, the royalties to CSIRO will make it one of the Organisation's most commercial agreements.

Dr Sinha and his team are preparing to start work on a new, one year collaborative project with Z-Tech to produce novel ceramic alloy powders based on zirconia, thus adding further value and making the plant's products even more attractive on the world market.

The Director of the Institute of Minerals, Engineering and Construction, **Dr Alan Reid**, said: 'Dr Sinha's successes arise not only from his ability to develop chemical process routes for treating minerals and his capability in scaling up the reaction systems in a chemical engineering sense with all the problems that arise at large scale, but also in his capacity to motivate and lead a team of very competent researchers and engineers.'

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Dr John Williams
CSIRO Division of Soils, Townsville

Dr Williams, a soil physicist and hydrologist, has been promoted from PRS to SPRS. His case for promotion cited his status as an authority on Australian soils (particularly those of tropical Australia), and his success in leading multidisciplinary teams to tackle pressing problems in soil hydrology, agronomy and pedology.

He joined CSIRO in 1974 in order to establish a soil physics/hydrology unit in the Division of Soils at the Davies Laboratory in Townsville. Before this he had spent six years in Canada and the South Pacific teaching and researching soil physics.

Since setting up the unit, he has successfully obtained substantial financial backing for a number of multidisciplinary teams, resulting in progress towards solving important problems in pasture and crop production, soil erosion and groundwater recharge. This has involved extensive collaboration with the Division of Tropical Crops & Pastures, James Cook University, the Queensland Department of Primary Industries and the Queensland Water Resources Commission.

Through his work he has not only established basic data about the relationship between (particularly) northern soils, water and plants, but also worked closely with those industries which rely on the soil in northern Australia and the relevant industry or government authorities. He has a flair for inspiring scientists from a variety of disciplines to work together on a problem and for getting his message across to industry – he's something of a scientific entrepreneur, and in fact his promotion was primarily based on his outstanding leadership qualities.

The Director of the Institute of Plant Production and Processing, **Dr Ted Henzell**, said 'he is also a generous co-operator and has worked in a particularly productive partnership with Dr Bob McCown of the Division of Tropical Crops and Pastures'.

At present, he is undertaking a project to quantitatively model the hydrological behaviour of soils right across the continent – a major undertaking and one which will provide 'portable' data available to engineers, soil scientists, agronomists and extension workers who use simulation models or decision support systems which require information on the reaction of soils to different water conditions. The work, which is mostly funded by the Australian Water Research Advisory Committee, is expected to take another two years.

Dr John Williams

Among his achievements to date have been: provision of the first quantitative evidence of the contrasting hydrology of red and yellow earths and the role of deep drainage from these soils to the recharge mechanisms for the Great Artesian Basin; techniques to define soil and climate constraints to the production potential of *Stylosanthes*-based pastures in Northern Australia; and contributions to the establishment of a major collaborative research effort which, among other things, will investigate the consequence of irrigation to the regional groundwater level and secondary salinity in the Burdekin Irrigation Area.

His work in the Burdekin region of mid-north Queensland is directed at ensuring that the mistakes made in the south – e.g. the Murray Darling basin which is now facing potentially devastating salinity – are not repeated. The Burdekin Irrigation Area, surrounding the Burdekin River at Ayr, is of considerable economic importance, with a major sugar growing industry as well as a cattle industry in its catchment with an export value of about $200 million per year.

Dr Williams has recognised that much of the work required to preserve the soil and therefore a valuable agricultural resource needed to be done with the primary producer.

He said one of his most rewarding jobs has been his involvement with the establishment of local land care committees in the Dalrymple Shire which covers much of the Burdekin River Catchment area.

With the promulgation of knowledge about the soil resource in the region, the graziers are asking more questions about agricultural practices and are starting to introduce nitrogen-fixing pastures such as *Stylosanthes*. The land care committee prepared detailed submissions for a delegation from the Parliamentary Committee on Land Degradation which visited earlier this month.

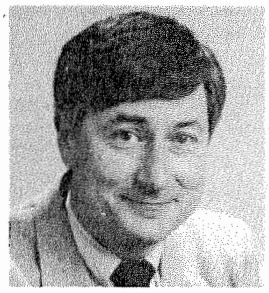
Soils in Australia are ancient and in many of our agricultural areas, overused and undernourished. One of Dr Williams' major contributions has been the examination of ways our soils can be treated with respect and care so that they can continue to provide for us. He said it was not too late, and he was optimistic that much of our land was resilient enough to come good again provided society took action now.

Dr Malcolm Good
CSIRO Division of Manufacturing Technology

Dr Good, a mechanical engineer and DMT program leader, has been promoted from PRS to SPRS. His case for promotion was accepted on the basis of his extensive contributions to industry and his exceptional research leadership.

Before joining CSIRO, Dr Good was a senior lecturer with the Department of Mechanical Engineering at the University of Melbourne. During 1975 he was a Visiting Research Fellow at the Institute of Sound and Vibration Research in Southampton, UK, and at the Highway Safety Research Institute of the University of Michigan, USA. He occupied a similar position in the Control Theory and Systems Program of General Electric's Corporate Research and Development Centre in New York State during 1983/84.

He came to CSIRO in March 1985, having established a distinguished international reputation in the fields of fluid mechanics, vehicle dynamics, human factors of automobile and motorcycle control and other areas associated with the science and mechanics of road safety. He also had a developing reputation in robotics – a reputation which has grown since joining CSIRO.



Dr Malcolm Good

In his role as Melbourne coordinator of the Division's Integrated Manufacture program (from June 1985 to November 86) and later as leader of the 30 member IM program (since November 86) he has been involved not only in scientific research and leadership but also in the business end of research, including development of funding proposals, negotiation with commercial interests, preparation of collaborative and contract research agreements and representation of the Division on joint management committees.

Dr Good's first major task on joining the Division was to lead a collaborative project on force-controlled robotics. The project was successful and a market for this technology is now being assessed.

For a local manufacturer he performed an investigation of alternative control strategies for large machine tools, and his solution was an algorithm markedly superior to that of conventional controllers.

During his short time as program leader, Dr Good has undertaken a reorganisation which has brought the Integrated Manufacturing program even closer to Australia's manufacturing industry. Major initiatives have included the development of a low cost cellular manufacturing system at Holden's plant in Elizabeth, South Australia, simulation of parts of Ford's Campbellfield and Geelong plants, collaboration with BHP Steel Coated Products Division for the development of automated on-line inspection of sheet materials and negotiations and consultations with many companies involved in the development and implementation of automated systems.

Program members work closely with local industries involved in robotics and machine tools. The robotics industry here will never rival the giants in this field – Japan, Germany, the USA, Sweden and Italy – but like other Australian industries, it is looking for the niche markets, the specialised requirements.

For example, a company here (Machine Dynamics) pioneered gantry-style robots, which are now used by Ford.

Dr Good said robots have had their greatest use in the automotive industry, traditionally in tedious jobs like spot welding but increasingly in electronic assembly. The use of robots is likely to increase, especially if lighter, more efficient and 'smarter' units can be developed.

Research is underway in Dr Good's program into increasing the performance and capabilities of robots. At present they are rather expensive and cumbersome, and research is directed at better mechanical design and better software. Also, sophisticated vision systems are being investigated.

Dr Good is a Director of The Preston Group, a software development company 42 per cent owned by CSIRO (the next largest equity holder is an MIC company). The Group arose from discrete event simu-

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Dr Dieter Plate
Assistant Chief, Division of Wool Technology

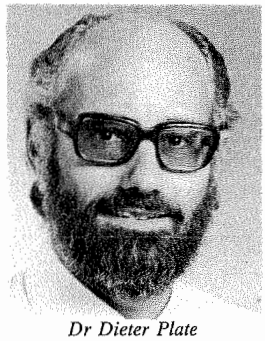
Dr Plate was promoted to CRS1 (from SPRS) on 1 July this year. About a month earlier he had been made Assistant Chief of the Division and OIC of the Division's Geelong laboratory. His case for promotion was based on two aspects of his research career at the Division: his position as group leader of the mechanical processing group; and his leading role in the invention and development of Sirospun, which is playing an increasingly important role in the worsted spinning industry worldwide.

The mechanical processing group has a range of successes to its credit. Among these is the Siroscour process which is now being commercialised, with the first plant being commissioned in Melbourne. Siroscour adds value to Australian wool by optimising cleaning and reducing effluent disposal costs. Also, cost effective and more efficient means of wool carding, and techniques for the removal of contaminants from raw wool indicate the type of industry-oriented work undertaken by Dr Plate's group.

Dr Plate is now fully occupied with the task of running the 200-person Wool Technology laboratory at Geelong and no longer conducts his own research at the bench. He still does, though, maintain a watching brief over perhaps his greatest achievement, Sirospun.

Sirospun is a tribute to the creativity and persistence of Dr Plate. The savings to industry and the royalties on the sale of the technology show that Sirospun is one of the greatest commercial successes to emerge from CSIRO.

It is estimated that Sirospun now saves the worsted spinning industry worldwide about $40 million per year, and has to date returned royalties of about $4 million (split three ways between CSIRO, Repco and the International Wool Secretariat.)



Dr Dieter Plate

Sirospun produces fine woollen yarn easily and cheaply, making possible the lightweight worsted fabrics marketed as 'cool wool', just right for spring or autumn.

Other attempts had been made over the years to produce spinning systems similar to Sirospun, but they failed because of a lack of clear insight into some of the fundamental processes at work in the production cycle.

Dr Plate undertook the basic work that was absolutely essential to get anywhere with future commercialisation. He developed the understanding of the spinning system required to establish conditions for operation of the process to produce a yarn with the desired properties.

He sought and, through tenacity, achieved simplification of the mechanical implementation of the basic principles. This simplicity has been the key to the ready acceptance of the process by industry.

After establishing basic principles and coming up with a

Cont. on p.6

Promotions/Dr O'Sullivan
Cont. from p.4

probably about three years away from commercialisation.

The mining industry could benefit from research by the team into better techniques for seismic imaging of rock layers ahead of the workface, enabling easier location of ore bodies and an improvement in mine safety.

Another project the team has pursued could have ramifications for Australian authorities charged with protecting our enormous coastline. Synthetic aperture airborne radar uses the same principle as that of a synthesis radio telescope to obtain a high resolution image – it makes use of time and movement to piece together an accurate picture.

The FFT chip has the edge on overseas competitors because of its speed and cost, permitting real time processing often not possible with even the largest main frame computers. However, the rest of the world was starting to catch up, as recent developments had shown, said Dr O'Sullivan.

A major announcement is expected to be made next month (November) on the availability of the FFT chip in the biggest potential market – the United States. The Japanese market is another which needs to be cracked for the chip to achieve multi-million dollar success, and Austek Microsystems is working on that.

Commenting on Dr Sullivan's promotion, the Director of the Institute of Information and Communication Technologies, **Dr Bob Frater**, said the case should dispel any fears that scientists in CSIRO may have about the recognition of industry oriented work. Dr Frater said he was 'full of praise for the role John had taken in establishing such a successful world-class program in the important signal processing area'.

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Promotions/Dr Plate
Cont. from p.5

basic design, Dr Plate was instrumental in forming a consortium comprising CSIRO, Repco and the IWS to commercialise the results.

In 1980 the consortium licensed Zinser AG of West Germany to manufacture and market the process. Since then, market acceptance has been exceptionally high.

By 1986, 130 000 spindles had been converted or installed. Last year the figure was about 15 000, and this year it looks like about 20 000 spindles will have been converted or installed. To put it into perspective, each spindle produces about 150kg of yarn each year. So, if the number of Sirospun spindles is about 165 000, 25 000 tonnes of Sirospun yarn will be produced annually.

The invention embraces the two thrusts of the Division's broad strategy – to develop new product technology to improve efficiency and product output; and to add value to raw wool by coming up with new, readily marketable types of products.

Conventional ring-spinning technology was 'old as the hills', said Dr Plate. Sirospun had added a new dimension. Fortunately, the conversion to Sirospun is quick and relatively inexpensive – about $100 per spindle. New spinning frames incorporating Sirospun are also manufactured by Zinser.

The benefit to industry is not only in the ability to produce fine yarns at much reduced cost, but also in that lightweight fabric made from Sirospun yarns have a smooth, crisp handle that makes them particularly suitable for spring and autumn.

Dr Plate said he had 'kept a constant eye on the process to see it if needed updating'. So far, he said, no improvement had been necessary as it was running very well.

The Director of the Institute of Animal Production and Processing, **Dr Alan Donald**, said 'Dr Plate has shown an out standing commitment to research for the benefit of industry, with a first rate record of achievement.

'The Sirospun technique in particular is playing a substantial part in expanding the world market for Australian apparel wool in which we have such a dominant position.

'Dr Plate is an example to all of us of what CSIRO is all about. He has my warmest congratulations.'

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Promotions/Dr Good
Cont. from p.5

lation research carried out by Dr Myles Harding within the IM program.

Apart from a project for Ford Australia designed to ease bottlenecks through the automotive paint shop, the Group has secured a contract to assist the national carrier Qantas with its air crew scheduling – a nice example of lateral thinking where a technique suitable for use in a factory is applied to quite a different problem.

The challenge was to easily and effectively schedule the shifts of all Qantas crew, taking into account union and civil aviation constraints and other factors. This is a major task – Qantas spends $5 billion a year on salaries alone. The Group is in the midst of negotiations for more contracts, mainly with transport companies.

CoResearch
Cont. from p.1

off the image, sometimes unfairly attributed to it, as a management tool, putting forward only heavily vetted information. As the Editor, I can say that management on the whole accepts that it must be independent and evidence of this is not hard to find.

Anyway, the point of this item is that for the anniversary issue in December I would like some comments and anecdotes from staff (or interested outsiders) about *CoResearch*. Just a line – certainly no more than 50 words. I know there are quite a few people out there who take pride in their complete sets of *CoResearch* and say they have always enjoyed reading the newspaper. There are probably plenty of others who will have something wry or critical to say – that's fine too, I will try to print all comments in to the December edition.

Liz Tynan
Editor

Parkes centre in the black, as astronomy grabs attention

Public interest in astronomy is on the rise, if the success of the CSIRO Astronomy Education Centre attached to the Parkes radio telescope is any indication.

The Centre is four times busier this year than four years ago, according to the manager Rick Twardy. Rick and the information officer Ben Longden run the Centre on behalf of the CSIRO Public Affairs Unit, with the support and co-operation of the Division of Radiophysics which operates the telescope itself.

A few years ago the Centre was in substantial debt. The Unit was told to get the Centre self sufficient, and Rick is proud to say that this has been achieved. It's now well and truly in the black with a tidy little surplus.

Its gross takings for the first 13 weeks of this financial year already nearly match the gross from four years ago.

Rick said there were a number of reasons for this, not least of which was its fortuitous position on the Newell Highway, which has allowed it to cash in on the Expo exodus. This had sent the numbers up perhaps artificially high in recent months, but there was no doubt that the upward trend started before Expo did.

And the Centre has more interest to a whole range of people than ever before.

A recent innovation has been 'Deskwatch', which shows visitors what the astronomers working in the telescope are observing, as it happens.

A coaxial cable links the three terminals in the Centre to the telescope control room, enabling the Centre to display the images and data received by the astronomers.

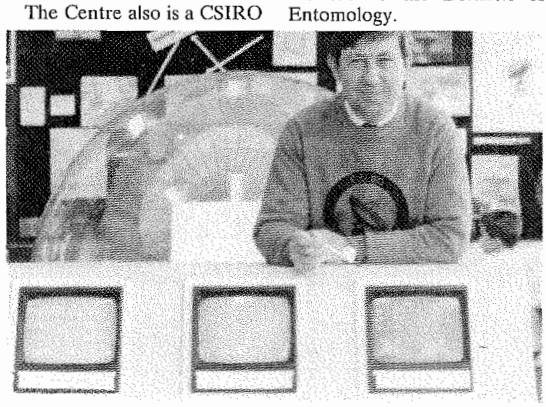
For school students, Rick uses the display to illustrate a range of basic scientific principles. Those with a deeper interest in the subject find that Deskwatch gives a fascinating insight into how radio astronomy works and what it observes.

Rick said the Centre is first and foremost a public information and educational facility, not a souvenir shop for the telescope, and school groups are its bread and butter. The Centre has books and kits for sale, and a magnificent audio visual presentation. These are the major sources of income.

Unfortunately, there is no objective measurement of the numbers of visitors to the Centre, or more importantly of its public relations success. However, Rick said judging by the anecdotal evidence, the Centre has had a very positive impact on its many visitors.

The Centre also is a CSIRO contact point for visitors. Apart from discussing the work of the radio astronomers, Rick said he and Ben often initiate discussion and answer questions about other aspects of CSIRO's work.

They are called on from time to time to answer queries about subjects unrelated to radio astronomy, such as a recent enquiry from a visitor who wanted to know how to get rid of a plague of moths. He was referred to the Division of Entomology.



Rick Twardy with Deskwatch

Children go for gold in DHN competition

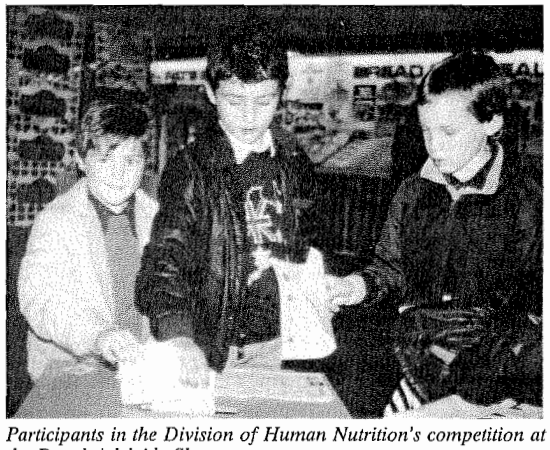
More than 5000 primary school children participated in a competition run by the Division of Human Nutrition at last month's Royal Adelaide Show.

Under the banner 'Know your nutrition facts and win gold', the children competed for 50 1988 $5 commemorative coins.

The general theme of the Department of Agriculture's exhibition hall, in which the Division presented its display, was the 'Yellow Brick Road' which concentrated on health and nutrition for children.

Also on display, with the co-operation of Bruining Headlam Computers SA, were two Commodore 64 computers, each showing one of the Diaryan or Frequan screens – computer packages designed for dietary analysis (on sale from the Division), and a dietary analysis questionnaire which enabled visitors to have their own diet evaluated.

The SA Branch of the Australian Nutrition Foundation provided an eyecatching drawcard for the Division – a large pyramid of artificial food arranged in three groups, 'eat most', 'eat moderately' and 'eat least'. This model soon will be housed in the clinic area of the Division.



Participants in the Division of Human Nutrition's competition at the Royal Adelaide Show.

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A Matter of Opinion/Cont. from p.3

there should be a pay-off in the not too distant future than with any advance in knowledge or understanding. The performance of scientists is no longer evaluated in terms of their contributions to knowledge and peer group recognition: we find in current research evaluation criteria phrases such as 'assess the commercial value of successful research...'; 'what are the total projected sales of the marketed product or process...'. So we have a change in values that leaves many floundering. Culture shock. The things we thought we understood are not as they used to be, the target has moved and we are not sure where it is. We compete not to excel but to survive and uncertainty prevails.

Yet we did need to change our ways and I wish the Directors – both those who were my colleagues and those who were not – all the best in trying to implement the new management systems. But I would ask that, before we go much further, someone make a study of this Organisation and try to understand the way it really functions and whether the changes are working. Is anything really different? How do people see the 'new' line management? Is project management a successful technique or just something to fill the research data base? Are resources any better focused? What are the differences in management style across CSIRO – and should there be differences?

Finding out will not be a matter of consulting the chiefs; they have axes to grind and anyway they're all too busy to sit back and talk to the staff and think about things. Finding out will require consultation which, contrary to what we seemed to think in 1987, does not consist of telling the troops what top management proposes to do and then rejecting most of their arguments for why it shouldn't. Most of the arguments put up in 1987 deserved to be rejected because they were reactionary and defensive, but there were some that should have been thought about. Consultation does not involve another consultant or questionnaire. It involves going out and talking to the scientists and the experienced technicians and administrative officers; it involves putting questions and listening to the answers and collating them and asking some more questions. Consultation does not mean that managers lose the right to manage: they have to manage and not everyone is going to like it. But let's have management from a base of knowledge, not on the basis of assumptions and assertions made without benefit of study.

Obituary: Dr David Peters

Dr David Peters died tragically with his wife Joan and their son Neil in a car accident on Sunday, 2 October 1988.

David was leader of the biomedical uses of collagen project in the hides, skins and leather program at the Division of Wool Technology.

He was born in England in 1938 and came to Australia as a schoolboy. He joined Monsanto Chemicals in Melbourne as a laboratory assistant in 1955 and studied part time at RMIT, gaining a Diploma of Applied Chemistry in 1961. In 1964 he became a laboratory technician at the ANU while studying for a BSc (Hons). He was awarded an Australian Wool Board research scholarship from 1968 to 1971 and received his PhD from ANU with a thesis titled *Correlation of Chemistry and Fine Structure of Wool*.

David joined the hides, skins and leather program in the former Division of Protein Chemistry in 1971 and since then worked on a wide range of projects. His many publications varied from *The Australian Emu, a new source of novelty leather* to *A morphological study of a mild form of Ovine Dermatosparaxis*. He led a project team which successfully addressed problems in hide and skin defects and applied his knowledge of protein chemistry to assist in the development of a viable biomaterials industry in Australia. His studies attracted substantial financial support.

David was seconded to the Federated Tanners' Association of Australia Training Institute for the first six months of its operation in 1982. In 1985 he was seconded to a company concerned with biomaterials to assist in the R&D program. David also assisted industry by using his problem solving skills to determine the causes of leather defects.

David had high principles and was a thinker who spoke his mind. He was a caring husband and father and his wife's prolonged illness took an enormous amount of his time and energy. In spite of this, he was always cheerful and had time for others' problems.

David's death is a great loss to the hides, skins and leather program and his friendship and guidance will be greatly missed, especially by those who worked closely with him.

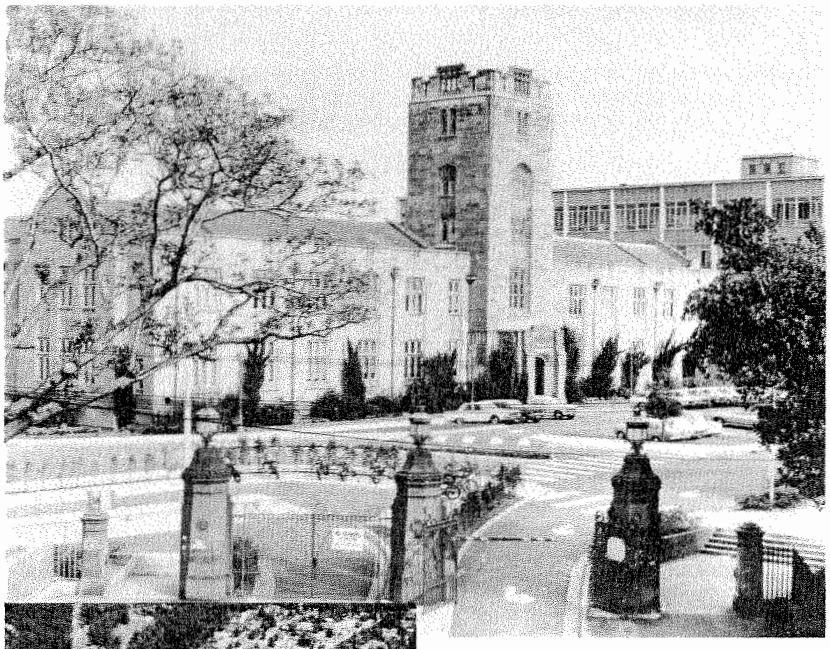
Our thoughts and sympathy are with David's 16 year old daughter, Lynne.

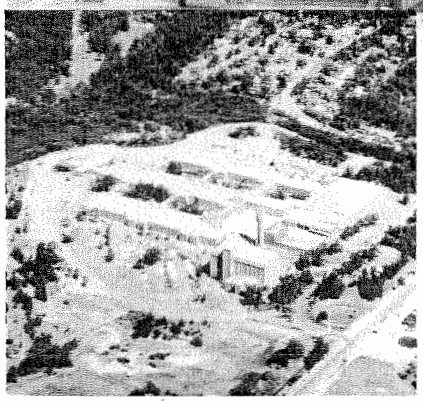
His colleagues

McGauran/Cont. from p.2

The coalition would push for greater links between government funded research and business/industry (a line which is very strongly encouraged by the present Labor Government). But because of its conservative power base residing strongly in primary industries and other traditional areas, it is likely that some of the emphasis on rural and energy research would be restored. Also, more research into nuclear energy is on the cards.

Applied Physics celebrates 50 years





This month the Division of Applied Physics celebrates its 50th anniversary. The photo above shows the building in which the Division started its life, the National Standards Laboratory (later the National Measurement Laboratory) on the campus of Sydney University. The aerial shot, left, shows the Division's more modern complex at Lindfield in Sydney. An account of the 50th anniversary festivities will appear in the next issue.

A message re. Victor Burgmann

The following is a message from Alan E Pierce, who among other connections with CSIRO, is a former Chief of the Division of Animal Health. His address is: 50 Endeavour Street, Red Hill, Canberra ACT 2603

'Margaret and I recently visited the Burgmanns in Sydney. Victor will be remembered with affection by many during his long career with CSIRO, which culminated in a period between 1977 and 1978 when he was Chairman of the Organisation.

Many of you will know that Victor has been unwell for several years with Parkinson's disease. Unfortunately, he recently fell and broke his hip. Although this has been satisfactorily dealt with, Victor has suffered quite a severe setback and is now in a nursing home.

All this naturally has placed a severe burden on Lorna, but she is being strongly supported by friends and particularly by their family, most of whom live in Sydney.'

NEW

FREE

REEF comes to AUSTRALIS.

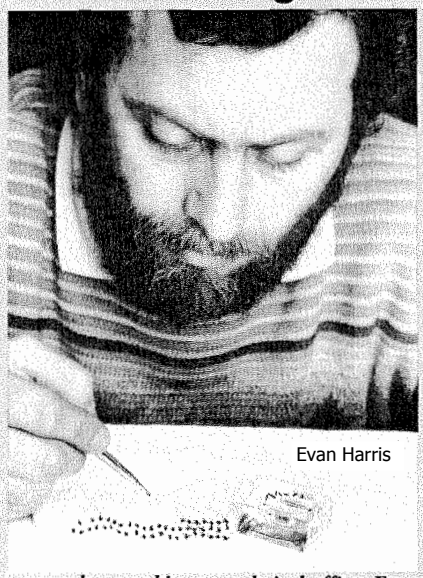
Explore the underwater world on AUSTRALIS.

Up to two hours free connect time in the REEF and MRIP databases for all AUSTRALIS users during November.

REEF is the database of the Great Barrier Reef Marine Park Authority.
MRIP is the Marine Research in Progress database.

This offer covers connect time and online display charges but does not include offline prints. For more information contact the CSIRO AUSTRALIS Help Desk. Phone 03-418-7333, fax 03-419-0459.

'And what do you do for a living...'



Evan Harris

Brain surgeons have nothing on technical officer Evan Harris. His job at the Division of Tropical Animal Production in Brisbane involves the delicate and exacting task of gutting buffalo flies.

Evan, above, removes part of the Malphigian tubules (excretory organs) of the tiny creatures.

His record is 270 flies in a single day, a feat of remarkable concentration and dexterity. But even then his output could be assembled on a collecting dish the size of a 20 cent piece.

The organs are used by the Division's biochemists as part of research project which aims to develop a commercial vaccine against buffalo fly.

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Brian takes on IRN

CSIRO's *Industrial Research News* has a new editor following the departure of Jeff Culnane. The mantle now belongs to Dr Brian Harding, who is keen to make himself known to those people in the Organisation who haven't already met him through his previous CSIRO position.

For the past five years, Brian has been in communication and marketing at the North Ryde Laboratory of the Institute of Minerals, Energy and Construction, latterly with the Division of Coal Technology. This Division had proven to be an ideal training ground for an editor of *IR News* he said, since under its Chief, Professor Ming Leung, it had become one of the leading divisions in putting into practice CSIRO's policy of working closely with industry.

Dr Brian Harding

Brian is no stranger to research work. He has a PhD in solid state physics from the Australian National University and has worked with the UK Atomic Energy Authority, the Australian Atomic Energy Commission (now ANSTO) and the Department of Defence.

He subsequently turned to professional writing, with a Diploma from the Canberra College of Advanced Education. He worked as a professional writing tutor before joining Pergamon Press and later Thomson Magazines in London.

Brian said 'I believe *IR News* has an important role to play in promoting CSIRO's research in the industrial community. But just as important, I believe *IR News* should tell industry about the facilities we have for research and about the wealth of expertise to be found among our scientists.'

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

Retirements

John Spink

A dinner held at Melbourne University to honour John Spink on his retirement from the Division of Materials Science and Technology after 46 years' service with CSIR/CSIRO turned out to be a reunion of many former colleagues.

The illustrated menu carried a 1943 photograph of the staff of the CSIR Lubricants and Bearings Section established as a wartime laboratory at the University of Melbourne in January 1940. This section was to become, in turn, the Division of Tribophysics, the Division of Materials Science and, finally, the Division of Materials Science and Technology.

Five members of the Lubricants and Bearings Section appearing in that early group photo were present at the dinner and are pictured above. They represent a total of more than 180 years of service with CSIR/CSIRO.

John Spink joined the Section in August 1942 and after completing a part time science degree in chemistry at Melbourne University was appointed to the research staff.

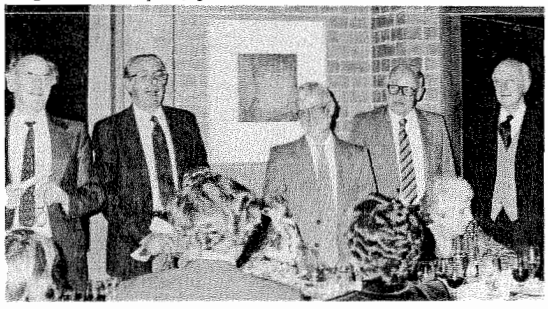
His research activities began with studies of friction and boundary lubrication and over the years have centred around the surface properties of solids and their modification. This has involved John in a wide range of techniques, particularly electron diffraction and microscopy and Auger electron spectroscopy.

During his final years with CSIRO he became interested in the history and philosophy of science. Some five years ago he gained an honours arts degree at the University of Melbourne and subsequently became involved in editorial work in the Division, producing three biennial research reports.

He also undertook the organisation of Divisional archives while continuing his experimental work in the laboratory.

Following his retirement in August, John was awarded a CSIRO Post-retirement Fellowship to complete a history of the CSIR/CSIRO Tribophysics Laboratory (1939-1969) as well as to carry out inhouse archiving duties.

The latter task in records management is a most urgent requirement following the recent extensive reorganisation with its attendant rush of retirements, redundancies and increased staff turnover.



Former Lubricants and Bearings colleagues at John Spink's retirement dinner. From left, Alan Moore, Bob Hughan, John Spink, Brent Greenhill and Bob Vines.

Photo: Errol Beckhouse

Jack Hession and Tom Precious

A large group of well wishers gathered at the Division of Mineral Products in Port Melbourne recently to farewell Jack Hession who has retired after 40 years with CSIRO.

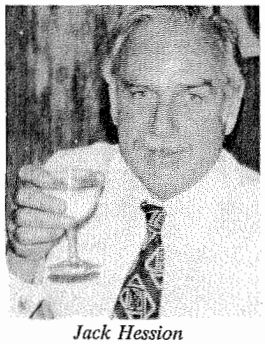
Jack started in the drawing office at the then-Chemical Engineering Section at Fishermens Bend in June 1948. When the site was amalgamated into the Central Research Laboratories, he worked there until finally transferring to Mineral Chemistry (now Mineral Products) in August 1978.

At his farewell, Jack recalled the early days working at Fishermens Bend and the many changes over the years. For example, the bus from the city (which cost fourpence) brought you to a site, the back of which was noted for its sandhills, rabbits, swamp and air raid shelters.

Another retiree is **Tom Precious**, who has left CSIRO after 40 years. Starting in 1948, he worked in the gasification of brown coal in the Chemical Engineering Section at Fishermens Bend and later transferred to Mineral Chemistry in 1966.

Tom, an excellent engineer and experimentalist, maintained a high degree of discipline and kept all those around him up to the mark; yet his gentleness, understanding and willingness to help when the occasion arose will be remembered and appreciated.

Their colleagues wish both Jack and Tom long and happy retirements.



Jack Hession

Tom Precious

Photo: Eva Kowal

1990 Churchill Fellowships

The Winston Churchill Memorial Trust is now calling for applications for its 1990 Churchill Fellowships.

The Trust offers Fellowships every year for Australians over 18 to travel overseas in order to further their study.

Successful applicants receive an allowance to cover expenses anywhere in the world, usually for a visit of about three months, plus airfares and fees.

In addition to the established Fellowships, a number of additional sponsored Fellowships are being offered in 1990. These include:

. **The Australian Institute of Parks and Recreation Education Trust Fund Churchill Fellowship**, for the study of a subject directly related to parks and recreation in Australia;

. **The Samuel and Eileen Gluyas Churchill Fellowship**, for study and research into the pastoral industry, particularly as it applies to the tropics;

. **The Jack Green Churchill Fellowship**, for the benefit of people engaged in the dairy industry; and

. **The Swire Group Churchill Fellowship**, for the study of an aspect of the Australian cotton industry.

Applications, including references, must be forwarded no later than Tuesday 28 February 1989.

For further information send a stamped addressed envelope to:

The Winston Churchill Memorial Trust,
218 Northbourne Avenue,
BRADDON ACT 2601

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CoResearch

No. 318 November/December 1988 CSIRO's staff newspaper

CSIRO AUSTRALIA

Funding crisis

Consultative Council condemns budget cuts – suggests action

The CSIRO Consultative Council, traditionally a low profile committee of staff and management representatives mainly dealing with terms and conditions of employment, has grasped the nettle on CSIRO funding.

Following its meeting in Canberra last month, the Council issued a strongly worded statement condemning budget cuts and calling for a series of measures to redress the problem. The motions had their genesis on the staff side of the Council, and after some modification during round table discussion, were passed by the whole Council.

A motion passed at the meeting stated 'Council notes with deepest concern the profound disillusionment of staff arising from the Government's continued under funding of CSIRO'.

Another said 'Council acknowledges the need to increase the private sector's contribution to Australia's R&D efforts but rejects the apparent corollary that measures to increase this contribution should be offset by a decline in government funding of R&D in general and CSIRO in particular'.

Council called on the Government to take account of the vital role of science and technology in fostering economic and social progress. To make this point forcefully, Council said CSIRO needed, by the end of the calendar year, to provide a comprehensive analysis 'which demonstrates the contribution of CSIRO research to Australia's economic and social prosperity and highlights the likely impact of recent changes in R&D funding on Australia's R&D activity and future prosperity'.

It was suggested that the Corporate Planner, Don MacRae, should play a major role in co-ordinating such an analysis, although he would obviously be looking to the divisions for basic information which he could develop.

Another motion called for the establishment by the Government of a science and technology committee comprising senior Cabinet Ministers and chaired by the Prime Minister, and the establishment of 'avenues for regular input to and feedback on government science and technology policy by the scientific community'.

One motion which would lead to interesting debate when it can be arranged was the call for Senator John Button to address CSIRO staff directly. This request has been passed on to Senator Button and the Council is awaiting his reply.

The thrust of several motions was reinforced soon after the Consultative Council meeting by a joint staff associations delegation which addressed the interdepartmental committee now examining science funding.

According to John Stephens, a member of the Council and president of the Officers' Association, the delegation spent two hours in session with the committee. One issue discussed was the need for a Cabinet committee on science and technology, although the group stressed that such a committee should not usurp the role of a Science Minister.

*A full report on the October meeting, contributed by the Council, appears on page six. In addition, the Board and the Council have issued a joint statement which appears as an insert to this issue of *CoResearch*.

Submission urges multi-million dollar boost for CSIRO

The CSIRO submission to the interdepartmental committee examining Australia's science capacity has called for the restoration of the 16.9 per cent reduction in recurrent funding said to have taken place since 1983/84.

In 1988/89, additional funding of $15 million is sought, with a continuation of $25 million in 89/90 and onwards, broken down as follows:

- Five million dollars to commence, and $7 million in following years to sustain, specific strategic research programs of substantial commercial potential (such as software engineering) or great importance to the environment (such as the greenhouse effect);
- Four million dollars ($10 million in following years), to recruit talented young scientists to allow promising research programs to make rapid progress towards international commercial success; and
- Six million dollars ($8 million in following years) to upgrade research equipment.

In 1989/90 and beyond a further $35 million is sought to support research likely to have particular scientific, technological and commercial potential. These include signal processing, new biological techniques (particularly those involving genetic engineering), advanced production technologies for metals and fuels, further development of carbon fibre technology, a range of food processing initiatives including the Sensory Research Centre, research into environments under developmental pressure such as estuaries, and land degradation.

According to the submission, 'perhaps the most important step that can be taken immediately to raise community awareness of the national importance of science and technology – and all that follows in relation to education and career choices – is for the Government to show greater recognition of this in its policies and financial support...'

Canberra rally puts pressure on politicians over science funding

The 'sophisticated science lobby' referred to in the October issue of *CoResearch* in the interview with Mr Peter McGauran (Shadow Science Minister), is taking shape.

Australian Science Action is a group set up less than two months ago to take on the huge task of showing the Government that it has taken the wrong course on science and technology policy.

It started with a survey of young scientists at the Australian National University, then there were media interviews, a huge rally of scientists outside the National Science and Technology Centre and now plans for a survey of scientists in CSIRO.

The survey will aim to determine whether our young scientists are satisfied with their careers. If the results follow those of the ANU study, more than half will be thinking of leaving either Australia or science because of serious dissatisfaction, particularly with the inability to gain tenure in their chosen fields. The problems in gaining tenure stem directly from reducing science funding.

Organisers of Australian Science Action are now awaiting the outcome of the Government's review of Australia's science capacity before initiating further action.

The rally, held in Canberra on 23 November, attracted about 1000 people, mostly scientists. Participants heard Dr Jim Peacock from the Division of Plant Industry, plus science spokesmen from the four major political parties.

It was an unprecedented indication of the strength of feeling in the science community. Despite the cold and rain, the numbers were there to make Mr Hawke well aware that it was not the case of a few 'ratbags' making a nuisance of themselves.

The focus of the rally was that funding cuts are harming our long term economic prospects. ASA spokesman Dr Matthew Morell from the ANU School of Biological Sciences emphasised this point in his many media interviews before and after the rally. and in his own address to the gathering.

He said the Federal Government had placed great emphasis on science and technology to underpin Australia's future economic performance, but it had failed to match its rhetoric with policy.

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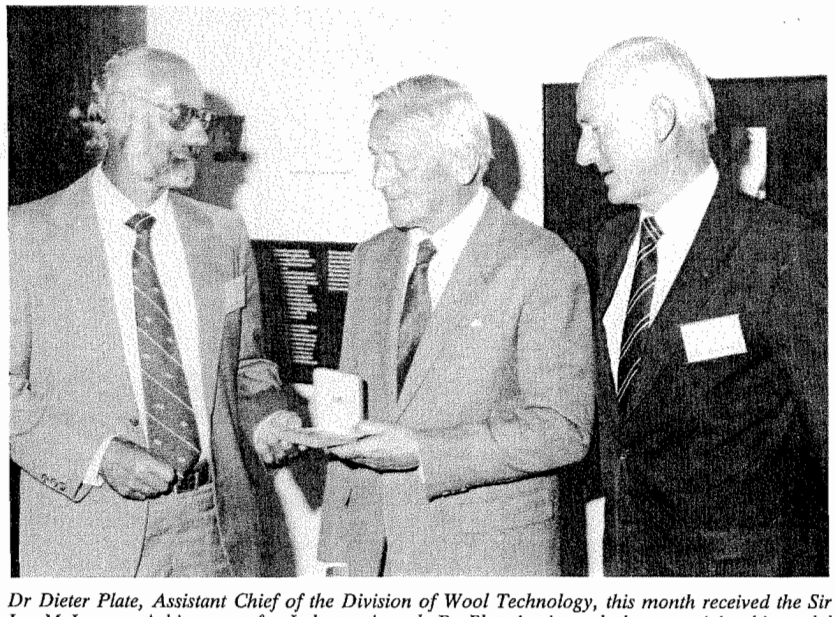
Dieter Plate takes out McLennan Medal



Dr Dieter Plate, Assistant Chief of the Division of Wool Technology, this month received the Sir Ian McLennan Achievement for Industry Award. Dr Plate is pictured above receiving his medal from the Governor of Victoria, Sir Davis McCaughey, at a ceremony at the Victorian Arts Centre. More details over the page.

Photo: N Prosser

From the Chief Executive

A column by Dr Keith Boardman

Senator Button's address to the recent forum in Canberra organised by the National Science and Technology Analysis Group (NSTAG) provided some clear insights into the Government's thinking about the role of R&D in improving Australia's competitive position and on industrial restructuring.

Senator Button put on record the Government's recognition of the importance of science and technology to Australia's development and the need for a proper balance between R&D in the public and private sectors. He acknowledged the enormous contribution R&D had made to agriculture and mining, the two sectors of the Australian economy that have remained internationally competitive and provided much of Australia's earnings and wealth generation.

'These research activities are widely acclaimed, both as good science and good exploitable technology,' said Senator Button. 'Much of the scientific work has been in the form of mission-oriented research with comparatively little basic research by comparison with other scientific fields.

While I agree that CSIRO's research for agriculture and mining has been strongly mission-oriented, it has involved much basic research from which the exploitable technologies were developed. An appropriate proportion of longer term basic research, but with clear strategic objectives, is essential for the development of innovative new technologies which are vital to the continued competitiveness of our primary industries.

Industry groups such as the National Farmers Federation and the Australian Mining Industry Council, as well as come Australian companies, recently have expressed their concern that CSIRO appears to be moving too far towards service and tactical or near-market research.

Senator Button said the predominant thrust of the Government's policy for manufacturing industry has been aimed at changing the culture prevalent in industry towards the innovative, productive, market-oriented, internationally focused characteristics that are vital for survival. These Government policy priorities and programs create opportunities for our research base. He said the issues are not about the value attached to basic science, but the linkages between science and other activities and the management of the research effort. 'Our desperate need is for sufficient research activities of world standing which are, at the same time, well integrated with our industrial capabilities'.

I certainly agree with these sentiments, but there will be occasions when our research is at the very cutting edge of world developments and ahead of the capabilities of industrial firms in Australia at the time. We must learn from past experiences to assist the private sector to exploit innovative research findings and establish new industries with good export potential.

Our submission to the inter-departmental committee reviewing Australia's science capacity will emphasise the major role of R&D in national

Cont. on p.4

Letters to the Editor

Dear Editor,
What a boost to the morale to read *CoResearch* 316, and especially your Matter of Opinion. Apart from the problem of lack of funding, our real morale problem stems from CSIRO management's failure to condemn the Government's cuts. Thank you for being brave enough to say this publicly. And thank you for the other morale-boosting items: 'The Federal Budget', 'Morale Boost from Cost Benefit Report', and, of course, the Titanic letter.

Alister K Sharp
Food Research Laboratory

Dear Editor,
Regarding your article in the September edition of *CoResearch* on CSIRO funding, you have summed up the situation perfectly. Well done. I agree totally.

Dr J K Wright
Division of Mineral and Process Engineering

Dear Editor,
The New South Wales Branch of the CSIRO Officers' Association congratulates you on your forthright statements, which appeared in the September 1988 issue of *CoResearch*, regarding CSIRO and the budget cuts.

Your comments on staff morale and perceptions of government and CSIRO top management attitudes to scientific work, reflect the feelings of the majority of NSW Officers' Association members.

Well done!

Michelle Smyth
NSW Chairman

Dear Editor,
The September 1988 edition of *CoResearch* contained letters from Dr D J Goodchild and Dr M D Hatch concerning the corporate centre review.

Dr Goodchild asked for information on reclassifications in the corporate centre and the average cost per position compared with the previous costs.

While I do not wish to duck the question on reclassifications, the matter is complicated considerably by the fact that at the time the corporate centre review was being finalised the Government agreed to the changes in the clerical/administrative officer structure which meant that all previous clerical/administrative positions were reclassified and integrated into the new structure. Because of the structuring to accommodate new functions, the mix of SES positions changed. Table 1 [see p.6] shows the before and after situation. In a previous edition of *CoResearch* I indicated that the number of positions in the ASO6 to ASO8 and equivalent positions reduced from 155 to 130.

Average costs per position in 1987-88 and 1988-89 respectively are $33 000 and $36 000 (compared to the CSIRO average of $39 083 (1987-88) and $39 720 (1988-89). The difference is due to a combination of the clerical/administrative office restructure and the abolition of many functions in the corporate centre previously carried out by staff at the lower classification levels.

I replied separately to Dr Hatch, and the contents of my letter follow.

'Dear Dr Hatch,

'Thank you for the letters to Dr Boardman and me dated 31 and 30 August respectively concerning the corporate centre review.

'I have attached a copy of the reporting sheet that goes to the Board on a bimonthly basis and this will give you a good indication of the staffing levels set in the corporate centre and the reductions involved.

'Each division has been provided with copies of the Implementation Handbooks 1 and 2 which set out the proposed structure and the reductions in each area including Limestone Avenue. These were provided some months ago and I am sure you could obtain them from your divisional secretary.

'I have attached a copy of Implementaiton Handbooks 3 and 4 which cover the library review and the final structure for the corporate centre. I have also attached a copy of the arbitrated salaries for administrative positions and you may wish to relate these to the positions in the handbook.

Fringe benefits only apply to officers in the senior executive service and depending on their levels, are similar to those available to SPRS and above and institute managers.

'I have also recently sent to chiefs a breakdown of the corporate centre budget, a copy may also be available from your divisional secretary.

'Let me say that I have considerable difficulty with your logic in separating out parts of the corporate centre. The intention was to reduce administrative overheads at the corporate level. The corporate centre, like an institute, can be in a number of geographical locations and the task has been to rationalise each particular function regardless of its location.

'My mandate from the Board has been to obtain maximum reduction in overheads with the savings being redirected to bench research. Out of the total of $10.6 million reduction in costs, about $1.6 million will be required to enhance administrative functions in divi-

Cont. on p.6

A great day for CSIRO wool research

Right, Dr Dieter Plate's industry partners, and his Chief, were also honoured for their part in the Sirospun success. Left to right, Mr Tony Avery representing Repco, Sir Ian McLennan, the leading Australian industrialist after whom the award is named, Dr Lada Benisek from the International Wool Secretariat, Dr Neil Evans from the Australian Wool Corporation and Dr Ken Whitely, Chief of the Division of Wool Technology.

Photo: N Prosser

It is no surprise that Dr Dieter Plate received an award for excellence in work with industry – in the October issue of* CoResearch, *and article about his recent promotion said that his invention, Sirospun, was 'one of the greatest commercial successes to emerge from CSIRO'. It's estimated that Sirospun saves the world's worsted spinning industry about $40 million per year, and it has so far returned royalties of about $4 million.

Dr Plate gave a gracious speech of acceptance at the ceremony, emphasising that the development of Sirospun was a team achievement.

Chief of the Division, Dr Ken Whiteley, accepted a plaque on behalf of the whole Division, and industry partners from Repco, the International Wool Secretariat and the Australian Wool Corporation also were honoured for their roles in making Sirospun a worldwide success.

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Gibb Maitland Medal to CSIRO scientist

A leading authority on iron ores, Dr Richard Morris from the Division of Exploration Geoscience, has been awarded the 1988 Gibb Maitland Medal from the Western Australian Division of the Geological Society of Australia.

Dr Morris has made important contributions to geoscience in WA through both his research and his collaboration with industry.

For more than a decade, the WA iron ore industry has increasingly sponsored his research and has reaped many benefits from the practical applications of that research.

Dr Morris joined CSIRO in 1976 and his initial research centred on phosphorus distribution within iron ores, expanding to a major study of the textural relationships between ore and banded iron formation. This provided the scientific basis for the Pilbara Iron Ore Classification (PIOC).

The industry credits PIOC with considerable reductions in blasting costs and acknowledges that significant savings have been achieved in exploration costs through changes in practices arising from the research.

Dr Morris also has developed a very practical technique for recording the structural and mineralogical character of core samples, using transparent adhesive tape.

The Gibb Maitland Medal is the highest award presented by the WA Division of the GSA. It is named in honour of Andrew Gibb Maitland, a government geologist and head of the Geological Survey from 1896 to 1926. He is regarded as one of the founding fathers of the State's geology, and was instrumental in co-ordinating geological investigations during the first gold rush period of the late 1800s. He laid the foundation for systematic geological mapping of the State.

The medal named in his honour recognises scientific excellence and is normally awarded to someone actively pursuing a scientific career in WA.

Mr Ian Reid, convenor of the GSA (WA Division) awards subcommittee presenting the Gibb Maitland Medal to Dr Richard Morris.

Dr Philip to review Danish environmental research

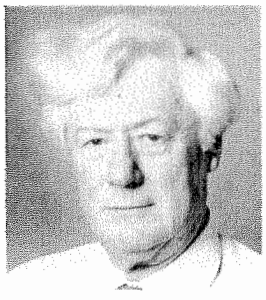
Dr John Philip, Chief of the Centre for Environmental Mechanics, is to head one of five international panels of scientists reviewing government funded research in Denmark.

Based on his long and distinguished career in hydrologic research and his expertise in science policy, Dr Philip has been invited by the Danish Council for Research Policy and Planning to chair the 'Soil and Groundwater' evaluation panel. Other panels will evaluate research in Air, Water, Terrestrial Ecosystems and Effects on Humans.

The scientists will meet in Copenhagen on 8 January 1989 for a briefing from the Danish Council. They will spend the following week in visits to laboratories and interviews with research groups.

Dr Philip will then join the chairmen of the other panels to form a main panel that will, in consultation with a Danish economist and representatives of Danish industry and agriculture, prepare the main report of the review. He also will take part in the final presentation of the report to the relevant ministers of the Danish Government on 15 March 1989.

Interestingly, the major thrust of the review is to evaluate the quality of Danish environmental research. Several aspects of the research quality will be investigated, including its standing on an international level, its relationship to national environmental problems and its coherence and consistency.



Dr John Philip

Another CSIRO breakthrough

Revolution in animal fertility

The key to easy, non-intrusive and reversible suppression of animal fertility, now within reach of CSIRO scientists and their industrial partners, could unlock an enormous world market and have a profound effect on stock production.

At the Division of Animal Production in Prospect a team (Drs Ron Hoskinson, Phil Mattner and Robin Rigby), in partnership with commercial collaborators, has been perfecting techniques for making vaccines to control sexual activity in livestock. These products are now being evaluated for their use in tropical cattle by Dr Michael D'Occhio at the Division of Tropical Animal Production in Rockhampton.

A commercial vaccine is likely to hit the market within three years.

The potential range of benefits of the work is wide, extending from farm stock to domestic animals, racehorses and even to the treatment of certain conditions in humans. The possible financial return to CSIRO and to Australia has yet to be fully calculated.

The initial products will enable temporary spaying of cows and castration of bulls, by blocking the processes which govern reproduction. The treatment involves immunisation against a major reproductive hormone.

Better control of stock fertility will add substantially to profitability for the grazier.

For northern cattle graziers particularly, an advantage will be in the non-surgical spaying of cull heifers and older cows, allowing the optimisation of body condition. Bull control is difficult in many areas and as many as 60 per cent of the one million female cattle slaughtered annually in Queensland are pregnant. Pregnancy reduces condition considerably, so spaying is desirable to ensure the best presentation at market.

Traditionally, spaying is performed surgically – a procedure which itself sets back body growth and can lead to complications and mortality (and of course can be expensive for the grazier). Adhesions and damage to the carcase may also negate the benefits.

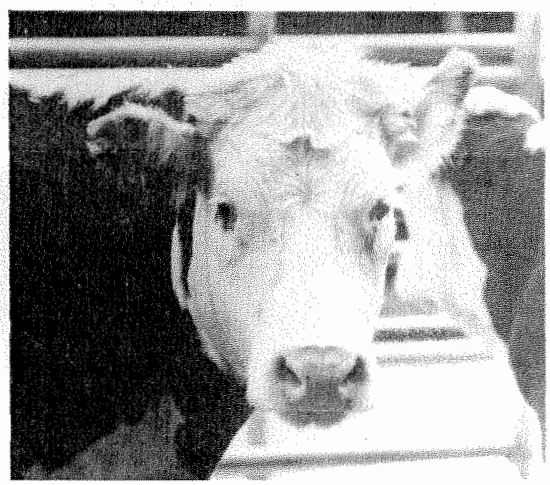
However, simple immunisation will remove the need for surgery and provide all the benefits and none of the pitfalls. It is also more humane, as the surgical procedure is somewhat traumatic.

Another application is the ability to prevent young heifers from becoming pregnant while they are still growing. By delaying fertility until the optimum time, the heifer could reach its best condition, making it able to cope better with pregnancy and allowing yearly pregnancies. At present there is no practical solution to the problem of early pregnancies in heifers.

Applying the technology to bulls could result in better body condition. Overseas studies suggest that immunologically castrated bulls show better growth performance than surgical castrates. Graziers could manage young bulls as though they were steers, and individuals that showed desirable attributes could later be used for breeding purposes.

Looking further into the future, the technology has some intriguing possibilities. For instance, a racehorse could compete as a gelding and still have a later career as a stud stallion. Geldings usually have better temperaments for racing, but of course they will never have any progeny – which is a real problem if the horse proves to be a winner.

Obviously, the control of fertility in domestic animals would be beneficial, not only avoiding the trauma of an operation but also leaving the way open for picking the best time the future to breed from the animal. Like farm animals, domestic pets can sometimes choose the most inopportune times to reproduce themselves.



Fertility control for cattle is just around the corner.

318-1988

New agreement

Multidisciplinary forest experiment set to assist newsprint mill

A significant commercial agreement is expected to be one of the major results of a multidisciplinary experiment which has provided the most comprehensive data yet on *Pinus radiata* forest growth in Australia.

The Biology of Forest Growth (BFG) experiment is a considerable achievement for the Division of Forestry and Forest Products. Scientists across a wide range of disciplines have been participated, enabling an understanding of forest growth which could substantially increase Australian forestry productivity and ultimately reduce Australia's $1.3 billion per annum softwood import bill.

The commercial agreement nearing finalisation is with the Australian Newsprint Mill (ANM) at Albury, a consortium run by several leading Australian newspaper groups to produce newsprint and other paper products.

With the technology available to the Division from the BFG experiment, it is proposed to nourish fast growing *P. radiata* trees which would become the raw material for paper production, grown in a plantation adjacent to the mill.

ANM is embarking on a major expansion program and wishes to ensure that the water quality of the Murray/Darling Basin is not adversely affected by the increased effluent which results from the post-production cellulose breakdown phase.

This effluent contains nitrogen and phosphorus which could cause an algae bloom problem.

But this effluent could be an asset if used for nourishing the trees.

This highly practical application results from basic research started in January 1983 at Pierces Creek near Canberra, on a *P. radiata* plantation provided by the ACT Administration.

This highly practical application results from basic research started in January 1983 at Pierces Creek near Canberra, on a *P. radiata* plantation provided by the ACT Administration.

The aim has been to generate a wide range of tree growth rates by manipulating factors such as water and nutrient availability and to explain the resulting growth differences in terms of the underlying physiological processes.

It was recognised that in the end, simple and, especially, portable, data would be essential if it was to be of real use to the forest industry. For instance, a basic model to predict the extent of thinning required during times of water stress (i.e. mild or severe drought) would be useful for the industry.

The Division used various combinations of irrigation and fertiliser to simulate differing conditions. There were five basic treatments:

. irrigated
. fertilised with a single heavy dose of balanced solid fertiliser
. irrigated on top of the solid fertiliser
. irrigated together with the weekly application of a complete nutrient solution supplied at a rate estimated to maintain maximum growth
. control

The difference between the control trees and those receiving the irrigation plus weekly nutrient treatment is dramatic. The latter's tall, lush growth is in marked contrast to the control stand just a few metres away.

Scaffolds which penetrate the plantation canopy have enabled the scientists to monitor stress levels and physiological processes such as photosynthesis and stomatal conductance as well as needle and branch elongation at all heights in the crowns of the trees.

A variety of measurements has been taken, such as stem respiration in a specially-made chamber while below ground such measurements as nutrient uptake, soil water consumption by trees under different conditions and growth rates have been particularly useful.

A number of other useful results have been recorded, including a coring technique for determining nitrogen mineralisation, uptake and leaching and a model to predict tree growth.

One major outcome has been the development of a water stress integral – a simple measure to quantify tree water stress over time.

A number of studies on the effects of water stress on tree growth have until now failed to find a link between growth and an integrated measure of water stress over a period of time.

The water stress integral is based on the accumulation of regular measurements of predawn leaf water potential, which is a measure of water deficit in trees.

This measurement was found to be an excellent index for predicting water stress. This stress is not a simple correlation with soil water content – non-fertilised trees experienced a higher water stress integral than fertilised trees growing with the same amount of soil water.

The greatest potential use for the water stress integral will be as a forest management tool, to assist decisions on thinning based on cumulative stress levels of stands, or to provide information on predisposition to pests such as sirex wasps which are attracted to trees that are stressed.

Another important outcome of the study will be improved understanding of the effect of tree growth rates on wood properties. Scientists in the Forest Products group in the Division will be studying these aspects in conjunction with the field biologists.

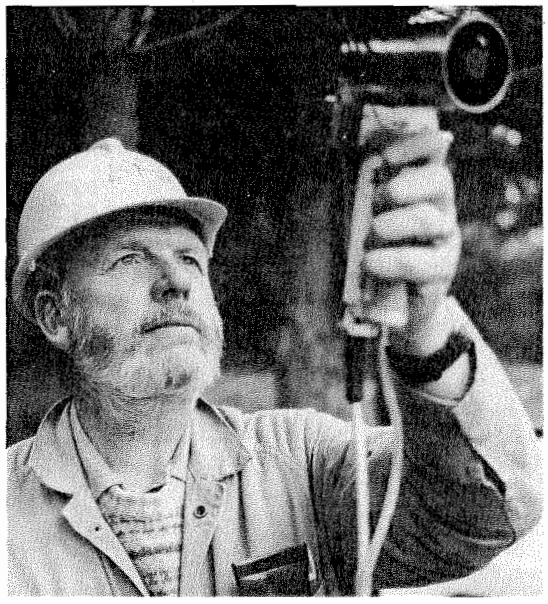
Preliminary examinations of the wood quality suggests that most of the fast growing treatments produced more dense wood than the control as well as producing more of it. Latewood, the wood produced in the latter part of the growing season (after the needles have completed their expansion in late January) is about 70 per cent more dense than earlywood produced in spring. However, trees in the control treatment were able to produce only a very small proportion of latewood since they had run out of soil water for growth. Irrigated trees continued active growth in the summer and autumn producing large proportions of latewood and increasing the overall wood density.

This has important implications for pulpwood growers, such as ANM, who want to maximise the number of wood fibres produced.

So fast growing trees, possibly less plagued by pests, could also yield better quality wood.

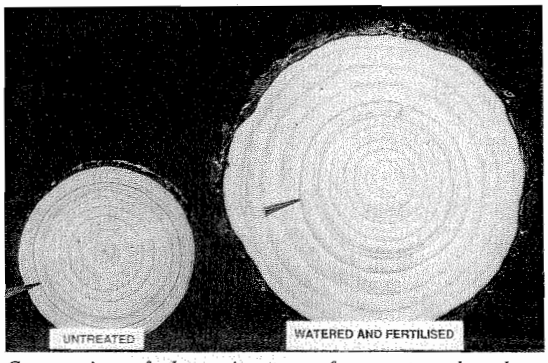
The findings of what started out as a large scale basic experiment to understand the growth of *P. radiata* forests will certainly affect our forest industry in practical ways for many years to come.

As mentioned above, a large number of scientists (including some from outside CSIRO) have participated in the BFG experiment, which is now overseen by project co-ordinator Dr John Raison. According to several participants interviewed by* CoResearch, *co-operation across disciplines has been excellent and has led to enhanced interpretation of data. It is an experiment which has captured the interest and enthusiasm of overseas scientists as well. In October last year, at a meeting of the International Union of Forestry Associations, 130 delegates from 30 countries were presented with data from the BFG experiment. Scientists were asked to submit written comments outlining their views on the value of the work. These comments expressed an appreciation of the vital importance of the research, which had established fundamental principles 'ripe for testing in the real world'.



Ed Meredith using a Li-Cor porometer to measure the rate of water loss from the needles.

Photo: Peter Hay



Cross-section of the main stem of an untreated and an irrigated-fertilised tree, showing the large growth response to the improved conditions. Both trees were similar in size before treatment (indicated by pointers).

Science lobby
Cont. from p.1

Dr Morell was one of five ANU scientists who carried out the survey which turned up such disturbing results about the future plans of young post doctoral scientists. The results of this survey were published as a letter in the 3 November issue of *Nature*.

Dr Boardman
Cont. from p.2

prosperity and CSIRO's vital role as industries. It will outline our important contributions to Australia's traditional export and wealth generating industries, and our growing importance to the manufacturing and service sectors. It will summarise the restructuring of CSIRO to align institutes and divisions more closely to the users of the research, the improved management of projects and the successful commercialisation of research findings, while maintaining CSIRO's research at the cutting edge of world developments in science and technology.

M Keith Boardman

No such thing as a free Helix?

CSIRO's Double Helix Science Club in Canberra was given a boost recently when the Education and Training Council of the ACT Administration provided funds to enrol all ACT primary school science co-ordinators as members of the Club.

The Double Helix Club has been operating in Canberra for three years, offering regular activities ranging from talks with astronauts to cooking bogong moths. Canberra membership now stands at 300, while the national total is 2600.

Ross Kingsland, National Director of the Club, said he was delighted that primary teachers were being provided with this opportunity to experience today's science and technology in a non-threatening way. He said the expectation of previous years that the best students would take an interest in science and aim for science careers could no longer be taken for granted. It was essential for the community to be made aware of the excitement of science and the vital role of Australian research in our society, he said.

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Important research project on hold through lack of funds

Five years' painstaking research into a new vaccine may have been in vain if more funding can't be secured soon.

Work on the development of a vaccine against parasitic worms of cattle was being carried out at the Division of Tropical Animal Production by Dr Iain East and a small team.

However, this year the Division is unable to fund any projects from appropriation money and as Dr East's project did not receive any rural industry grants, the work has been suspended, at least until some more money becomes available.

If successful, the vaccine could be a boon to graziers. Mr Rob Innes, grazier and member of the Division's advisory committee, said a vaccine would be particularly useful for graziers on the northern coastal areas, where he himself has 22 000 acres and runs 2500 Brahman cattle.

'I consider worms to be the biggest biological problem we face in this area,' he said.

He said the problem outstripped ticks, lice and buffalo fly in severity, certainly among young cattle. At $2 per dose of drench, it was also an expensive problem.

According to Dr East, 'the production of a vaccine against parasitic worms of cattle is a very attractive proposition because it avoids the two serious problems of residues left by chemical control and the ability of the worm to develop resistance to the various chemicals used currently for control'.

He said it was decided to work on the nodular worm *Oesophagostomum radiatum* because of the wealth of knowledge already accumulated on this species by previous workers at the Division's Long Pocket Laboratories. *O. radiatum* is a serious pest in tropical and sub-tropical areas, and is one of five major worm species in Australia that cause production losses in cattle. The cost of control of worms in Australia exceeded $21 million in 1987, compared with $5 million in 1982.

Infection by gastro-intestinal worms can seriously hinder the ability of young cattle to gain weight, with one of the major effects obviously being reduced prices at market. What's more, parasitism can drastically affect both milk and meat production It's been estimated, for instance, that worms cause an average of 6.6 per cent drop in milk production, potentially costing the dairy industry many millions of dollars each year.

Control of these problems is becoming more difficult as resistance to chemicals (anthelmintics) increases. Recent research papers indicate this resistance is accelerating.

The projected benefit to the grazing industry of an effective vaccine has been estimated as more than $120 million per annum through increased productivity and lower mortality rates among cattle.

If Dr East's project had been allowed to continue, it would probably be about five years away from the marketplace.

Although the work had concentrated on one species, Dr East and his team had lately commenced a feasibility study on a second species, *Ostertagia ostertagi*, the brown stomach worm, and preliminary evidence suggested the research could be extrapolated to other species of economic importance.

An earlier grant from the Rural Credits Development Fund allowed the purchase of equipment used for *in vitro* culture of the early parasitic stages of *O. radiatum*. 'We are one of only two groups in the world that have mastered this technique,' said Dr East.

'Soluble extracts of the *in vitro* cultured larvae provided 99 per cent protection from infection when used to vaccinate cattle. Similar soluble extracts from adult worms were also highly protective,' he said.

'The further purification of these antigens has ceased through lack of funding. For the past 18 months, the project has been staffed by one scientist working half time on this project with two technicians. Despite this lack of staff, in the past four years we have conducted 14 vaccination trials which each take 15 weeks to complete.'

'Tomato man' leaves

CSIRO's 'Mr Tomato', Dr Barry McGlasson, is leaving to become a Fellow in the Faculty of Horticulture at Hawkesbury Agricultural College, New South Wales. McGlasson

Dr McGlasson will be a great loss to the Organisation. He has had a high profile in both the industry and the media, particularly in relation to his work on producing tastier tomatoes.

Dr McGlasson has worked in postharvest horticulture his whole career, starting in 1951 at the South Australian Department of Agriculture. In 1964 he became a Senior Research Scientist with the (then) Division of Food Research. He is leaving the Division of Horticulture as a Senior Principle Research Scientist.

His early research on the ripening of cantaloupe melons at the University of California led to a long career in postharvest physiology of fruits and vegetables, especially the involvement of ethylene as the ripening hormone in fruit.

His tomato research started in earnest in 1973 while at Purdue University in the United States (during study leave from CSIRO), when he examined the use of mutant non-ripening tomatoes as a tool for studying fruit ripening. Following the advent of new, firmer tomatoes with longer shelf lives, complaints from consumers started about lack of flavour.

Dr McGlasson has addressed this problem for some years now, conducting a range of experiments to determine the elements of tomato flavour. Methods for bringing out the best in current varieties have been developed. Ways of combining improved flavour (Tasty Toms) with good storage characteristics have been devised.

Aside from this research, Dr McGlasson has been active in foreign aid work, beginning with an AIDAB mission to Pakistan in 1975 and later heavy involvement in developing postharvest horticultural research centres in ASEAN countries as well as Bhutan and more recently China.

His work has been strongly oriented to collaboration, and he and his team have worked particularly with the New South Wales Department of Agricultural and the Queensland Department of Primary Industries.

In his new position at Hawkesbury, he will develop teaching and research programs in postharvest horticulture.

Industry sees forestry research first hand

The Division of Forestry and Forest Products' Plantation Forest Research Centre showed its work to the forestry industry at a successful field day this month.

The work of the Centre at Mount Gambier, in the heart of South Australia's forestry industry, includes a major project, which has been running four years, on organic matter and nitrogen dynamics between crop cycles of radiata pine.

Forty-seven industry representatives, ranging from senior managers to technical assistants and some members of the media inspected the project's field experiments.

The project is being conducted by Experimental Scientist Mr Philip Smethurst and Assistant Chief Forestry Dr Sadanandan Nambiar, with additional collaboration from Dr Clive Carlyle, Mr Paul Woods and Dr Partap Khanna. The Centre also enjoys a close working relationship with the local forestry industry, includes the Southern Australian Woods and Forests Department, CSR-Softwoods and SEAS-Sapfor. Funding and a lot of help-in-kind from these organisations helped get the project underway and contributed to its success.

Mr Smethurst, who escorted the visitors around the experiments, said it was one of the largest field demonstrations of the Centre's work for some time, and he had been very pleased with the results.

The two field experiments under inspection were the slash management study and weed management study. The first aims to examine the effects of clearfelling and slash litter management on the dynamics of organic matter and nitrogen, while the second provides data on the question of competition between trees and weeds for nitrogen.

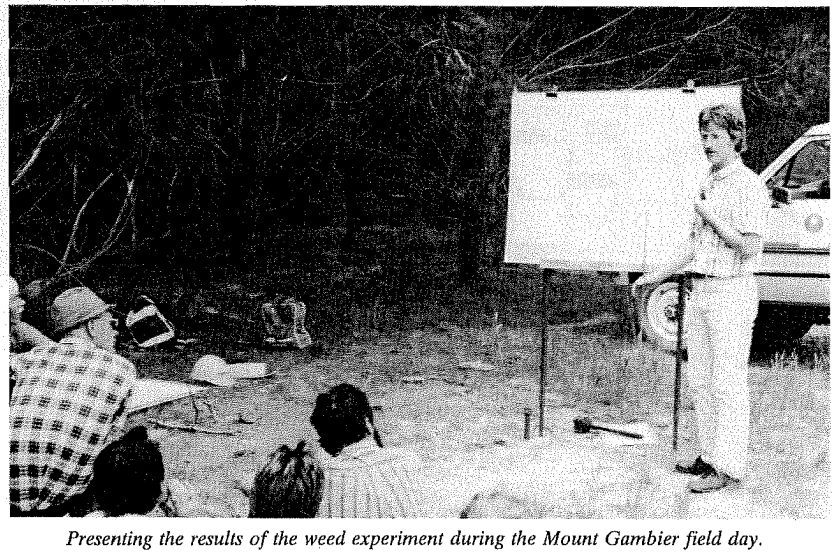
An important result emerging from the studies has been the potential mismatch between decreasing patterns of nitrogen supply, irrespective of slash and litter management, and the increasing requirements for nitrogen during the early years of tree growth. Such results explain the lack of response to nitrogen fertilisers applied at planting, and point to an increasing likelihood of response in later years. Weed competition for nitrogen has been found to further reduce the supply of nitrogen to trees.

Results also show that slash and litter removal, a common practice even today, can cause substantial declines in reserves of organic matter and nutrients on sandy soils. Although such declines haven't affected early tree growth, they augur poorly for future productivity. This is, of course, vital information for foresters, who have for some time questioned such practices.

In the face of diminishing reserves of nitrogen and other nutrients due to harvesting and site preparation, the challenge ahead is for scientists to come up with ways of managing native and added sources of nutrients which better match the trees' requirements.

One remedy being researched is the use of a legume, in this case lupins, which is able to fix nitrogen in the soil. With careful management, it has been shown that lupins can be as effective as nitrogen fertiliser for supplying nitrogen to young plantations.

SEAS/Sapfor and CSR Softwoods have taken up the concept and a few thousand hectares of young plantations are now operated under the regime. Another wise use of legumes has been the widespread aerial sowing of clover after the Ash Wednesday fires to help rebuild soil reserves of nitrogen.



Presenting the results of the weed experiment during the Mount Gambier field day.

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Letters
Cont. from p.2

sions and establish site groups to handle cheque production – the remainder will be available for what we are all about, namely, research.'

It can be seen from my response that there appears to be a communication problem within some divisions in that the information necessary to, as Dr Hatch says, 'allay mistrust, re-establish some level of morale and quash various rumours' has been made available on an ongoing basis since early 1988 to all divisions.

P H Langhorne
Director
Corporate Services

Table 1
Corporate Centre Positions

SES Level	1*	2	3**	4	5
Pre PCEK (Sept 87)	9	9	3	1	1
Post PCEK (Oct 88)	10	7	3	1	1
Difference	+1	−2	–	+2	–

* includes one core position filled on contract
** includes Secretary to the Board

Table 2
Corporate Centre Implementation Report

	1987/88	1988/89								1989/1990	
		1 July		1 September		1 November	1 January	1 March	1 May	1 July	30 September
		Exp.*	Actual	Exp.	Actual	Exp. Actual	Exp. Actual	Exp. Actual	Exp. Actual	Exp. Actual	Target Actual
Office of Chairman & Board Secretariat		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Office of Chief Exec.		11.5	11.5	11.5	11.5	11.5	10.5	10.5	10.5	10.5	10.5
Public Affairs		17.0	17.0	15.0	15.0	15.0	15.0	15.0	14.0	14.0	14.0
Corporate Audit		15.0	15.0	15.0	15.0	15.0	13.0	13.0	13.0	13.0	13.0
Corporate Planning		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	5.0
Corporate Services:											
Human Resources		57.0	57.0	50.0	49.0	44.0	44.0	44.0	44.0	43.0	42.0
Corporate Resources		262.5	261.5	236.5	236.5	221.5	214.5	210.5	201.0	192.0	188.0
MIS Br. (incl RAOs)		172.0	172.0	146.0	149.0	115.0	64.0	64.0	64.0	64.0	62.0
CIRC		7.0	7.0	7.0	7.0	6.0	5.0	5.0	5.0	5.0	5.0
Library		5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Office of Director		10.3	10.3	10.3	10.3	9.3	9.3	9.3	9.3	9.3	9.3 (2)
Other (e.g. VFT)		13.0	13.0	11.0	11.0	4.0	3.0	3.0	3.0	1.0	0.0
STAFF	603 (1)	581.3	579.3	517.3	519.3	456.3	393.3	389.3	378.8	366.8	356.8
BUDGET	32 518 (1)	29 848								22 959	21 847
Composition of Staff											
	Core	356.8	356.8	356.8	356.8	356.8	356.8	356.8	356.8	356.8	356.8
	Supplementary & temporary	224.5	222.5	160.5	162.5	99.5	36.5	32.5	22.0	10.0	0

(1) Note that 1987/88 headquarters configuration is not comparable in detail to the revised corporate centre structure (i.e. 1988/89)
(2) Includes Legal and FOI
** Expected*
NB. The target in the last column was determined by the review group following PCEK review; endorsed by Board on 16 February 1988

Dear Editor,

While much has been discussed about the corporate logo, little has been said of those funny little letters lurking underneath.

After being sentenced to spend three days at the Dubbo site of the 'Travelling Bicentennial Exhibition' babysitting the corporate display, it became obvious that the meaning of those funny little letters was unknown to every person that ventured forth to find out what we were all about.

Displays and a gee-whiz multiscreen audiovisual expounded forth; but not the meaning of those funny little letters.

No matter how I try, I cannot get them to spell 'Research Advancing Australia'.

Now we have the guide to the Organisation. A very well put together little booklet that succinctly explains what we are trying to do, funding permitting. However, there again I cannot find any indication of the meaning of those funny little letters that stand for our corporate identity (along with the never-to-be-discussed-again logo).

Would somebody tell me if I am incorrect in assuming that they still represent an acronym for the 'Commonwealth Scientific and Industrial Research Organisation'?

Ben Longden
Astronomy Education and Visitors Centre
Parkes

Sending letters to* Co-Research *is one way of getting your voice heard, both within the Organisation and outside. If you have something to say – about science funding, the reorganisation, research matters, criticism, praise or observations – in fact anything of interest, write to the Editor, Liz Tynan, at the address on the back page.

Consultative Council October meeting

The CSIRO Consultative Council is the central forum for consultation between management and staff of the Organisation and normally meets twice a year, in April and October. It comprises 16 members: eight from senior management and eight from staff associations. The Council is chaired by CSIRO Chief Executive Dr Keith Boardman, and the Deputy Chairperson is Miss Carole Popham of the CSIRO Technical Association.

The CSIRO Consultative Council held its most recent meeting in Canberra on 26-27 October. As part of the meeting program, a visit to the Division of Forestry and Forest Product's Laboratory was conducted and lunch was provided to enable representatives of Canberra staff to meet Council members and discuss issues of concern.

The Council's primary function is to consider matters of interest to, or affecting, staff of the Organisation, and to report to the Board. Among the issues discussed at the latest meeting were: the need to improve internal communication; the development of an Industrial Participation Plan; a review of the Council's operations; the CSIRO budget; and means of developing and co-ordinating efforts to promote CSIRO and science.

Ongoing issues such as EEO, staff development and training, occupational health and safety and personnel policy and conditions were also considered.

In discussing the CSIRO budget, Council expressed concern at the resource cutbacks in the Organisation and the continuing decline of Australian R&D funding in general. A concerted effort to redress the balance was recommended.

Through a number of motions passed at the meeting, Council called on the Government to review its attitudes towards science and technology and to recognise the role science and technology has to play in Australia's economic and social progress. It also called on Senator Button to address staff and the Council on prospects for CSIRO.

The motions were given good coverage in the press, and were seen to signal a new accord between management and staff in the Organisation.

Members of Council discussed the need to improve communication throughout the Organisation. This was seen to be particularly important because of the recent major restructuring and the challenges of the future.

Council has referred its concerns to the Communication Working Group and asked for a report on the development of a communication plan for CSIRO with particular emphasis on improving internal communication.

Another Council initiative was the development of a plan aiming to provide for greater participation of staff in decisions affecting their work. A statement jointly prepared by the CSIRO Board and the Council has been released in this issue of *CoResearch* reaffirming the Organisation's commitment to the involvement of staff in the decision making process and acknowledging the important contribution made by CSIRO staff.

The development of the Industrial Participation Plan and the release of this statement reflect a co-operative and consultative approach adopted within CSIRO.

Council also has been responsible for the introduction of work based childcare in CSIRO. Construction of a childcare centre at North Ryde is due to start soon, and centres at a number of other sites are planned for the future.

A corporate strategy for employee development also has been developed with assistance from Council members.

A review of Council's operations recently was completed and a number of changes have been proposed aimed at making it a more effective and responsive mechanism.

The review reinforced the important role of Council in the consultative and decision making processes of CSIRO. It was seen as providing a necessary link between management and staff and had contributed to improved working conditions and an enhanced industrial relations climate in the Organisation.

It is hoped it will continue to meet the needs of CSIRO's management, staff and staff associations.

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The more things change ...

Right, this clipping from **CoResearch** *No.3, June 1959, gives a glowing account of highly successful open days at Black Mountain. That tradition has certainly persisted, but one sharp eyed staff member happened to notice that the report gave details of Wildlife's display (second column of the 1959 story) which link it to this year's open days. Coincidentally, this year the Division of Wildlife and Ecology mounted a display of a 1950s bush camp as it must have been demonstrated at those far off open days, 29 years ago.*

...00 VISITORS TO BLACK MOUNTAIN

SO MANY people came to the first Open Days at the Canberra Laboratories at Black Mountain on 6th and 7th May that the exhibition was put on again on Saturday, 9th May.

MEMBERS of Parliament turned up in such force that the Whips were forced to allot different times to Members to maintain a quorum in the House.

The Open Days coincided with the opening of the new headquarters building of the Australian Academy of Science on 7th May.

The public was invited to inspect the Laboratories on 6th May, school children on the morning of 7th May, and V.I.P.'s on the afternoon of 7th May.

Important visitors included Fellows of the Australian Academy of Science, members of the Diplomatic Corps, and the Heads of Government Departments.

Among the 70 exhibits was the prototype of a phytotron cabinet described as a "Machine for making tailor-made climates".

The Wildlife display drew large crowds. Children stared, fascinated at hairless mice and rabbits.

Visitors were able to walk through a mock camp like ones which serve as bases for C.S.I.R.O. research teams on long and lonely survey trips.

In the canvas laboratory, visitors saw botanical specimens being pressed, soil samples for analysis, and bundles of aerial photographs.

Although under canvas, and walking on an earth floor, the teams have washing machines, medical supplies, two-way radio, and electric light.

Next month this equipment will leave Canberra for the outback, where some 40,000 sq. miles of country in the West Kimberleys will be surveyed.

The Plant Growth exhibit included a series of diagrams showing all stages in the development of the wheat plant. It excited comment for its imaginative display technique.

Technical Assistant, Mrs. O. Kuusik, helps Susan Ballard to study a specimen under a microscope at the Chemistry of Wool exhibit. Mrs. Ballard and son, Barry, look on.

From left: Mr. C. S. Christian (Chief, Division of Land Research and Regional Survey), Mr. R. G. Casey (Minister in Charge of C.S.I.R.O.), and Dr. F. W. G. White (Deputy Chairman) at the Regional Survey exhibit.

Fire

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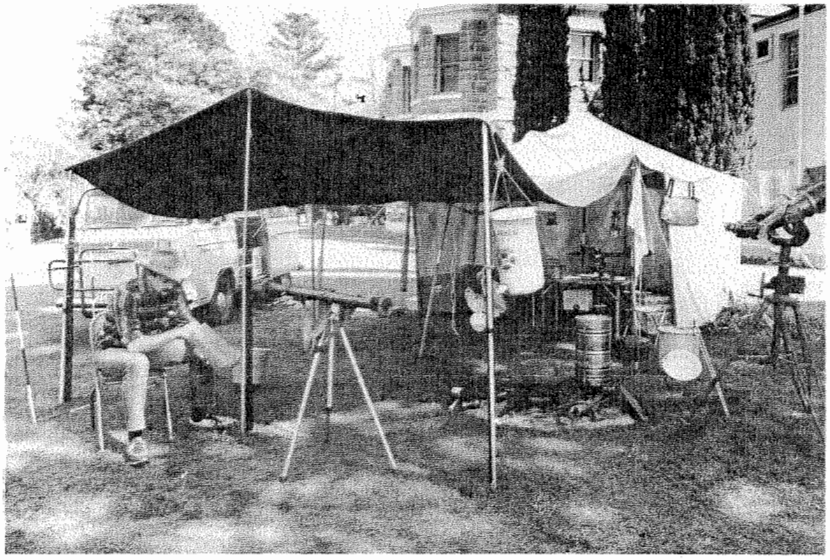

Left, the 1988 Wildlife and Ecology display. Greg Richards contemplating the anticipated reaction to the 1950s bush camp constructed as part of the Gungahlin open days in September. The camp created much interest and was used as a focal point for short talks by staff about aspects of the Division's past and present work.

Photo: Graeme Chapman

As promised in the previous issue of CoResearch, here are some more photos from the open days in Canberra

NB. Open days have also been held at North Ryde, during November. A pictorial account of these will appear in the next issue.

Dr Richard Milner from the Division of Entomology with the Chinese Ambassador Mr Zhang Zai. Above, well known CSIRO retiree Mr Ken Prowse takes time out for a chat during his visit to the open day at Ento. Right, Tom Greaves may be retired but he still takes an avid interest in what his old Division, Entomology, is doing.

Photos: Allan Edward

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Retirement of Paul Brown leaves big gap at Plant Industry

The Division of Plant Industry lost its most personable figure – what there is of it – when Paul Brown retired on 21 October after 40 years of service to the Organisation.

Paul's charisma affected staff at all levels – even various encumbent Chiefs were concerned as to what fate might befall them at the hands and discretion of Paul's 'wiles' and deception.

Staff at the Division remember 'Brownie' in two distinct areas. His dedicated approach and incisive mind had a major impact on morale. The Chief could rest assured after PDB had attended to issues of staff relations, productivity and management. On Paul's retirement a prominent Chief stated:

'We ... salute him as a true gentleman, whose sharp intelligence and deep insight into flawed humanity never deflected him from being the kindest and most helpful person we know'.

This statement of fact truly reflects the sorts of things Paul did for others. For instance, there was his great contribution to the policies and operations of the CSIRO Benevolent Fund.

Paul's ability to resolve complex human issues did not distract him from generating humour among staff. A litany of anecdotes was the highlight of his 60th birthday, a surprise party which attracted the participation of the entire division recently. He suffered, protesting, when examples of his notoriety were recounted for the amusement of the gathering.

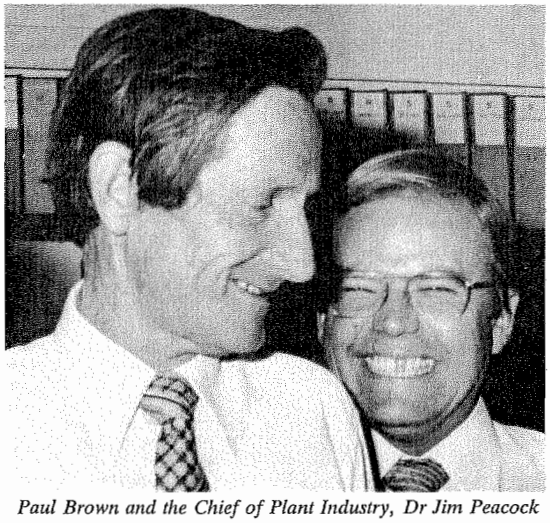
Paul's work chronology can be summarised by beginning with his appointment to CSIR on 24 February 1948 where he worked in the Canberra Central Administration Unit until 1960 (during which he had a short departure from the Organisation). In Central Administration, Paul worked in accounts, purchasing and salaries and established a reputation which saw comments such as the following appearing on his PH file:

'I should like you to know that Mr Brown is doing a very good job and is becoming increasingly effective in assisting the Divisional Administrative Office to meet overall administrative needs'.

From the early 1960s Paul was Senior Clerk for the Division, a position he held until a restructuring saw him become the Divisional Administrative Officer in 1973 before progressing to the position of Divisional Secretary in 1982. His experience in these positions was frequently called upon by other divisions and units throughout the Organisation, particularly in Canberra, where he earned the respect of his peers at all levels.

Paul's love of sport was well known in the Division – he was consulted frequently on sports administration following his successful management of the Manuka Football Club where he was one of its most successful players. He reached representative levels in his Aussie Rules career as a Manuka player, as well as winning a number of premierships in the 1950s. It was heard recently from one of his peers that it was unfortunate he has not been crowned with similar success in his horse racing enterprises.

The Division of Plant Industry, and indeed CSIRO, will remember Paul as one of the true greats to emerge from CSIRO administration ranks, as well as a wonderful humanitarian. From his colleagues throughout CSIRO, we wish him a healthy and happy retirement full of all the good things in life.



Paul Brown and the Chief of Plant Industry, Dr Jim Peacock

Bunny says goodbye to Wildlife Division

Current and former staff of CSIRO, ANU, colleagues from State Departments and friends gathered at Gungahlin for a barbeque lunch on 11 November to formally farewell Bunny Fennessy on his retirement after almost 39 years' service with CSIRO.

Bunny graduated with a BAgrSc in 1946 from the University of Melbourne where the School of Agriculture was greatly influenced by its then Dean, Sir Samuel Wadham , who took pains to ensure his graduates not only gained a sound professional training but acquired the skills to impart their knowledge. Such a skill was soon recognised as one of Bunny's many virtues. Before many of today's communicators had seen their first VDU, Bunny was already noted for his ability to disseminate the results of research into a very practical approach to vertebrate pest control, with the aid of simple props – usually an oversized clipboard, butchers' paper and a felt pen.

After involvement with a survey of the sheep industry in western Victoria, Bunny left the University to join the infant Wildlife Survey Section in the early 1950s as one of the first appointees from outside CSIRO to that small group. Initially based in Melbourne, he was involved in post war attempts to establish the disease myxomatosis in rabbit populations centred on the Murray River Valley and subsequently joined Ken Myers in the establishment of a permanent field station in Albury. There he was responsible for field studies of the performance of myxomatosis and investigations into the planning and techniques of rabbit control.

Subsequently he was based in Armidale where he was associated with the late Ted Waterhouse, whose interest was the vectors of myxomatosis and also John Bromell who undertook initial studies of the dingo problem. Bunny himself participated in intensive surveys of rabbits and rabbit control during this period. In particular, he developed effective liaison with people, both landholders and departmental staff, who worked with rabbits. It was his undoubted competence in this area that was responsible for developing his high standing within the rural community.

By the time Bunny moved to Canberra in the early 1960s, his responsibilities for the Section's vermin studies had increased, with a consequent expansion of his liaison role. His value was recognised by State vertebrate pest control agencies, leading to his cooption as a member of Vermin Control Advisory Committees set up in most cases in response to newly proclaimed Vermin Acts. As one person common to these State Committees, Bunny provided a profound influence on unifying and updating their approach to rabbit control strategies, and the application of current research findings to control measures.

His influence spread through his subsequent participation on the Vertebrate Pest Committee of the Standing Committee on Agriculture, while his influence was no less profound through his association with fauna agencies and his input to the organisation of national conferences associated with both the management of native fauna and the control of vertebrate pests.

Formal recognition of Bunny's services to his profession and to the rural and pastoral industries in particular, was made with his election as a Fellow of the Australian Institute of Agricultural Science in 1977 and the award of the Order of Australia Medal in 1982.

Within the Division, Bunny was always ready to assist his colleagues with sound counsel. He was been involved with the supervision of scientific publications, reading panels, annual reports and the operations of CSIRO Wildlife Research, the forerunner of Australian Wildlife Research. There can be no argument that he dealt with more enquiries by telephone and mail than any of his colleagues and here again his breadth of knowledge enabled him to satisfy many an enquirer.

Outside the Division, his activities are perhaps less well known. He has always been active in the affairs of his church and has provided support to many individuals in the community. For example, over the past 10 years, Bunny has become a respected narrator, covering a wide variety of subjects for 'Hear-a-Book', a scheme to provide tape recordings of books for people suffering physical impairments limiting their reading ability. He has been honoured as one of the few narrators to achieve a total of 500 cassettes – a remarkable feat recorded in his spare time, if it is realised that a novel of average length may require five or six 90 minute tapes.

With his retirement, the Division will suffer the loss of a prominent and respected member of staff. We wish him well for a long and fruitful retirement.

Bill Poole

Fennessy

The way they were: four early members of the Wildlife Survey Section associated with rabbit studies. The photo was taken in 1963 by E Slater. From left, (the late) Francis Ratcliffe who was OIC of the Section from 1949-61, Bunny Fennessy, John Calaby who is now retired but continues his work as an Honorary Research Fellow, and Roman Mykytowycz who is retired.

New DMS Chief

Dr Ron Sandland has been appointed Chief of the Division of Mathematics and Statistics, following the departure of former Chief Dr Peter Diggle in July.

Dr Sandland has been with the Division since 1969, and his research contribution has included the application of statistical techniques to problems in marine biology and the development of diagnostic tools for the mining industry.

Maths and Stats has recently undergone one of the greatest upheavals of all CSIRO divisions, effectively losing about one third of its staff (many of whom have been assigned to other divisions), and gaining a new research direction with emphasis on work aimed at Australia's information, communications and services sectors.

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

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