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DESIGN AWARD FOR `SILENT AUSTRALIAN'

A room air conditioner in which CSIRO ideas have enabled substantial noise reduction has won a Certificate of Merit in the Prince Philip Prize for Australian Design for 1971 presented by the Industrial Design Council of Australia.

The air conditioner, marketed by the manufacturers, Kelvinator Australia Limited, as 'the silent Australian', was awarded first place in Category IV which covers building systems and components.

With the general increase in the use of air conditioning, the single unit one-room air conditioner is becoming more widely used because of its relatively low initial cost, but its sales have previously been inhibited in many cases by excessive noise.

noise. Kelvinator approached the CSIRO Division of Mechanical Engineering and sponsored research aimed at producing a room air conditioner with a lower noise level. Under Mr D. Pescod, experiments were carried out to identify the sources of noise in conventional air conditioners and to investigate means of eliminating the noise or at least containing the noise or at least containing the indice in a room under normal circumstances.

A close study of earlier units enabled most of the sources of sound to be identified. Components were redesigned and constructed and their performances were checked on test rigs. Sound-absorbing material was then added and tested and, based upon the final arrangements, completely new units were constructed and comprehensive measurements were made of noises and thermodynamic qualities. The suggested design alterations were then incorporated into the design of the new room air conditioner by Kelvinator Australia Limited. The new design promotes laminar flow which, apart from giving a marked reduction in noise level, significantly increases air flows and reduces fan motor wattage. The laminar flow of the air

leaving the outlet grilles also promotes a greater penetration of the air stream into the conditioned space.

The competition for the Prince Philip Prize is conducted each year to encourage products likely to make a substantial economic contribution to Australia's industrial advance.

Commenting on the Kelvinator product, the judges said: "The company, in conjunction with CSIRO, has succeeded in producing a room air conditioner having a noise level significantly lower than that of similar products.

"This has been achieved mainly by re-designing the aerodynamic characteristics of the unit so as to promote lami-

nar flow, thus greatly reducing the forced vortices in the air stream which are the main source of noise.

"The achievement of laminar flow has not only reduced the noise but has increased air flows. "Noise has been further

reduced by lining the air passages with sound-absorbing materials.

"The manufacturers are to be congratulated on converting the research findings into practical reality so that the final product is economically viable."

The "old lab", as this building is affectionately known, has probably had a longer association with CSIRO and its predecessors than any other building in the Organization. It was built in 1919 for the Mildura and District Research Committee at their Research Station at Merbein, Victoria. The work at Merbein received financial assistance from the Advisory Council of Science and Industry for several years. Then, in 1927, the newly-formed CSIR assumed control of the Merbein Station. The "old lab" is now used as a general storeroom by the Division of Horticultural Research.

Aboriginal Pre-schoolers Assisted

The CSIRO Aboriginal Scholarship Fund has decided to contribute \$2,000 to a new pre-school centre for aboriginal children.

At the Annual General Meeting of the Fund, it was decided to clauge the emphasis, for the present, from primary and secondary school children to those of pre-school age.

Various agencies involved in this field were investigated and it was decided to assist the N.S.W. Division of the Save the Children Fund which has already set up ten pre-school centres for aboriginal children in various country towns throughout rural New South Wales. The location for the next centre will probably be Collarenebri.

The CSIRO Aboriginal Scholarship Fund has been in existence since 1967 and during this period has supported six scholarships. A grant of \$1,000 which was sont to the Aboriginal Education Council (N.S.W.), Incentive Scholarship Scheme in 1970 has assisted four primary and secondary school children with fully paid up scholarships extending from one to three years depending on the age of the child.

In the August/September school holidays, 85 aboriginal children were taken by charter buses to the Warragamba Lion Park. The children, from country areas all over New South Wales had been brought to the Lane Cove National Fitness Camp by the Students Camp Movement.

The secretary of the CSIRO Aboriginal Scholarship Fund, Miss Eve Ahearn of the Division of Animal Genetics, says that, in view of the success of the outing, an annual grant of \$100 will be given to the Student Camp Movement for similar events. People interested in contributing should contact Miss Ahearn direct.



Ceremonial Court Identified

One of the most remarkable soil structures built by Aborigines for ceremonial purposes anywhere in Australia has been identified near Brisbane by Mr W. Arndt of the Division of Soils.

Mr Arndt who has investigated aboriginal relics in the Northern Territory as a hobby for many years was shown the site by the land owner, Mr Noel Beckey of Laidley.

The ceremonial ground which is very well preserved consists of 21 mounds of soil covering one acre of land. The mounds which are circular, curved, triangular and rectangular in shape average 14 feet in width and 12 inches in height. The straight mounds which are up to 130 feet long have a combined length of 1100 feet and contain an estimated 300 tons of soil.

The mounds are separated by 2000 feet of channels, about 4 feet wide, which all join and enter a dry creek bed. Near the end of the channels there is a large hole 18 feet long, 12 feet wide and 2 feet deep, which is filled with the run off water from as little as one inch of storm rain.

The ceremonial ground is too large to cover by photograph from ground level but it shows up quite clearly on enlargements of air photos taken from a height of 3 miles! Mr Arndt has spent many weekends measuring and

Mr Arndt has spent many weekends measuring and examining the area and searching for information in libraries and elsewhere. He has produced accurate plans and a graphic three-dimensional model.

The large size and complex design of this ground distinguish it from any other in Australia and certainly from the simple Bora rings which are very common all along the east coast of Australia.

The latter were used for initiation purposes, but there are practically no clues to other uses for other types of grounds in eastern Australia.

A search of old records by Mr Arndt showed that the ceremonial ground is located at a point where the boundaries of 6 tribes meet in the Lockyer Valley. Their combined territories covered 20,000 square miles extending as far afield as Southport, Rathdowney, Stanthorpe, Millmerran, Dalby, Nanango and Sandgate.

The six tribes were allies known collectively as the Birin People. Since the ceremonial ground is located at their logical meeting place Mr Arndt has called it Birin Place.

The Birin People opposed the squatters in 1840 with an

army of 1200 warriors and many Europeans were killed. A corps of soldiers was then stationed in the Valley and official reports say they 'thoroughly subdued that quarter' within 2-3 years.

By 1845 the first main road between Drayton (Toowoomba) on the Darling Downs and the Moreton Bay settlement (Brisbane) was established and Royal Mail coaches passed regularly within 300 yards of Birin Place. By 1865 tribal life was entirely disrupted and the local king was working as a charcoal burner for the blacksmith at Gatton.

Mr Arndt argues that the Aborigines who were being hunted would not have congregated on the main road to build a ceremonial ground after 1840. He suggests it was in use before then and has been abandoned for 130 years.

There are practically no clues in eastern Australia to account for the type of ceremonies that may have been conducted on such an unusual ceremonial ground by allied tribes 130 years ago.

However, Mr Arndt suggests that fairly recent studies of law and order or judicial ceremonies by Professor Elkin in South Australia and Professor Berndt in Northern Australia provide the best guide.

They found that ceremonies designed to settle disputes and maintain law and order were a very important part of Aboriginal culture.

These ceremonies often involved complex arrangements of ceremonial mounds and the use of water to 'wash away' the troubles. Earth pits, very similar to the one in Birin Place, represented sacred water holes for this purpose.

holes for this purpose. When disputes arose the elders gathered the people for special ceremonies which were concluded by placing the litigants in the pit and pouring water over them. Birin Place is designed to provide an artificial waterhole after each rain storm that could accommodate 20 men.

modate 20 men. Mr Arndt suggests that Birin Place was the central forum for thousands of allied tribes people who were bound to have inter-tribal disputes which had to be settled to maintain the alliance. He believes that this meant large gatherings and ceremonial washing.

Although the ground itself is very well preserved, it is threatened by very serious gully erosion less than 30 feet from its border.

The site has been reported to the proper authorities and now comes under the jurisdiction of The Aboriginal Relics Preservation Act of 1967.

A 'SMITHY' FLIES AGAIN !



Mrs Shirley Smith, a clerical assistant with the Division of Atmospheric Physics, won the Oaks Air Race last November piloting a Piper Cherokee 140. The Oaks Air Race is an annual event conducted by the Royal Victorian Aero Club for Women Pilots.

New Appointees

Mrs Judith Ruello has joined the Division of Food Research to work on the biochemistry, chemistry and processing of prawns. Mrs Ruello graduated M.Sc. from the University of Sydney in 1969 and at the time of her appointment was Assis-tant Education Officer at the Australian Museum Australian Museum.

Dr D. E. Smiles has been appointed to the Division of Environmental Mechanics to conduct experimental and theoretical research into the



Dr SMILES

basic physics of water move-ment and solute transfer pro-cesses in saturated and un-saturated porous media and soils. Dr Smiles graduated B.Sc.Agr. with honours from the University of Sydney in 1958 and Ph.D. from the same university in 1962. From 1962 to 1963 he was a research associate with the British Agri-cultural Research Council Unit of Soil Physics at Cambridge. He has been with the Univer-sity of Sydney since 1964 and at the time of his appointment was Senior Lecturer in Soil Science.

Dr A. P. Raiche has joined the Mineral Physics Section to work on the theoretical model-ling of the physical properties of buried ore bodies. Dr Raiche graduated B.Sc. from the Car-negie Institute of Technology in 1963, and obtained his Ph.D. from the Catholic University of America in 1970. Between 1966 and 1970 Dr Raiche worked with T.R.W. Systems Inc. and since March this year has been Senior Operations Research Analyst with Caltex Oil.

Mr D. R. Burton has joined the Division of Mechanical Engineering to work in the field of air conditioning research and development. Mr Burton obtained a Diploma in Technology in Aeronautical

Engineering which was later converted to a B.Sc. (Eng.) by the Council for National Academic Awards. His career to date has involved human engineering studies both at the Royal Aircraft Establishment, Farnborough, and during pre-vious employment in the Division vious e Division.

Mr E. W. Holroyd has been appointed to the Cloud Physics Section of the Division of Atmospheric Physics where he will be involved with the plan-ning, conduct and assessment of cloud seeding experiments. Since graduating B.Sc. from the University of Rochester in 1966, Mr Holroyd has been studying for his Ph.D. at the State University of New York.

Miss Wendy Parsons has been appointed Press Informa-tion Officer at Head Office, After graduating B.A. from Monash University, Miss Par-sons became a teacher. Before



Miss PARSONS

joining CSIRO she spent two years travelling and teaching in Canada, the United States, Britain and Europe. Miss Par-sons will work in Communica-tion Services, supplying inform-ation about CSIRO to the general public and assisting the Press.

Mrs Irja Sofield has been appointed to the Division of Plant Industry to study en-vironmental control of flower-ing in wheat. Mrs Sofield graduated B.Sc. from the University of New South Wales in 1969 and for the last twelve months has been working in the Department of Botany at the Australian National Uni-versity. versity.

Dr M. A. G. Willson has been appointed to the Division of Atmospheric Physics to undertake studies in general circulation at the Common-wealth Meteorological Research Centre. Dr Willson graduated B.Sc. from the University of

SAFETY NOTES

Back to Normal

Following the loss of Lyn Thompson to another section, the Safety Group has been operating at half strength for some 14 months.

This, together with the embargo on travel and other restrictions earlier this year, resulted in the cancellation of planned visits to Divisions.

A second safety officer, Mr G. C. Barnes, has now been appointed and Divisions can again look forward (?) to regular visits.

Mr G. C. Barnes, better known as Gil, is an electro-mechanical engineer and a Member of the Institution of Engineers, Australia.

Gil spent 10 years in the U.K. with the Atomic Energy Authority at the Harwell and Culham Laboratories.

After seeing the light, and coming to Australia in 1965, he has lived in Canberra and worked with the Patents Office and later with Interior.

Gil, I am sure, can look forward to the same co-operation and friendship which I have always enjoyed in my dealings with members of staff.

J. W. Hallam, Safety Officer.



Susan Moore is one of a team at the Long Pocket Laboratories of the Division of Animal Health, who are devising a laboratory model to help with work on tick resistance. It would certainly be a crusty old tick that could resist the charms of this laboratory model.

Cambridge in 1967 and Ph.D. from the same university in 1971.

Dr J. L. Black has been ap-pointed to the Division of Animal Physiology to work on the growth and nutrition of lambs. Dr Black graduated lambs, Dr Black graduated B.Agr.Sc. from the University



of Melbourne in 1964 and Ph.D. from the same university in 1971. For the past twelve months he has been working at the National Institute for Research in Dairying at Shin-field, Britain, where he held a CSIRO post-doctoral student-shin ship.

Monour

Mr H. J. Lee of the Division of Nutritional Biochemistry has been made a Fellow of the Australian Society of Animal Production.

Earning a world-wide reputa-tion for his published work on the importance of trace elements in livestock nutrition, Mr Lee has made a significant contribution to the understand-ing of phosphate requirements of grazing sheep, vitamin B₁₂ metabolism, liver and blood abnormalities and the syndrome associated with phalaris stag-gers in sheep. gers in sheep.

Throughout his research career he has constantly been aware of the importance of ensuring the application of his results to the grazing industry.

Mr Lee is leader of the Trace Elements section of the Division of Nutritional Chemistry and the supervisor of the Division's Glenthorne Field Station at O'Halloran Hill, South Australia.

Currently, he is a member of the Organizing Committee for III World Conference on Animal Production to be held in Melbourne in 1973.

Visitor

Professor J. H. Connell, Professor of Zoology, Department of Biological Sciences, University of California, is spending his subbatical leave working with Dr L. J. Webb and Mr J. G. Tracey of the Rain Forest Ecology Section of the Division of Plant Industry.

Professor Connell first began this collaborative work on his last sabbatical leave in 1963. It involves studying the popu-lation dynamics of rain forests at two localities in Queensland.

The research is aimed, among other things, at understanding the mechanisms which enable between one and two hundred species of trees to coexist in Queensland's tropical rain forcets forests.

Aid to Bengal

The Community Aid Abroad group at the National Stan-dards Laboratory has raised more than \$550 in support of an Oxfam project in West Bengal.

ARID ZONE SYMPOSIUM

A symposium on animal pro-duction in the Australian arid zone was held at Deniliquin last October at the Riverina Laboratory of the Rangelands Research Unit.

Research Unit. Fifty delegates from univer-sities, State Departments of Agriculture, CSIRO Divisions, and other bodies engaged in animal production studies in the arid zone attended. The symposium dealt mainly with animal production and the physiology of animals in arid environments, and with the influence of grazing on arid vegetation.

vegetation.

Particular attention was given to the possible introduction of carpet wool and hair-growing sheep into the arid country, and to the future use of traditional sheep grazing lands by cattle and goats, as well as by sheep.

Deadline

Copy for the February issue of Coresearch should reach the Editor at P.O. Box 225, Dick-son, A.C.T. 2602, by Friday, 14th January.

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"Haven't they anything else they can be getting on with?" Courtesy "New Scientist".

ORESEARCH FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF NUMBER 155, FEBRUARY

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LABORATORY NATIONAL STANDARDS

Tenders are expected to be called in the next few months for a new laboratory complex to house the Divisions of Physics and Applied Physics which together constitute the National Standards Laboratory.

Work began on the 73 acre site at Bradfield Park, 7 miles north-west of Sydney, about the middle of last year and is now well advanced.

The site is one mile north of the group of CSIRO Divisions located at North Ryde.

The complex of buildings will be served by a system of in-ternal roads, car parks and services and the site will be ex-

Below. This model shows how the proposed National Stand-ards Laboratory will look when viewed from the north-west.

tensively landscaped to preserve the character of the surround-ing residential areas and ing residentia National Park.

The total gross area of the proposed National Standards Laboratory is 435,000 square feet and includes 120,000 square teet and includes 120,000 square feet of general purpose labora-tories, 70,000 square feet of research offices and adminis-trative support facilities and 35,000 square feet of ancillary laboratory services including workshops and storage rooms.

As much of the laboratory space as possible has been designed as general purpose laboratories to allow maximum flexibility in future years.

Among provided the new facilities is a dead-load which has been machine, whi ordered and manufactured. and a new high-voltage labora-tory which will permit new work to be undertaken.

A geodetic tape tunnel has been provided under one building and an optical tunnel under the other. under the other. In general, the laboratories are located internally in the building and the offices which are comfort air-conditioned are on the perimeter, thus pro-viding a thermal shield to the laboratories.

Various special areas are provided, such as a lecture theatre to seat 200, a foyer of appropriate size containing a display area, and a cafeteria

with lig facilities. light food preparation

Tacilities. The theatre, foyer and cafe-teria can be isolated so that these facilities may be used without entering the main building. One aim in this de-velopment is to provide facili-ties for conducting short train-ing courses for people from industry. ing cour-industry.

The two-floor development of the building has resulted primarily from performance re-quirements. Activities requir-ing minimum vibration are to be placed on a slab on the ground which is structurally isolated from the rest of the building. building.

Activities which are less sensitive to vibration are to be placed on the first floor.

The two-floor design leads to a simple form of construc-tion with brick load-bearing walls and a concrete floor slab resting on the walls.

One difficulty associated with the site, a powerful television signal, will be overcome by coarse screening the buildings with chicken wire in the cavity walls and by the use

of a particular type of glass for the windows. The general internal labora-tory finish is painted brick-work with no false ceilings and with exposed services. Spacial areas such as Chiefe'

Special areas, such as Chiefs' offices, lecture theatre and library are to have special finishes,

The external appearance will be one of simple, massed brick-work. There will be a window in each 12 foot module.

The building has been de-signed by the Commonwealth Department of Works and ex-pected cost of the project is in the order of \$17 million.

Key to aerial perspective of proposed National Standards Laboratory as viewed from the north-east.





DIRECTOR OF RESEARCH

I know more about metal fatigue than anyone — even the Russians. I can look at an X-ray picture of a piece of fractured metal and tell you why it broke, or a picture of a weakened piece and know it's about to break. Whenever there's an important airplane crash, the company who built the plane hires me to prove it wasn't their fault. I won't fly, so it takes a long while, sometimes, to get to the spot. get after them about that, they scream that they're pure scien-tists. Let me tell you, Dr Fairley, pure science' is a virtue—one of the seven deadly virtues. How can any-body be against virtue?' Liked bis stute.

Last week, for instance, I had to go all the way from Cambridge, Massachusetts, to Portland, Oregon. The trains in the East were dirty (and full of metal fatigue), but from Chicago on they were great.

At dusk the first night, I climbed up into what they call a Vista-Dome — a glass blister on top of a railroad car — and looked around.

I was peering down a canyon of hairy trees into a skinny river when the man in the seat in front said, 'Beautiful — just beautiful!'

I nodded.

'God's country!' he said. Now, these 'God's country' guys are bad news on a train trip, so I nodded again and ran for the club car.

ran for the club car. I had a drink there, and be-gan looking through the Metal Fatigue Newsletter. (This metal-fatigue business is a big deal. A while back, some metal-fatigue men got together and formed a society. Now they have a regular monthly magazine. I was the first man to get a Ph.D. in metal fatigue, so damned if they didn't make me an editor.) Well pert thing I know, who

me an editor.) Well, next thing I know, who comes up the alley but old God's Country. There was an empty seat next to me, and I figured I was trapped. I hunched down and lifted my Newsletter, but, sure enough, he plumped right down beside me. I lowered the magazine to my lap and waited.

Nothing happened. The steward came by, and God's Country asked for a Martini, smiled at me, and began to read.

What was he reading? The Metal Fatigue Newsletter? I couldn't believe it.

I figured I must know him — must have run into him at con-ventions. He was about sixty — thin; bony hands; lots of hair, some of it gray.

He was in good shape, though. He had a clear skin, with none of those liver patches, and he began to give me the feeling that he was wise. The more I looked at him, the more I liked him. His dipk some he and

him, the more I liked him. His drink came, he and I smiled at each other again, then he went back to his Metal Fatigue Newsletter. Well, I'm one of the editors, for God's sake, and I knew it couldn't be that interesting, so I leaned over to get a peek at what article he was on.

It was an editorial I'd written It was an editorial 1'd written about how important metal fatigue is for the survival of the American Way of life. I don't remember what got into me to write the darn thing.

Seeing it being read by this man made me a little dis-gusted. I decided to go to the diner.

As I got up, I dropped my Newsletter. The man picked it up and gave it to me. He saw what it was, but he didn't say anything — just held up his own copy to show camaraderie. I made for the diner and ordered another drink. The car was full except for one seat at my table.

In a moment, the metal-fatigue man was in it facing

me, the magazine open in front of him. He said, 'Want to hear something funny? Good for digestion'.

digestion". And he began to read out loud: ""Metal fatigue may seem remote from the survival of our American Way of Life, but where would we be if our trains fell apart, our autos shattered, our plumbing disin-tegrated? Where would we be if research had not shown us the way?" Shall I read some more? It's really a scream."

I said, 'Will it embarrass you if I tell you I wrote that?'

He didn't bat an eye. 'Not a bit, not a bit. It's the best digestive I've read in a year.' 'When I wrote, I meant it,' I said

This article by W. J. J. Gordon first appeared some years ago in 'New Yorker'.

T'm sure you did — sure you did,' he said. 'I see by the signature that you're Dr A. M. Fairley. I've watched your work for years. I have a sug-gestion for you. Work. Don't write.'

I said, 'Who are you, sir? How do you know me?' I don't know why I didn't get mad. 'I'm Hurlbet, of Inter-national.'

That was enough. Hurlbet, director of research for the greatest airplane-rocket-space-vehicle company in the world, was the most distinguished name in industrial research.

'I'm glad to know you, sir,' I said.

We ordered our dinners and another drink. Hurlbet took a long sip of his, then, 'Where did you do your graduate work, Dr Fairley?'

'M.I.T., sir.'

'Best trade school in the country,'he said. 'I went there myself.

No matter what he said, he didn't make me angry. 'What do you mean, sir?'

'I hear at M.I.T. now they make you learn to read and write. None of that high-falutin nonsense when I was there.' He paused and said, 'Research-Orama

I had no idea what he meant, so I kept quiet.

Twe got three hundred Ph.D.s in my central lab,' he said after a moment. 'You've seen pictures of the lab, I'm sure. Fifty acres, and twenty storeys high. Beautiful, just beautiful. You ought to see the toilets. Beautiful.

The waiter went by, and Hurlbet ordered another drink. So did I. Hurlbet went on, 'At nine o'clock in the morn-ing, a big bell rings on top of the research structure — that's the research structure — that's what the company calls it, the research structure. They call me the research director. I'm in charge of the whole goddam Research-Orama. That's what I call it.

I call it. "When the bell rings, my three hundred Ph.D.s march in, in lock step — hup-hup-hup-hup — right to their desks or benches, or whatever. Till five o'clock, you know what they do? They destroy possibilities. They prove that certain com-binations won't work. "They mele a his issue of not

'They make a big issue of not caring, either, and when you

'Oh, no, sir. If I understand you, the men you're complain-ing about destroy little chemical possibilities. They add a bit of this, exactly measured, to a bit of that, exactly measured, and if the mixture doesn't work, they put it down in their notebook as another possibility destroyed. Pasteur destroyed a cultural conviction. That's different!' I thought I'd been clear, even somewhat philosophical, for a metal-fatigue man. I was pleased with myself. Might make a good editorial in the Metal Fatigue Newsletter. Dr Hurlbet seemed to be looking at me with more respect.

'You're saying Pasteur was dealing with hypotheses, not particulars,' he said. 'Another thing — he cared. He believed that spontaneous generation was invalid, and he cared. He had to prove it wrong. My people don't care. If you want great research, you must have a consuming bias.'

a consuming bias.' Hurlbet knew he'd said some-thing that in science is hereti-cal. Bias! He looked over at me to see how'I was taking it. Apparently, what he saw satis-fied him. 'What else about Pasteur, Dr Fairley?' he asked. 'As a man, I mean.'

Now, I'm no philosopher or historian of science. For my money, Eddington and Jeans were great, but too far out. Not as far out as Whitehead, but too much for me.

That's the thing about M.I.T. That's the thing about MILLE. From the time you start as an undergraduate till you pick up your Ph.D., you're aiming at what you want to know. No extra philosophy and meta-physics. I went straight through and came out with the knowledge.

If you want to know how things are with a piece of metal, I'm your man, at three hundred and fifty dollars per diem, and no kidding. I'm the best best.

But I always thought Pas-teur was a hell of a guy. The whole bit—the beard, the rabies—just the way Paul Muni did it. In fact I was thinking of Paul Muni when I answered. I guess he was off his nut a little. You know— eccentric. He was no dresser. He loved a lot of things — kids, his wife. He was soft, but

tough when he had to be. He was who he was, that's all? Hurlbet's face took on a sly look. 'I wonder how Pasteur would have filled in one of our personnel questionnaires,' he said. 'I wonder if my deputies would have wanted to inter-view him after reading his qualifications.'

'Wouldn't it depend on what Wouldn't if depend on what kind of man you were looking for?' I said. 'What area of technology you needed?' 'Where would Pasteur have fitted, Dr Fairley?'

'If you needed a red-hot bio-chemist, you'd have signed him right up, wouldn't you?'

'That's what you think he would have called himself? A biochemist?' Hurlbet asked.

'What else?' I said.

'What else?' I said. 'I don't know.' He paused. 'I think I'll tell my deputies not to hire anyone who fills out his questionnaire too easily, too quickly. My people know exactly who they are — physi-cist, chemist, biologist. That means each of them has an image of himself to me, and by which he goes through life. 'Everyone talks about the

'Everyone talks about the 'Everyone talks about the gray-flannel-suited organization man. Well, the chorus of white lab coats is just the same. And that's the trouble. Those goddam lab coats are flags of virtuous objectivity and pure research, so the men never have to care. As people, I mean. I think I've got something here. 'The reason a may in a lab

The reason a man in a lab coat doesn't produce is, only half of him is working — the rational half. The other half is prohibited from entering with the result that all the work is possibility-destruction.'

I was beginning to feel like I was beginning to feel like a bartender listening to some guy's troubles, but this Hurlbet is a big man, and I wasn't about to interrupt his train of thought. Also, as I said be-fore, I liked his style. He wanted to do something. He was trying, and it made me feel good to be in on it.

At five o'clock, on the but-ton, these three hundred scien-tists line up and lock-step the hell out of there,' he said. Three hundred Ph.D.s. Ph.D.-Orama — Oh, thank you, waiter.



'Was Pasteur a great scientist? Yes,' I said. 'How did that happen?' Hurl-bet asked. 'Did Pasteur have a Research-Orama?'

cation.

Research-Orama?' I thought a moment. 'I think Pasteur was great because of his astounding dedication to proof,' I said. 'The elegant ex-periment. He nailed the theory of spontaneous generation like a bat to a barn wall, just with those stoppered bottles on the back road to Lyon. People had been arguing spontaneous generation for years, but Pasteur proved its impossi-bility.' bility.

'Now you've put Pasteur in the same league with my pos-sibility-destroyers, Dr Fairley,' Hurlbet said.

I liked his style. I mean, his style as a man. He wasn't whiny — he was no has-been. He just was goddam concerned. I said, 'Sir, there is a place for pure science, isn't there,'

He was mumbling. 'Objec-tivity. They're so virtuously Research - Orama - pure - and-objective that they don't care . . Excuse me, Dr Fairley, what did you say?'

'Isn't pure science necessary?' 'What is pure science, Dr Fairley?'

I knew what pure science was. I was on the fringe of it myself. 'Pure science is dis-covery about phenomena with no regard to commercial appli-

'Was Pasteur a pure scien-tist?'

'Sure, I guess so.'



'I sit here and solve mathematical problems, program electronic music, analyze architectural possibilities . . . but somehow being a Renaissance man isn't what it used to be.

Courtesy 'Saturday Review'.

Our drinks had come, and Hurlbet closed his eyes a moment as he took care of about half of his. 'I wonder what they tell their wives when they get home,' he went on. 'The wife asks, "And what did you do today, honey?" What the hell's the Ph.D. to say? "I destroyed sixty-eight possibili-ties, but I had an off day. When I'm really hot, I can destroy eighty and not even feel it." And his wife putters around him and finds his slippers and cooks him something special, so that tomorrow he can get back up to eighty again. Then there are gala days, when he so that tomorrow he can get back up to eighty again. Then there are gala days, when he rushes up the front steps, grabs his wife and hugs her, and tells her the great news. Today he destroyed one hundred possibilities! A new record! record!

Hurlbet wasn't bitter or any-Hurlbet wasn't bitter or any-thing — just talking mostly to himself but partly to me. If I hadn't been there, I don't think he would have tried to make it sound as funny as it did. 'I just got an idea,' he said. 'A breakthrough in how research personnel should be rewarded for their contributions. "We'll may 'are on a piece."

We'll pay 'em on a piece-work basis. Ten dollars for each possibility destroyed. How's that for efficiency in re-search? What could be fairer?'

I didn't want Hurlbet to think I didn't catch the irony. I chuckled and said that could have an effect on education,

He said, 'Of course. It would He said, Of course. It would revolutionize the whole system. Exams would be possibility-destruction races. It'd be a boon to teaching. Make things easier to mark.'

easier to mark." Over the past couple of years, Ive developed a conversational gambit that I toss in whenever I feel I'm being left behind. It doesn't matter in what con-text I pull this gambit; some-how it always puts me on top, or at least gives me a breath-ing spell while I try to figure what's really going on. It works like a charm. It always seems portinent, and I never am asked to explain its rele-vance. In my business, a gam-bit like this is priceless. I pulled it now. 'What about the Russians?' I asked.

Hurbet finished his Martini in a gulp. 'We've got Research-Orama and the Russians'il get the moon. Jesus Christ! Let

me tell you something else, Dr Fairley — we have creativity classes. No kidding. Once a week, a man from New York week, a man from New York comes out and tells us how to sit around and think up things. Brainstorming, he calls it. We've got Research-Orama, Ph.D.-Orama, and Create-We've got Ph.D.-Orama,

'This brainstorm fellow's a York City. He's got a little bell, like a silver dinner bell. In these creative meetings, as soon as someone gets an idea, he tells about it, like in a Quaker meeting.

Quaker meeting. "But when anyone asks a question or tries to analyze anything, the creative expert tingles his bell, because he won't allow what he calls negative thinking.' Hurlbet caught the steward's eye and waved towards his glass and mine. 'Did you ever read "The Hunting of the Snark," by Lewis Carroll?'

I shook my head.

There's a line in there that goes something like "And the Bellman angrily tingled his bell". That's what this creative fellow from New York does — tingles his bell. Jesus Christ?

He was rambling on at such a wonderful pace that it was risky to interrupt him, but I did. 'Why did you let him in?' I asked asked.

'Who? Let in who?'

"The man with the bell."

For a moment, I was afraid that he had cracked. He shut his eyes again, so tightly that his check muscles twitched and bulged. Then the muscles re-laxed and his eyes opened when the waiter brought our drinks.

drinks. 'Dr Fairley,' Hurlbet said, 'let me tell you about a big research operation. On top, there is the chief. That's me. I have three divisional heads — for pure research, for de-velopment, for engineering. Each division has about a dozen departments. The de-partments have sections, and the sections are made up of groups. groups. 'I can't keep track of all the

'I can't keep track of all the labs or the people. They wander around and try to find out what's going on. Each week, we have a meeting and they give their reports. A year ago, I suddenly saw that some-thing was wrong. We weren't

productive. I didn't know why, and I didn't know what to do. I just knew something was wrong.

'One of my deputies told me about this bell-tingler, so we sent for him. That's how it started. Now he's a fixture. Once a week, there's bell-Once a week, the tingling for all hands. there's

'You ough to see their Ph.D. faces shine. It makes me sick -1 don't mean a little sick--but I don't know what to do.' He looked at me. 'What would you do, Dr Fairley? You're a reigntiet' you do, Dr Fairley? scientist.'

scientist." While Hurlbet was talking, I had been thinking about how my job was a fake, and how I hated it and would quit, if I weren't getting rich. 'Sir,' I said, 'I'd fire all of them, then hire back the best ten and find a barn somewhere and get to work — that's what I'd do.' 'If I fired them what would

'If I fired them, what would happen to their families until they got another job?'

'Give them a year's wages,' I said.

'How do I know I've even got ten men worth saving?" Hurl-bet asked.

Don't you?' This talk about who should be saved gave me the creepy feeling that I was helping the Old Testament God decide on who, of all the evil ones on earth, was to be chosen to sur-vive catastrophe and start the human race off on the right foot.

The reason Tm a consultant —on my own, with no one to hire or fire or be responsible for — is that I hate to have to judge people. For all I knew, this Hurlbet would fire his whole division the minute he got back. I was getting uncom-fortable. Maybe he was some kind of nut. The reason I'm a consultant Hurlbet shut his eyes again.

I had ten a few years ago Where are they now?' I

asked. "They're my deputies, my divisional heads. You know what? They'd make a hell of a team—just those ten. Fire everyone else. The ten of us would be back together again."

Hurlbet's dinner came. He opened his eyes and waved it away. I was hungry, but when the waiter started to put down my plate I shook my head. I wanted Hurlbet to feel that I was with him.

His eyes were gleaming now. 'You know what we could do?' he said. 'We could go back to the old lab. It's small, but it'd be perfect for us — the ten of 118.

us.' He stood up, bumping the man seated behind him. The man gave him a dirty look, and Hurlbet apologized like a French courtier — only he apologized too long, made too much of it, insisted on wiping the man's shoulder as though he'd spilled soup on it. He kent on at this until the

he'd spilled soup on it. He kept on at this until the head steward came up. Then Hurlbet apologized to the head steward and began wiping off the steward's right lapel. That made a little scrum—head steward trying to get Hurlbet out of the way, waiters with trays lined up on either side of the scrum, unable to pass, and Hurlbet scraping away at the head steward's lapel.

I looked out of the window I looked out of the window. I would have run for it, but I couldn't have got by. Then I became disgusted with myself. I liked Hurlbet, and there I was, chickening out. In a pretty loud voice, I said, 'Where is your old lab?'

Hurlbet let go the lapel and slowly dropped back into his seat. The head steward smoothed himself and made his way toward the other end of the diner.

He had to stop as he went, because people wanted to know what had happened.

Hurlbet shut his eyes tight again and winced. Even before

he opened them, he said, 'Everybody's old lab is always a barn where everybody cared, and worked night and day, and they invented the electric light. And everybody's wife kept saying, ''Listen, you fool, come to bed or you'll catch your death''. No—our lab is a cement building, with good heat, about half a mile from the research structure. We use it for storage.' I leaned toward him. I felt

I leaned toward him. I felt sorry for him. 'Why don't you take your ten men and get go-ing? Tomorrow?'

For someone who didn't For someone who didn't want to get involved, I was really jumning in up to my neck. I almost didn't know what I was saying. 'Because they wouldn't come, that's why,' he said. 'How about five of them? Five would be a start.'

"There aren't five who come - or one. I know. who'd T built this Research-Orama. It was all my idea. I made the men. I was the one that said we needed better facilities and trained people.

"That goddam Research-Orama is a monument to me — toilets and all. I trained the people to need it.' He stood up again, carefully this time. "There's one thing I can do, though —I can fire that nice young man with his goddam tingling bell. Let him get a job in Russia.'

Hurlbet started out of the diner. As he approached the head steward, Hurlbet smiled and the man ducked, clutching his lapels. Hurlbet went right by him.

I felt like an idiot. I'd re-fused my dinner when it had come, and I was too em-barrassed to order again, so I just asked for the cheque and stuck my nose into the Metal Fatigue Newsletter.

SAFETY NOTES

Signs of Confusion?

Driving interstate? Before starting the journey you would be wise to make a quick check of how the traffic regulations vary from State to State.

Unfortunately the meanings of similar road signs and carriageway markings are not uniform throughout the Commonwealth. Also, some of the traffic rules which have become ingrained in your driving habits do not necessarily apply in all States.

Some of the most important variations you should be aware of are:

Speed limits

Speed limits for cars and light vehicles outside built up areas are as follows: N.

S.W.	 — 50 mph prima facie except where sign-
	posted. The prima facie limit can be
	exceeded but the onus is on the driver
	to prove he was not driving dangerously
	should an accident occur or if he is
	stopped by the police.
с.	-70 mph maximum for a trial period
	ending in December 1972.
đ.	- 60 mph maximum.
λ.	60 mph prima facie.
A.	65 mph maximum.

W AC.T. and N.T. - As signposted.

Lane lines

Vi

01 S./

The regulations covering the crossing of lane lines vary considerably. In N.S.W., W.A. and Queensland single unbroken lines should not be crossed except when turning. In Victoria, S.A. and Tasmania they can also be crossed to change lanes, whereas in the A.C.T. it is a breach of the law to cross or drive on a single unbroken lane line at any time. law to c any time.

In N.S.W. and W.A. double unbroken lines can be crossed to turn into side streets or private entrances. In all other States they should not be crossed for any reason.

Giving way in turns

Except in Victoria, a driver turning right must give way to any vehicle approaching from the opposite direction in-cluding those turning left. In Victoria the approaching vehicle turning left must give way.

Stop signs

In all States drivers must stop at the sign and not move off again until it is clearly safe to do so. Except in Tasmania and W.A., where a driver must give way to the right and left, normal give way to the right provisions apply when moving off again.

Give way signs

These are used more extensively in the A.C.T. When faced with a 'Give Way' sign, you must give way to vehicles on your right and left.

Line arrows

Except in N.S.W., it is mandatory for a driver to follow one of the directions indicated by arrows on the carriageway of the lane he is travelling in.

Remember: Irrespective of what particular regulations apply, your safety and that of your passengers and other road users largely depends on your own skill, commonsense and courtesy. Therefore, always drive defensively, match your speed to the road conditions and signal your intention of stopping or turning well in advance.

G. C. Barnes, Safety Officer.



APPOINTMENTS TO STAFF

Dr K. L. Burns has joined the Mineral Physics Section to in-vestigate electromagnetic tech-niques of mineral exploration and the physical properties of ore bodies that influence them. ore bodies that influence them. After graduating B.Sc. with honours from the University of Tasmania in 1956 and Ph.D. from the same university in 1962, Dr Burns became Senior Geologist and Officer-in-Charge, North-West, Geo-logical Survey of Tasmania. From 1963 to 1964 he was a demonstrator at the University of New England and from 1965 to 1966 Assistant Lecturer in Geophysics at the Univer-sity of Melbourne. Since 1967 he has been Senior Lecturer in the Geophysics School of Earth the Geophysics School of Earth Sciences at Macquarie University.

Mr D. M. Doube has been appointed to the Division of Entomology to work on the ecology of cattle tick with par-ticular emphasis on the effect of the physical environment on the development and survival of ticks on cattle. Since grad-uating B.Sc. with honours from the University of Adelaide in 1967, Mr Doube has been carrying out research on the kangaroo tick for his Ph.D.

Dr R. Driver has been ap-pointed to the Division of Applied Physics to study the electrical and magnetic proper-ties of materials, particularly simple organic compounds, alkali halides, and rare earth intermetallics. Dr Driver grad-uated B.Sc. from the University of Newcastle in 1965 and Ph.D. from the same university in 1969. Since completing his National Service early last year, Dr Driver has been a chemist with the Department of Customs and Excise. of Customs and Excise.

Mr R. J. Eldridge has joined the Division of Applied Chem-istry where he will carry out work on the synthesis and properties of novel polymer flocculants which are to be applied to problems of water purification. Since graduating B.Sc. from the University of Melbourne in 1967, Mr Eldridge has been studying for his Ph.D. at the same uni-versity.

Mr R. L. McBride has been appointed to the Division of Food Research to manage its taste test laboratory and to of its to organize taste and other sub-jective tests upon fresh and pro-cessed foods. Mr McBride graduated B.Sc. with honours



Mr McBride

from the University of Canter-bury in 1969. Since then he has been research assistant to the Director of Market Re-search, William Adams & Co Ltd.

Dr D. C. Foulger has joined the Division of Applied Geo-mechanics to work on the in-stallation and monitoring of instruments underground in the CSA Cobar mines. He will also be involved in the meas-urgenet of track stresses stope CSA Cobar mines. He will also be involved in the measi-urement of rock stresses, stope deformation, soil pressures and general sampling and in the interpretation and classifi-cation of these measurements. Mr Foulger graduated B.Sc. from University College, Lon-don, in 1959 and, after com-pleting his National Service, spent twelve months as a geo-logist in Jordan. From 1963 to 1967 he was employed in translating Russian scientific papers on meteorological and allied subjects. He then spent four years in the Soils Section of the Civil Engineering Sec-tion of the Ministry of Public Building and Works. Mr Foulger came to Australia in 1970 where he has been work-ing with a group of consulting geologists. geologists.

Mr M. L. Menton has joined the Building Operations and Economics Section of the Divi-sion of Building Research to work on the conduct and management of building opera-tions Since graduating B Sc itions. Since graduating B.Sc. (Agric.) from the University of Western Australia in 1970, Mr Meaton has been working as a research officer with the Western Australian Depart-ment of Agriculture.

Dr R. M. Robinson has been Dr R. M. Robinson has been appointed to the Division of Atmospheric Physics where he will work on the dynamics of atmospheric phenomena. Dr Robinson graduated B.Sc. from the University of Western Australia in 1967 and Ph.D. from the same university in 1971.

Dr G. A. Rockwell has been appointed to the Division of Animal Genetics to investi-gate the nucleic acids of animal cells and their significance in differentiation and growth. Dr Rockwell graduated M.Sc. in 1966 from the University of Sydney and Ph.D. from the same university in 1971. Since 1967 he has been a teaching fellow in the Department of Biochemistry at Sydney Uni-versity. versity.

Mr S. J. Thrower has joined the Division of Food Research to work on problems concerned with the processing and preser-vation of fish, arthropods and molluscs and products derived from them. Mr Thrower grad-uated B.Sc. from the University of Sydney in 1967 and obtained his Dip.Ed. in 1968. Since 1969 he has been a research assistant in the School of Biological Sciences at Mac-quarie University. quarie University.



Miss Stella Gilbert of the Central Library was awarded the British Empire Medal for public service in the recent New Year Honours. She is seen here showing Mr J. P. Shelton and Dr C. K. Coogan the telegram she received from the Prime Minister.

News in Brief

New Year Honour

Mr H. C. Minnett of the Division of Radiophysics has been created an Officer of the Order of the British Empire for public service.

Medals

The Royal Australian Chem-istry Institute has awarded the H. G. Smith Memorial Medal for 1971 to Dr C. C. J. Cul-venor and Dr D. H. Solomon of the Division of Applied Chemistry. The Royal Society of Via

The Royal Society of 'Vic-toria Medal for 1971 has been awarded jointly to Dr B. Daw-son of the Division of Chemical Physics and Dr A. Baklien of LC.I. Australia Ltd.

Study Grant

Dr I. G. Jarrett of the Divi-sion of Nutritional Bio-chemistry has been awarded a special study grant by the Nutfield Foundation to investi-gate specific pathways of meta-bolism in the liver of the sheep at the Institute of Animal Physiology, Babraham, Cam-bridge. bridge

Institute Member

Dr F. A. Blakey, Assistant Chief of the Division of Build-ing Research, has been made a member of the Australian Institute of Building.

Pollution Commission

Dr A. J. Dyer, Assistant Chief of the Division of Atmospheric Dr A. J. Dyer, Assistant Cance of the Division of Atmospheric Physics, has been appointed to the Commission on Atmos-pheric Chemistry and Global Pollution. The Commission is set up under the auspices of the International Association of Meteorology and Atmos-pheric Physics.

Obituary

Mr Arthur Frost of the Divi-sion of Textile Physics died recently. Mr Frost, who was supervisor of the Division's workshops, began there as a fitter and turner twenty years are ago.

He was a foundation mem-ber of the Laboratory Crafts-men Association and was its longest serving Branch and Federal Officer.

Rural Research

KUral Kesearcn Mr B. Woodruff, who joined the writing group for 'Rural Research in CSIRO' in August 1970, has become Compiler and Senior Writer for the pub-lication. Before joining CSIRO, Mr. Woodruff was concerned with extension and mass media work with the Victorian State Rivers and Water Supply Com-mission. He holds a Post-graduate Diploma in Agricul-tural Extension from Mel-bourne University.

Walk on Want

Walk on Want In a recent Melbourne 'Walk against Want' sponsored by Community Aid Abroad, Catholic Relief and Inter-Church Aid, Miss Jean Cono-chie of the Central Library completed the full circuit of \$396. This is a record for a CSIRO walker, and was made possible by the generous sup-port of hundreds of colleagues from Victorian, New South Wales and South Australian Divisions.

World's Largest

"The most extensive radio tele-scope in the world is the C.S.I.R.O. (Commonwealth Scientific and Industrial Re-search Organization) radio-heliograph installation, com-pleted in September 1967, at Culgoora, N.S.W. Australia, where 96 receivers are on the 6-mile long circumference of a circle covering 1,833 acres."

Guinness Book of Records.

Bowls Day

A CSIRO team was invited to participate in the Annual Com-monwealth vs. State Public Ser-vice Bowls Day at the Mel-bourne Bowls Club, Windsor, last December.

bourne Bowls Club, Windsor, last December. The team was Ted Stevens, Jack Weymouth, Wal Revell and John Little. After a mediocre start in poor weather conditions they managed to improve with the weather and at the end of the day had won two of the four games played. The Shield held by the State for the past two years was re-tained by them by the narrow margin of 25 shots after an aggregate of 920 ends had been played for the day. Anyone interested in start-ing either an annual CSIRO Bowlis Day or setting up a CSIRO Bowling Club should contact John Little, Applied Chemistry, P.O. Box 4331 G.P.O., Melbourne, Vic. 3001 (phone 64 0251 ext 655).

Deadline

Contributions to the March issue of Coresearch should reach the Editor at P.O. Box 225, Dickson, A.C.T. 2602, by Thursday, 10th February.

Printed by CSIRO, Melbourne



Eric Christie of Mechanical Engineering welcomes Santa with the skirl of pipes at the children's Christmas party organized by the Highett (Melbourne) Divisions last December. Santa arrived in a helicopter piloted by Ken Robertson of Building Research.

RESFA FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF NUMBER 156, MARCH 1972

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Satellite Aids Ocean Work

Space science and marine science will be linked in a joint research project to be undertaken later this year in Western Australia by the French National Centre for Space Studies (C.N.E.S.) and the Division of Fisheries and Oceanography.

An unmanned French satellite will collect information from the Indian Ocean of special interest to Australian oceanographic research.

search. The Division's research group located at the Western Aus-tralian Marine Research Laboratory at Waterman, north of Pertli, has for some years been carrying ont studies on the western rock lobster and in the course of this work has been gathering a good deal of oceanographic data.

Ocean currents play a central role in the planktonic stage of the life cycle of the lobster. The minute larvae of this free-

The minute larvae of this free-floating stage have been found up to 700 miles from their hatching grounds outside the coastal reefs. The French 'EOLE' satellite to be used for the project was launched on a Scout rocket in the United States by N.A.S.A. last August and has largely been engaged on a massive meteorological project since that time.

that time. For the Australian project infor-mation later this year from an instrument-laden buoy as it drifts westwards in the ocean from a launching site near Parth.

Perth. The satellite will track and interrogate the buoy on each pass of its 103-minute orbit. On command from the satellite, the buoy will transmit radio data on air temperature and on sea temperatures at the surface and at a depth of 300 metres. metres.

watres. Using ranging and doppler techniques, the satellite will record the position and speed of drift of the buoy. The information will be transmitted to one of six stations of the C.N.E.S. track-ing and telemetry network dis-tributed around the world. Re-transmitted to a data pro-cessing centre at Bretigny, France, it will be forwarded to Australia in the form of a com-puter record.

puter record.

C.N.E.S. will lend the Aus-tralian scientists the matched

It's in the Bag

The American magazine, Tide, recently questioned 1,100 com-muting executives — mostly from advertising agencies — about why they carried brief-cases. Almost to a man they admitted it was to create the image of a man who liked his job so much that he is willing to work in his own time.

Some 66% of them, however, admitted that they rarely

Some 66% of them, however, admitted that they rarely opened their briefcases at home and only 18% claimed they opened them on the train. Surprisingly, a poll of bosses (who must have been junior executives themselves once) re-vealed that the trick works. Most bosses agreed that they noticed which executives left the office empty handed. They also admitted that when a pro-motion came up—all other things being equal—the man with the bulging briefcase would be more likely to get it.

radio instruments necessary for transmitting data from the buoy to the satellite.

to the satellite. The sensors on the buoy will be supplied by CSIRO. The assembly will be placed on board an oceanographic vessel shortly to test the tech-nique before the instrumented buoy is launched off the Western Australian coast later this year.

this year.

Satellite - based observations offer a high degree of precision in fixing location regardless of weather conditions.

This holds true not only for instruments mounted on a buoy instruments mounted on a buoy but also for instruments operat-ing on an oceanographic vessel where precise location of the sampling point at which sea-water samples and other data are obtained is essential.

COASTAL PLAINS

The Division of Land Research is to reduce its activities at the Coastal Plains Research Station near Darwin and administration of the Station will be transferred to the Northern Territory Administration.

Coastal Plains was established in 1959 when the Administra-tion invited CSIRO to set up a research programme to assess the rice-growing potential of the Northern Territory's sub-coastal plains.

This work has now been largely completed.

The Animal Industry and Agriculture Branch of the Ad-ministration plan to use the facilities at Coastal Plains to expand pasture investigations on the sub-coastal plains and on the adjoining higher country. country.

The station will operate in conjunction with the adjacent Beatrice Hills Experiment Farm to form a major regional agri-cultural research centre.

Work by the Division of Land Research at the Station has included research on rice breeding, soil suitability, aerial seeding, fertilizer requirements, weed and insect pest control, and diseases of rice.

Novel methods of puddling rice lands under natural flood-ing have been developed in addition to traditional irriga-tion methods.

New, high-yielding rice types have been introduced from the International Rice Research In-stitute in the Philippines, and some locally bred varieties are also promising.

In a dry-season crop iust In a dry-season crop just harvested on the better soils of the Station, an average yield of 3.4 tons an acre was obtained from 73 varieties with the best variety yielding 4.4 tons an acre, a yield unsurpassed any-where else in the tropics.

The Division's work has the Division's work has shown that large quantities of irrigation water would be necessary for commercial rice production in the area and this could only be provided as a result of heavy capital invest-ment ment

Soil problems of the area in relation to rice-growing require further investigation to com-plete the rice research pro-gramme and this work will continue, along with the variety testing programme.

Below: Hand planting of rice in the early days of the Coastal Plains Research Station near Darwin.

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'INSPECT' IN ACTION

No one would claim that the special problems associated with a rapidly growing society such as ours based on science and technology are easily solved. There are prob-lems of environmental deterioration, of depletion of the physical inputs needed for our technology, and of sociological unrest.

origins, solutions.

Everyone agrees that some-thing must be done, but there are a number of barriers to finding solutions.

First the problems are often created in one part of the sys-tem by attempts to improve the situation in another part of the system. Hence there is a tend-ency for everybody to put the blame on to someone else. Each discipline seems to look to discipline seems to look to another for the major thrust of solution.

a solution. Secondly, many of the prob-lems are a result of the very ethic and mode of life which we hold so dearly and are averse to give up, and are in-separably related to the basic premises under which the de-cision-makers operate.

In this article, Dr R. M. Gif-ford of the Division of Plant Industry writes about IN-SPECT, an Australian environ-ment movement for youth which encourages and assists secondary school students to undertake research into man med his anticomment. Since its and his environment. Since its inception two years ago, a number of CSIRO people have become involved in INSPECT activities. ······

The people of the INSPECT The people of the INSPECT programme (Inquiry into the State of Pollution and Environ-mental Conservation) are try-ing, in a small way, to do something about the special environmental problems of modern society.

modern society. INSPECT marries profes-sional expertise with youthful concern, inquisitiveness and openmindedness. Socially concerned profes-sionals such as scientists (many from CSIRO), lecturers, teachers, doctors and planners motivate and help secondary school students to go out into their local environment, examine and describe the prob-



Solutions. The professionals who help run INSPECT programmes recognize that the complex and vexing environmental problems of the day have multiple origine origins.

lems, try to understand their origins, and suggest possible

We are all to blame. Hence we must all be involved in con-sidering solutions. This is especially true for practising scientists.

Science and technology dom-inate our way of life even though the majority of people have little appreciation of science. inate have science.

This paradox is at the root of many of our math of many of our problems. Society has been mesmerized by the awesome potential and difficulty of science and has tended to swallow it whole without question.

without question. The professional people help-ing INSPECT believe that they have a responsibility to point out any drawbacks they can see in technology and to en-courage the public to query the social value of technologies. We have been passing through a phase when almost anything that is technologically possible and can be manipu-lated to be economically viable is done. The end to that attitude is within sight. The first INSPECT pro-

attitude is within sight. The first INSPECT pro-gramme, held in Canberra in 1970, was the idea of Dr Peter Ellyard of the Legislative Re-search Service to Parliament and was sponsored by the A.C.T. Society for Social Re-sponsibility in Science. With the support of the De-partment of Education and Science, the New South Wales Department of Education and the headmasters of Canberra high schools, students studied many topics including conser-vation of flora and fauna in the A.C.T. waste disposal prob-lems, air pollution, noise levels, pesticides usage, water pollution and mass transporta-tion problems. The results of these studies were presented by students at a nine-hour public symposium. Some of the studies were published in a book called Bad Luck, Dead Duck: the report of INSPECT 1970. The book sold throughout Australia and is now out of print. It will be reprinted shortly. The idea spread. In 1971 INSPECT programmes were run in Canberra, Sydney, Bris-bane, Adelaide and Albury. Topics studied ranged over the potential for resource re-rycling from city wastes, atti-tudes of citizens to city nature reserves, drainage problems in built-up areas, biological di-versity in natural and artificial forest ecosystems, conflict of interests in the coastal environ-ment, the suitability of the privately-owned internal com-bustion engine as a mode of oity transportation, air and water pollution, noise levels, and the quality of life and general happiness of citizens. A selection of the papers pre-sented at four o

(continued on page 3)

POLYMERS AND FOODS

Man's demand for natural polymers has always been large and, on the basis of the individual, almost constant throughout the history of the species. It can be said with confidence that food polymers have an assured future.

estimated use of The natural polymers as food for the world population at present is 600 million tons a year of which about 100 million tons is protein, 490 million tons is polysac-charide, and 2 million tons is nucleic acid, the last not being essential but always present in normal diets other than milk.

This consumption of natural polymers can be compared with the recent and inessential demand for synthetic polymers and natural polymers used for purposes other than food.

Natural fibre consumption is about 21 million tons a year and synthetic fibre consumption and synthetic hole consumption about 4.5 million; natural rub-ber about 0.6 million and syn-thetic about 2 million. Total synthetic polymer production amounts to about 9 million tons a year.

The consumption of food polymers yields 13.5×10^{18} in energy (or 13.5 megatera joules) for the population annually at 3.65 GJ per head.

Production of carbon dioxide by this combustion of foods amounts to about 2.7 million tons a day or 10,000 million tons a year.

It is perhaps worth pointing out that the process is efficient in that wastes from this vast annual use of polymer amount to only about 8% and these wastes are, as we all know, bio-degradable.

Less than 10% of the energy of our food is used to syn-thesize the bacterial component of the faeces.

The fact that I have been asked to speak on the topic of 'Synthetic Foodstuffs' at a Con-ference of this nature pre-supposes that synthetic food-stuffs are or are likely to be polymers.

The presupposition arises naturally enough from the polymeric nature of natural foodstuffs and we must consider a little why natural foods are polymeric and whether this is a necessary condition for a syn-thetic food.

We live by a process of auto-cannibalization — we feed from minute to minute on ourselves and it is our own substance that is the primary source of energy and raw material.

This, it is at once evident, cannot be a self-sustaining pro-cess and in the rather quaint words of the OED, we have to supply waste.*

supply waste.* Initially we do this from a secretion of another of our species but after weaning we rely necessarily on the bodies, secretions, and reproductive products of other species— principally the last in the form of plant seeds.

Pure cannibalism can ob-viously never be a success within a closed society.

The bodies and tissues of the animals and plants we eat share some broad characteristics.

Polymers are a condition of life as we know it for it is only in the polymeric state that there is the opportunity for the

*'Food: 1. What one takes into the system to maintain life and growth, and to supply waste; aliment, nourish-ment, victuals.' Shorter Oxford English Dictionary 3rd edition, re-vised with addenda 1968.

specificity that allows for the controlled release of energy over the temperature range found on the surface of this found on the planet.

For us to produce energy at a rate 10,000 times faster than the sun on a weight basis at a temperature relatively close to absolute zero, remarkably com-plex mechanisms are required.

Thus the mechanisms are required. Thus the mechanisms of energy conversion are mixed polymers—the proteins; and the mechanisms of control of the synthesis of the proteins and the governance of develop-ment of the organism are mixed polymers, the nucleic acids.

ment of the organism are mixed polymers—the nucleic acids. No organism can in general afford the risk of taking into its cellular machinery the enzymes and nucleic acids of other or-ganisms so digestion or hy-drolysis of these foreign polymers is a necessity.

Natural foods, then, will always contain polymers—pro-teins and nucleic acids—and polymers to be used as foods must be hydrolysed as a pre-liminary step to their use within the body. will

This article is based on a talk given by Mr V. M. Tracey, Chief of the Division of Food Research, at the 'CSIRO Poly-mer Conference' held in Can-berra last October.

Indeed not only do our bodies have efficient means to ensure that foreign polymers are digested to their monomeric are digested to their monometric constituents but they also have elaborate mechanisms to recog-nize and dispose of any foreign polymers that escape or bypass the digestive system—as those engaged in organ transplants have become vividly aware.

The essential machinery of organisms must be polymeric. There is also a requirement that other components of the body be polymeric.

Consider for example the desirability of energy stores—ob-viously in many conditions of intermittent alimentation they are essential.

Storing monomers raises immediately problems of segre-gation from the working machinery and enormous prob-lems connected with osmotic pressure and chemical activity.

The obvious solution is to store monomers as polymers— and this, particularly in plants, is the principal role of the polysaccharides.

Animals tend, however, to store energy in oligomers — the lipids in which the esterified fatty acids lose their water solubility.

All organisms have the prob-lems of delineating themselves from the environment — if it is aqueous an insoluble surface coat is required, if it is aerial it must also be impermeable to useter water.

Here, too, polymers are re-quired for their special proper-

Finally, if an organism is to be of any size and differentiated in structure, a skeleton is re-quired.

The most popular polymer for this purpose is cellulose, but chitin (a nitrogen contain-ing polymer) and other poly-saccharides are also employed.

Animals (since they eat plants at first or second hand) are seldom short of nitrogen and use either chitin or protein as the skeletal materials fre-quently reinforced with calcium All this has the consequence that our foods always contain polymers and these are usually predominant.

In some diets there is also a considerable component of the lipid oligomers. That is the condition of foods entering our mouths.

To enter the tissues our food must be digestible if it is to be used.

Obviously there is a possi-bility that man could be fed from non-natural sources by giving him monomers that were usable by the cellular reaching. machinery.

There is no reason to sup-pose that man could not subsist on a monomeric diet of glu-cose, amino acids and accessory cose, amino acids and accessory factors — but he would rapidly find it intolerable for it would lack completely one of the two main characteristics which we associate with food — texture.

All natural food polymers have a characteristic texture or feel in the mouth and this is an essential to their ready acceptance.

It is, of course, possible to make synthetic polymers which would be suitable as foods but it seems very unlikely indeed that they would ever be made more cheaply than the natural products more che products.

There are two main reasons for this. To enter the body's tissue the food polymers have to be hydrolysed to monomers by enzymes.

by enzymes. Enzymes are notoriously specific in their action so that the linkages between the monomers in a synthetic poly-mer would have to be very closely controlled—for example the difference between a β 1:4 linkage between glucose and glucose in a polymer and an α 1:4 linkage is the difference between cellulose and starch, the first completely indigestible by man (though not by the three-toed sloth) and the second digestible by him. digestible by him.

A few β 1:4 links in a pre-dominantly α 1:4 polymer would considerably reduce its digestibility.

Polymers can be made from Polymers can be made from the twenty or so essential and commonly occurring amino acids in a non-specific but non-random way which are digest-ible by some single cell or-ganisms and would probably be digestible by us.

But some proteins are ex-tremely toxic by mouth pre-sumably because toxic frag-ments are produced during digestion and are stable enough have a toxic effect before being completely broken down.

We know the structure of a few natural toxic peptides, but we have no idea what peptide sequences not found in natural products might be toxic.

Thus, in the attempt to syn-thesize a food protein, we would have to undertake a specific synthesis of a sequence known to be harmless or under-take a directed synthesis and try it out after extensive animal testing and furthermore acsure try it out after extensive animal testing and furthermore ensure that the conditions during directed synthesis were so exactly controlled that there was no chance of variation occurring with the possible pro-duction of toxic peptides.

It is possible now to produce the cell's mechanism, and these proteins are identical with the natural products—whether they are to be regarded as natural or synthetic is a matter of semantics but they are cer-tainly irrelevant as a major practical source of food.

Some work directed to this end is in progress at Unilever.

The last possibility of a new source of food polymers other than the use of living organisms is tissue culture.

It might be possible, for example, to grow muscle cells in tissue culture and produce a meat substitute in this way without involving the slaughter of demetic avised. of domestic animals.

Costs are likely to be high, however. One kilogram wet weight of human lymphocytes can be grown in a day using a 1200 litre culture unit at a cost of \$2,500 for medium alone.

I conclude, then, that there is little likelihood of synthetic polymers forming a significant part of man's food in the future.

Oddly enough, however, syn thetic polymers are already part of his diet though not his food in some countries.

Thus polyglycerol esters are permitted additives in many foods in many countries, though not as yet in Australia, at levels of up to 3% in some products.

In Australia some chemical derivatives of natural products are allowed - for example are allowed — for example methyl ethyl cellulose at a level of 0.9% in cream and carboxy methyl cellulose at levels up to 0.3% in toppings and ice cream and at any concentration in low calorie foods.

The purpose of both is to provide texture and not nutriment which again emphasises the importance of texture in foods.

So far I have covered the topics of natural polymers as foods, the possibilities of using synthetic polymers as foods and the use of synthetic polymers or chemical derivatives of natural polymers as constituents of foods.

There are, however, a num-ber of related topics that are of

interest; these include the socalled synthetic meat and dairy products, the use of natural polymers which are not foods as sources of foods, and the use of polymers in processing foods.

The materials popularly re-ferred to as synthetic meat and artificial milk are of course merely natural foods processed in such a way as to simulate other natural foods which are regarded as more desirable and hence command a higher price.

hence command a higher price. The first of these products was margarine, which has evolved over the last century from a product made from a cheap animal fat (tallow) pro-cessed to resemble an expensive one (butter) to a product made from a cheap plant fat to re-semble, and in some ways sur-pass, the imitated product.

Margarine nowadays has physical qualities that are more desirable than those of unmodidestrable than those of example spreadability—and some nutri-tional qualities believed to be more desirable than those of butter—for example a controlled vitamin content and a specified content of polyun-saturated fats.

In both instances efforts are being made to meet the chal-lenge of better quality in margarine by improving the relevant characteristics of butter.

butter. Much more recently it has been found economically feas-ible to produce 'milks' in part or largely of plant origin and 'meats' of plant origin. The first — to produce plant-based milks — was the easier for it was largely possible to bypass the problems of texture and 'mouth-feel'. To make an accentable 'meat'

To make an acceptable 'meat' from plant protein involved a series of very demanding tech-nological developments.

First, soybean protein had to be produced in a reasonably pure form on a large scale and then methods for forming it into fibre had to be developed.

(continued on page 4)

SAFETY NOTES

Hear Ye, Hear Ye

Some sounds are very pleasant to the ear such as certain music, the tinkle of cash and so on. Other sounds can be unpleasant or annoying and are generally known as noise. Noise can be defined as unwanted sound.

Besides being an annoyance, noise may interfere with working efficiency and safety. Most importantly it may damage hearing. Regular exposure to some kinds of noise over a long period may result in irreparable damage to the inner ear and permanent hearing impairment.

Recently it was discovered that equipment in one of our laboratories was producing noise levels which would be likely to cause hearing damage to those working in the vicinity. Probably there are other locations in CSIRO where a noise hazard exists. If it is thought that the noise level in the vicinity of a particular piece of plant or equipment is dangerously bink

particular piece of plant or equipment is dangerously high, then the assistance of the Commonwealth Acoustics Labora-tory should be sought to make an assessment of the high. tory sho problem,

It is impossible to assess sound levels by ear. Also there is no necessary connection between annoyance and potential hearing damage, or between lack of annoyance and lack of hazard. However, a noise hazard may be indicated in an approximate way if those working in the area need to shout at close quarters to converse or if, after exposure, they suffer from ringing in the ears or partial deafness. Hearing loss is insidious. Loss occurs first at frequencies above those important to speech. But, as exposure and lower into the speech frequencies, while getting worse and worse at the originally affected frequencies. By the time it is noticed, it is too late for protective measures. Because of the way the higher frequencies are affected It is impossible to assess sound levels by ear. Also there

is noticed, it is too late for protective measures. Because of the way the higher frequencies are affected first, a husband exposed to excessive noise might be able to hear the conversation of his mates in a bar after work but have trouble hearing his wife when he gets home; a situation fraught with danger! Do not believe you can get accustomed to excessive noise. You can only get accustomed to deafness.

News In Brief

Professor

Dr N. W. Rees of the Division of Chemical Engineering has been appointed Professor of Electrical Engineering at the University of New South

Hasler Award

Dr A. Walsh, Assistant Chief of the Division of Chemical Physics, has been awarded the Maurice F. Hasler Award in Spectroscopy, presented annually by the United States Society for Applied Spectro-scopy. scopy.

scopy. Dr Walsh will receive the award, which takes the form of a scroll and an honorarium of \$1,000, at the national meet-ing of the Society for Applied Spectroscopy in Dallas, Texas, next September, when he will describe atomic absorption re-search in his Award address.

Assistant Chief

Mr H. C. Minnett has been appointed Assistant Chief of appointed Assistant Chief of the Division of Radiophysics. Mr Minnett's ability as an antenna and telescope designer and his role as Project Manager for the 150 inch Anglo-Aus-tralian optical telescope project led to his being awarded an O.B.E. in the recent New Year's Harower Honours,

Doctorates

DOCTOFATES Mr V. T. Morgan of the Division of Applied Physics has been awarded the degree of Doctor of Philosophy by the University of London for his thesis 'A theoretical and experi-mental analysis of the factors which determine the thermal behaviour of an exposed cylindrical current - carrying conductor'. behaviour of cylindrical conductor'.

Mr J. H. Price of the Divi-sion of Applied Chemistry has been awarded the degree of Doctor of Philosophy by Monash University for his thesis 'An ESR study of iron group transition metal ions in chemical complexes'.

Advisory Board

Dr W. E. Hillis of the Forest Products Laboratory of the Division of Applied Chemistry has been appointed to the Board of Advisers of the Inter-national Academy of Wood Science

Commission Member

Mr I. C. McIlroy of the Divi-sion of Atmospheric Physics sion of Atmospheric Physics has been appointed as the Aus-tralian Representative on the International Commission on Irrigation and Drainage Work-ing Create and Drainage Working Group on Evapotranspiration.

Master of Science

Mr R. W. Sleigh of the Division of Food Research has been sion of Food Research has been awarded the degree of M.Sc. by the University of New South Wales for his thesis 'An im-munochemical and structural investigation of some egg white proteine' proteins

London Liaison

Dr E. G. Hallsworth, who has been Chief Scientific Liaison Officer, London, since January 1971, completed his tour of duty at the Australian Scientific Liaison Office on the first of this month. Dr G. N. Lance, who replaces him, takes up duty on 20th March.

The Function of an Executive

As nearly everyone knows, an executive has practically noth-ing to do except to decide what is to be done; to tell somebody to do it; to listen to reasons why it should be done by someone else, or why it should be done by someone in a different way; to follow up to see if the thing has been done, to discover that it has not, to inguire why: to listen to not, to inquire why to listen to excuses from the person who should have done it; to follow up again to see if the thing has been done only to discover that up again to see if the thing has been done only to discover that it has been done incorrectly; to point out how it should have been done; to conclude that as long as it has been done, it may as well be left where it is; to wonder if it is not time to get rid of a person who cannot do a thing right; to reflect that he probably has a wife and a large family, and that certainly any successor would be just as bad, and maybe worse; to consider how much simpler and better the thing would have been done if one had done it oneself in the first place; to reflect sadly that one could have done it right in twenty minutes, and, as things turned out, one has had to spend two days to find out why it has taken three weeks for somebody else to do it wrong.'

wrong. Journal of Irreproducible Results, March 1971.

CSIRO on BBC

A BBC film unit visited several Divisions recently to obtain material for television.

The unit is seen below at the Division of Textile Industry making a film on the self-twist spinning process.



'Inspect' in Action

(continued from page 1)

(continued from page 1) pared and will be published this month by the Dalton Pub-lishing Company, Canberra. This year INSPECT pro-grammes are being planned in Hobart, Melbourne, Armidale and Newcastle as well as in most of the cities which held them in 1971. The idea is now developing in places overseas. We have heard of similar efforts in the United States and Britain. Such programmes of environmental

programmes of environmental investigation have advantages for all three elements involved — the student, the professional

— the student, the professional and society. INSPECT studies give the child the rare opportunity to carry out interdisciplinary studies on real problems of their own choosing. This is a valuable educa-tional experience. Traditionally education of children has been organized by subject and the purpose of the studies is to master the discipline. Moreover, we often wish we had had the motivation to study

had had the motivation to study some of the material harder. INSPECT studies start with a problem which the student chooses because he is in-terested.

terested. Material is drawn in from whatever subjects seem to be necessary. The problem pro-vides the motivation. So we find the interesting situation of some school child-ren who say they hate science

ren who say they hate science doing scientific investigations of their own volition.

This approach soon reveals to the student the complexity of problems of environmental planning and how decisions must always involve compromise.

It should become clear to the student how the solution to one problem frequently generates another.

The main advantage to the professional, who helps and advises the students, is that INSPECT provides an oppor-tunity for him to express his concerns about the broader social implications of his pro-fession fession.

Expression of such concern Expression of such concern may not otherwise be possible because of the vested interests of his business affiliation, be-cause of the secretive, self-preserving bureaucracy of his civil service or because, in the case of the natural scientist, consideration of the social im-plications of research is tradi-tionally a taboo matter. The opnortunity for a profes

The opportunity for a profes-sional to interact so closely

Above: Dr Nan Anderson of the Division of Environmental Mechanics adopts an original approach to publicising IN-SPECT SPECT.

with people in other walks of life and with the future citizens on whom his decisions may be imposed is a valuable one.

If the solution to the en-vironmental crisis is just a matter of investing more effort into controlling pollution and recycling materials, as the opti-mists believe, then the work of INSPECT will help to speed up the achievement of such worth-while goals while goals.

If the much more pessimistic reports of such prestigious groups as the international 'Club of Rome' in its project on 'The Predicament of Man-kind' are true — namely that, irrespective of man's purposive efforts, all growth (population and economic) will inevitably slow down, stop and perhaps become negative within our children's expected lifetimes — then really radical changes in social organization, attitudes, ethics and morality must take place rapidly. If the much more pessimistic place rapidly

PETRICHOR Mortem Amore Mortuis

Petrichor, or essence of stone, is the name given by Dr R. G. Thomas (former Chief) and Miss Joy Bear of the Division of Mineral Chemistry, to the 'compound' associated with the smell of rain falling on dry soil. Some of the components of petrichor have been named. There is a lactone and an aldehyde, an alcohol and some nitrophenols, and of the volatile acids, nonanoic acid predominates, but up till the present, the essential aroma has not been identified.

It has been suggested that petrichor originates in volatile essences liberated into the atmosphere from leaves and grass at a rate of some 438 million tons a year. It has also been suggested, somewhat cautiously, that the emana-tions of the plants which the hot sun distils into the air and part of which become absorbed on the surface of the earth and rocks could well become, through the long process of geological time, petroleum.

geological time, petroleum. Since the world was very young the flowers and trees have sent up into the air nectars, essences and oils, where they have hung, blown and hovered and have been a fine snare for insect, beast, bird and poet-Man; and for some among them, an insistent call to make and procreate, extend the span of life into the future: make secure the Wall against the erosion of dying's destruction. Its purpose done, it fell as the gentle rain upon the earth beneath, and seeped by runnel and tiny rivulet, deep to earth, and has lain in great lakes until man's inquiring funnel dug and found them: and this liquid perfume this attar, million-flowered, leaved, berried, is now fed to his Monsters, which shriek and boom whose breath is death: and who may yet see us buried.

James Piper, Site Services, Canberra.



Polymers and Foods

(continued from page 2)

After these problems had been solved at the bench it still required 300 developmental man years for General Mills to get the product on to at market market.

It is of interest that the original effort to produce It is of interest that the original effort to produce soybean protein fibres was directed to producing a sub-stitute for wool and not meat, and Ford in the '30s spent a great deal on this development.

It was not a success but much that was learnt then proved of value in the later development of a simulated meat.

of a simulated meat. All natural polymers (even lignin) are potential sources of nourishment for other organ-isms — if any were not, the sur-face of the earth would be covered with them by now. While lignin is useless to us as a source of monomeric foods, cellulose may not be.

Cellulose, chitin and starch are the most abundantly pro-duced polysaccharides and of these we can only digest starch.

Several million tons of chitin are synthesized a year by many of the invertebrate phyla and by the fungi, perhaps ten times as much cellulose is produced by the green plants.

They are polymers in which the chains of monosaccharide units are very closely packed, consequently they can only be hydrolysed by enzymes from the surface and not all surfaces present the chains in a suitable attitude for attack.

As a result, hydrolysis is a slow process and among verte-brates significant amounts are only digested in those with a relatively large gut content and a slow throughput.

a slow throughput. Ruminants and marsupials and, less efficiently, pigs and hippopotami are able to use cellulose as a source of energy relying for the hydrolytic step on the microorganisms housed in their guts — but we are not.

In their guts — but we are not. Yet our activities in food processing and in using trees for wood generate considerable amounts of waste cellulose which is a potential source of glucose which could be used for the production of alcohol or other useful sources of energy.

Man is also unable to digest one of the animal proteins which is a byproduct of rais-ing animals and birds as food $-\infty$ keratin.

This is because an essential This is because an essential preliminary to the enzymic hydrolysis of keratin is reduc-tion — a step the clothes moth larva is adept at but again one we cannot compass unaided.

Recovering byproducts from food processing is only a first step in treating wastes.

It has always been attractive owing to the possibility of in-creasing profit by the sale of a marketable byproduct.

Now, however, attention is increasingly paid to the desira-bility of reducing waste in order to reduce pollution.

Since foods are foods not only for us but for micro-organisms, the biological oxygen demands of wastes from food factories are likely to be onerous.

A process for removing pro-tein from meatworks effluent by the use of ion exchange resins has been developed in New Zealand and it may be that methods such as this will prove worth developing as a means of reducing the biological oxygen demands of effluents.

I believe it important that the food industry becomes more aware of the literature dealing with sewage treatment as there are many common problems.

The uses of polymers in pro-cessing food are limited but may be of importance in rela-tion to some foods.

I have already mentioned the use of polymers that are of no food value in altering for the better the texture of food pro-ducts of a liquid or homo-genous nature.

There are also uses for poly-meric films in packaging both living and dead foods.

living and dead foods. In these applications con-trolled permeability to oxygen, carbon dioxide, sulphur di-oxide, water and ethylene are important and, by achieving particular combinations of selective permeability, consider-able advances in the storage of foods become possible.

Liquid foods are obvious candidates for processing by ion exchange or other con-tinuous processes in which the food is exposed either to poly-meric surfaces or granular beds of polymer with specific properties.

Thus, ultrafiltration can be used, and is being used in trials, for concentrating liquid food and for altering their con-tent of small molecules.

Exclusion chromatography using Sephadex gels is used in processing milk in order to pro-vide milks of high protein or low sodium and lactose con-tents for special purposes.

In recent years, work in England has shown that it is possible to marry the synthetic and natural polymers to pro-vide the basis of possible new ventures in food technology.

Enzymes can be produced from microorganisms in con-tinuous culture or other sources and then chemically bonded to synthetic polymer beds or sheets to form a column pack-ing or surface with extremely specific hydrolytic or other activity.

A recent review lists enzymes that have been attached to synthetic polymers heen in this way.

The enzymes include the oxide-reductases, transferases, hydrolases, and lyases, four of the six classes of enzymes.

Isomerases and ligases have not yet been successfully treated in this way.

Much of this work has been done using commercially avail-able polymers as the support but there seems little doubt that supporting polymers de-signed for the purpose will prove much more effective in ensuring maximal effectiveness of the attached enzyme.

of the attached enzyme. Potential uses for these natural-synthetic polymer hy-brids have already been found in analytical work (glucose oxidase peroxidase), hydrolysis (continuous production of high glucose syrups from starch, hydrolysis of sucrose and lac-tose) and partial hydrolysis (clotting of milk, chill proofing of beer). In the processing of liquid

In the processing of liquid foods there are possibilities of their use in flavour and pig-ment modification in addition to destroying unwanted con-stituents of the food.

Finally, there are possibilities in the physical hybridization of the two forms of polymer in the micro encapsulation of enzymes within a polymer permeable to small molecules as for example asparaginase in the treatment of leukaemia.

Deadline

Material for the April issue of Coresearch should reach the Editor at P.O. Box 225, Dick-son, A.C.T. 2602, by Monday, 13th March.



'My God! There are traces of tuna fish in this shipment of mercury!' Courtesy 'Saturday Review'.

APPOINTMENTS TO STAFF

Dr A. R. Aston has been ap-pointed to the Division of Plant Industry where he will work on the computer modelling of biological systems particularly in relation to pasture growth and to hydrological and land use studies being undertaken by the Division in the Upper Shoalhaven, catchment Dr by the Division in the Upper Shoalhaven catchment. Dr Aston graduated B.Sc.Agr. from the University of Sydney in 1963, M.Sc. from the Uni-versity of New England in 1966 and Ph.D. from the University of Illinois in 1969. From 1965 to 1970 he worked first as a re-search assistant and then as a search assistant and then as a research associate at Illinois and since 1970 has been a re-search fellow with the Texas A and M University.

and M University. Dr R. H. Barrett has joined the Division of Wildlife Re-search to investigate the ecology of the feral pig in re-lation to the environments of the coastal plains in the Northern Territory. Dr Bar-rett graduated M.Sc. from the University of Michigan in 1966 and obtained his Ph.D. from the University of California in 1970 for his work on the ecology of the feral hog in Tehama County, California. Since then be has been an associate specialist at the Uni-versity of California.

Mr R. D. Beattie has been Mr K. D. Beattie has occur appointed to the Mineral Physics Section to carry out re-search into the use of geo-physical and geological para-meters in the identification and definition of mineralized zones. definition of mineralized zones. After graduating B.Sc. with honours from the University of Tasmania in 1967, Mr Beattie spent three years with the Bureau of Mineral Resources before joining Anaconda Aust.

Mr A. Bendeli has joined the Division of Applied Physics to work on the development of precise length and angle measurements. Since graduat-ing in engineering with honours from the University of New South Wales in 1968, Mr Ben-deli has worked with A.W.A. and Warburton Franki Pty. Ltd. Ltd

Dr G. J. Clark has been ap-pointed to the Mineral Physics Section to study the physical properties of Australian rocks in relation to the limitations of in relation to the limitations of existing techniques of minerals exploration and extraction. Dr Clark graduated B.Sc. with honours from the University of Tasmania in 1964 and Ph.D. from the Australian National University in 1968. Since then he has held a fellowship at Harwell with the U.K. Atomic Energy Agency.

Mr I. R. Dick has joined the electronics group of the instru-ment section at the Division of Chemical Physics where he will Chemical Physics where he will work on the development of electronic instruments. Since obtaining his Diploma in Elec-trical Engineering from the University of Adelaide in 1969, Mr Dick has been a project engineer with Philips Industries Limited.

Limited. Mr G. R. Dolby has been appointed to the Division of Mathematical Statistics and will be stationed at the Cun-ningham Laboratory, Brisbane, to work on statistical aspects of the research programme of the Division of Tropical Pastures. Mr Dolby graduated B.Sc. from the University of Wales in 1958 and obtained his Diploma of Education from the same uni-versity in 1959. In 1966 he graduated B.Sc. with honours from the University of New Zealand and he recently ob-tained his M.Sc. from the Uni-versity of Queensland. Since 1967 he has been a bio-metrician with the Queensland Department of Primary Indus-tries. tries.

Mr R. C. Garvie has joined Mr R. C. Garvie has joined the Engineering Ceramics and Refractories Group of the Divi-sion of Tribophysics to carry out research on oxides, sili-cides, borides, carbides and metal-ceramic composites. A graduate of the University of Toronto, Mr Garvie has spent the last five years in the Coronics Research Dancetwart the last five years in the Ceramics Research Department of the Corning Glass Works in the United States.

Mr D. A. Griffiths has been appointed to the Division of Mathematical Statistics to carry out research on the statistical aspects of the research pro-grammes of the Ian Clunies-Ross and McMaster Labora-tories in Sydney. Mr Griffiths graduated B.Sc. with honours from the University of New South Wales in 1966 and since 1968 has been studying for his Ph.D. at the University of Oxford.

Dr A. J. Nicolson has joined the Division of Land Research and will work at the Tobacco Research Institute, Marceba, on Research Institute, Mareeba, on the rehabilitation of de-teriorated sandy loams and on the prevention of such de-terioration under intensive irri-gation. Dr. Nicolson graduated B.Ag.Sc. from the University of Adelaide in 1960 and completed his Ph.D. from the same university in 1970. From 1960 to 1964 he worked as a soil conservation officer with the South Australian Department of Agriculture and from 1964 to 1968 was involved in re-search with the Agronomy De-partment of the Waite Agricul-tural Research Institute. Since then he has been senior lecturer at Roseworthy Agricultural Roseworthy Agricultural College.

College. Dr C. M. Perrott has been appointed to the Division of Tribophysics where he will st u dy the thermodynamic properties and deformation be-haviour of intermetallic com-pounds with a view to their use as structural materials or as constituents or 'hard-facing' alloys. Dr Perrott graduated B.Sc, with honours from the University of New England in 1967 and Ph.D. from the same university in 1971. From De-cember 1969 to March 1971 he was a post-doctorate fellow with the National Research Council of Canada and since then has been a post-doctoral then has been a post-doctoral teaching fellow in the Physics Department at the University of New England.

of New England. Mr I. F. Somers has joined the Division of Fisheries and Oceanography where he will be concerned with the development and evaluation of techniques for analyzing population size in non-exploited marine animal populations. Mr Somers grad-uated B.Sc. from the University of Queensland in 1970 and re-cently obtained his Diploma of Computer Science from the same university.

Mr J. E. Watts has been ap-pointed to the Division of Animal Health to carry out a field survey of the blowfly problem with particular refer-ence to the predisposing causes of fly-strike. Mr Watts grad-uated in veterinary science re-cently from the University of Sydney.

Sydney. Dr I. A. Weeks has been appointed to the Division of Applied Chemistry to carry out laboratory studies related to artificial rain-making. In particular he will study the effect of mechanical stress and electrical fields on the nucleation of ice and super-cooled water. Dr Weeks graduated M.Sc. from the University of Tasmania in 1966 and Ph.D. from the same university in 1970. Since 1969 he has been a post-doctoral fellow with the National Research Council of Canada.

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CORESEARCH FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF - NUMBER 157, APRIL 1972

157##1972

Science and Society Sir Otto Urges New Forum

A new forum to enable scientists to play an active role in society, was urged by Sir Otto Frankel, when he delivered the Second J. E. Falk Memorial Lecture at the Academy of Science, Canberra, last month.

Sir Otto urged the scientists present to consider ways of setting up a science and society forum which 'may lead to a new orientation of applied science, from its ahmost exclusive preoccupation with economic productivity to the more general purposes of human welfare'.

In his lecture, Sir Otto used a study of the campaign for conservation of crop genetic resources as a parable of the participation of scientists in social affairs.

Sir Otto began the lecture by discussing the balance of genetic variation.

'Evolutionary response to environmental change has been a continuing process, no doubt with evolution of cultivated plants between 8000 and 3000 B.C. — and possibly with corresponding troughs; and there is no reason for assuming that man's ascendancy as the dominant species has made further evolution redundant,' he said.

'Indeed, on the face of it, the dynamics of our impact on the environment rather suggest the opposite.

However, as I shall endeavour to show, the most profound genetic effect of the current environmental impact is on the balance of genetic variation or, in other words, on the evolutionary potential of living organisms.

'For a large number of species, both domesticated and wild, the main effect is a narrowing of the genetic base.

'I shall argue that, if allowed to continue unchecked, this trend is likely to have perilous effects upon many forms of life on earth.

'In the past, genetic variaton has tended to be universal and self-renewing.

Species, both wild and domesticated, were populations in balance with the environment, with genetic diversity within and between populations maintained by natural selection in response to the immense diversity of environmental factors, both in time and in space.

"Crop varieties were populations evolved over long periods of primitive cultivation, with little migration between localities, and with little or no deliberate selection by the cultivator.

Vator. 'In wild species the position was similar, genetic diversity being safeguarded by the size and ecological diversity of the natural or semi-natural communities which, until little more than a century ago, were abundant in most parts of the world.

'The invisible cost factors were the low productivity of agriculture on the one hand,

the large areas occupied by unproductive or low-producing natural communities on the other.

'But this system provided for the modest needs of the time and for the unpredictable evolutionary requirements of the future.

"This period of evolutionary laissez-faire is now at an end, the scientific revolution and the population explosion providing the means and the motives.

'Variation is being increasingly narrowed — in domesticates through selection for productivity in optimized environments and in wild species through the progressive restriction of their habitats in the course of economic development.

The John Falk Lecture is named after the late Dr J. E. Falk, Chief of the Division of Plant Industry from 1963 to 1970. Sir Otto Frankel, Senior Research Fellow in the Division of Plant Industry, was Chief of that Division from 1951 to 1962 and a member of the Executive from 1962 to 1966.

'In the former, and especially in cultivated plants, there is direct and alarming evidence that the primitive varieties are disappearing, and to this I shall turn first.

'In wild organisms, direct evidence is confined to the increasing rate of species extinction; but the restriction of the habitat range of many species is strongly suggestive of a corresponding constriction of genetic resources.'

Sir Otto then discussed the loss of primitive genetic species and described them as vanishing treasures.

'The short-term effect of the replacement of the primitive populations by high-producing varieties — in combination with an upgrading of the agricultural technology as a whole is in most cases a substantial, or even dramatic increase in productivity.

"But it is widely believed that in the longer term the loss of the genetic reservoirs could prove harmful, or even disastrous, for the world as a whole, and especially for the countries in which they have evolved and to which they are peculiarly adapted.

EVOLUTIONARY INSURANCE

It should be noted that a good deal of progress in plant improvement is still being made without the use of primitive germ plasm, and that some plant breeders believe that the gene pools of advanced varieties, together with induced mutation, should be adequate genetic resources for future needs. There is thus scope for argument which, however, cannot be resolved, especially since the potential value of primitive gene pools cannot be assessed in anything like precise terms, partly because few have been intensively studied, partly because the needs of the future are unknown.

'But their significance as rich sources of genetic diversity, complementing the highly selected modern varieties on the one hand, induced mutations on the other, is now widely acknowledged; and, at the very least, their preservation is a kind of "evolutionary insurance".

CASE FOR ACTION

The search for mineral resources has comparable features with the survey and assembly of crop genetic resources.

'Both aim to make available resources with suspected but as yet unproven location, extent or profitability (indeed, the location of gene pools is often a great deal better known than that of mineral deposits). But the differences are more striking.

'Mineral resources are exhaustible, often in less than a generation; genetic resources will be used and needed as long as we grow our food.

'Many minerals serve luxury or war, agriculture only human welfare.

welfare. To assemble representative gene pools of the world's crops would cost a small fraction of the search for minerals during the last 10 years in Australia alone; and the likely benefits, in economic terms, are in similar proportions when one considers that the escape from Malthusian predictions is largely due to the use of plant gene pools, and that a few varieties of wheat and rice triggered the economic, social and moral resurgence associated with the "green revolution", and transformed some Asian countries from large importers to exporters of grain.

'But the operational differences are more germane to our discussion.

'Mineral search, and soil or water conservation, are motivated by direct economic, social, political or local interests, and hence have "built in" advocates and operators.

'Genetic resources serve the community, the nation, the world, the future.

The only possible advocates are the scientists who identify the problem, recognize the implications, and devise likely solutions; and the only operators are those whom the scientists are able to convince.

GENETIC CONSERVATION

What then, you may now be asking, has anybody done about genetic conservation, and



Rocket Survey

A Skylark rocket was launched at Woomera last month to test the feasibility of techniques for high-altitude sensing of earth resources.

The instruments and cameras carried in the rocket were recovered and evaluation of the data will be carried out by the University of Reading and the Mineral Physics Section with co-operation from the South Australian Mines Department and the Division of Soils.

SIRONET

Completion of an Adelaide-Melbourne link last month marked lue start of operations of SIRONET (CSIRO Computting Network), with the CSIRO computers in Adelaide, Melbourne, Brisbane, Sydney, and Canberra linked by voice-grade telephone lines.

Providing scientists working in these cities with immediate access to the major machine of the Network in Canberra, SIRONET will extend the interactive computing facilities enjoyed in Canberra to users at laboratory locations.

Access by telephone is also available from other locations in Australia through Subscriber Trunk Dialling.

A user sitting at any console may now enter his program and data directly through the keyboard and have the results returned promptly.

He may also request computer jobs to be run at a later time, after which volume output will be transmitted to his local branch site and printed there.

there. Small Digital Equipment computers installed at each branch site by the Division of Computing Research handle information transfers in the network and provide files to the larger Control Data computers owned and operated by the Division. The Weapons Research Establishment of the Department of Supply, through the Joint Project arrangements with Britain, was responsible for the range operations and for photography.

The range operations and for photography. The Skylark photographed specially selected test areas in South Australia from altitudes of between 170 km, and 270 km, (100-170 miles).

km. (100-170 miles). The data gathered by the rocket will be compared with data gathered by similar instruments on aircraft flying at 6,100 m. (20,000 ft.), and on NASA's earth resources satellite ERTS-A as well as by ground parties.

ground parties. The cameras recorded information in both the visible and infra-red parts of the spectrum.

A wide range of geographic features of varying contrast is available in South Australia for the experiment, and the University of Reading is interested in the geographic implications of the data.

of the data. The interest of the Mineral Physics Section is a general evaluation of remote sensing techniques, with particular emphasis on their use in minerals search.

phasis on their use in minetain search. The Section will correlate the ground, aircraft, rocket and satellite data to determine the optimum parts of the spectrum for distinguishing different terrain types at different altitudes.

tudes. Maps drawn from the data collected by the rocket- and aircraft-borne cameras will be compared with corresponding terrain features at ground level. A comparison of the data collected by the rocket and by the satellite is expected to indicate the optimum sun angle for recording ground features and also the best time of day for launching remote sensing vehicles.

SCIENCE AND SOCIETY

(Continued from page 1) especially about the endangered plant gene pools?

'First—clarification of the scientific issues, especially at the conferences to which I re-ferred earlier, and in compre-hensive publications.

hensive publications. 'Next — publicity directed at a wider circle, in popular scientific journals, press, radio and television. Lines of com-munication were established and maintained with leading national and United Nations administrators and with other men of perception and far-sightedness who frequent the corridors of power.

'All this communications 'All this communications effort has begun to pay off in action. Co-operation, largely informal, between FAO, the International Biological Pro-gramme, the Rockefeller Foun-dation, government and univer-sity institutions, and individual scientists, is becoming increas-ingly effective.

ingly effective. 'Now with three regional gene banks established in Europe, one in the Near East, several more being discussed in the centres of genetic di-versity, in addition to greater interest and activity in the older institutions, and with in-ternational liaison, leadership and support growing in strength, there is hope that the main objectives may be achieved — but only just in time. time.

COMMUNICATIONS

'In the case history I have presented to you, a large part of the scientist's activity was in the area of communication as it is in all involvements of scientists in issues of social relevance relevance.

'In many instances it is the only form of involvement; but inevitably it is the first, and sometimes crucial one.

It may be directed at political and administrative executives, at particular sec-tions or local groupings, the community at local community at large,

These are not mutually ex-clusive if one considers that even busy executives succumb to the influence of the com-munications media, either directly or indirectly through the impact on their associates or their constituents.

John Falk was much inter-John Falk was much inter-ested in exploring — and im-proving — lines of communi-cation of scientists with indus-trialists, politicians and depart-mental administrators (you may notice that I do not like the popular term "bureau-crats").

This is an important field in a modern society, the discus-sion of which an empiricist like myself is wise to leave to political scientists and scienomists.

'I confine myself to a brief reference to some new and promising lines of communica-tion between parliament and science which are relatively little known.

"A small number of scientists have been appointed to the staffs of the Senate and the House of Representatives to service appropriate Parlia-mentary Committees, and scien-tists also serve as staff members to the Lavislative Research Serto the Legislative Research Ser-Library, whose task it is to provide information for indi-vidual Members of the Parliament.

These are useful and poten-tially important links between politics and science, and any co-operation and assistance that scientists can give to their col-

leagues in the service of parlia-ment would no doubt be to the advantage of both worlds.

COMMUNITY INTEREST

'There are two reasons for the growing, and often intense, public interest in such issues.

'First, in the last quarter century the community has become intensely involved — usually in a passive role — in the changes brought about by the dramatic technological de-velopments of our time, some of which are having adverse effects which are plain to see.

'Second, there is a growing awareness, and a desire for in-formation, largely due to the spread of secondary and tertiary education and to the interest aroused by the mass media of information.

'As a result there is a widearea result there is a wide-spread sense of apprehension and of responsibility which is beginning to extend not only to current but to future conse-quences of the drastic changes made possible by our vast tech-nological potential.

'Without a doubt there ow a strong sector in the community which has the wish to be informed and to partici-pate, and this is clearly on the increase.

The children of today will be the intelligent, critical, well-informed clitzens of tomorrow who will demand full informa-tion and consultation as a matter of course.

"Who could be in doubt that the high school students who participate in Inspect will carry this interest and initiative into adult life?

SCIENTIFIC RESPONSIBILITY

'Social responsibility, the re-sponsibility to society, is dis-tinct from that to the particular group or sector — be it an in-dustry, a government institu-tion, or a university — to which a scientist owes professional service and loyalty.

'Social responsibility, however, is a personal responsi-bility, perhaps the only excep-tion, as Admiral Rickover remarked, being the medical profession which has built a social ethic into its profes-sional ethic sional ethic.

Before leaving this topic of the scientist's responsibility, I shall commit myself to a cate-gorical statement on motives and actions in human affairs.

It is neither possible, nor desirable, to regard scientific responsibility, social responsi-bility, and personal, i.e., part-em ot io n al involvement as separate, or separable, entities. 'Every scientist becomes emo-tionally involved in his scien-

tific work.

'My own participation in genetic conservation, which for me is a social responsi-bility rather than a scientific interest, has been sustained by a (partly emotional) sense of "evolutionary responsibility".

'To return to first principles of human behaviour, scientific integrity should direct, but must not dampen the flame of enthusiasm.

CONSTRAINTS

'Constraints on the, roughly, one third of Australian scien-tists and technologists em-ployed in government depart-ments and instrumentalities constitute a significant depriva-tion of the "public interest".

'It is therefore welcome that although "current restrictions on public comment in Aus-

tralian statutes and regulations trainan statutes and regulations are more comprehensive than is necessary or healthy in a liberal-democratic community ...this has been mitigated in practice by a good deal of tolerance and restraint on the part of administering authori-ties ..."

This attitude is exemplified by recent statements by both the former and the present Chairman of CSIRO.

Chairman of CSIRO. 'Asked in an ABC science programme whether people in CSIRO, being a government organization, felt restricted in some way, Sir Frederick White said, "I don't know whether individuals feel that they're re-stricted. I don't see that they need feel this way. They ought to write and talk about these things, if they have sound views to express."

"This arose from a question about the social responsibility of scientists.

'In an address to the Vic-torian Society for Social Re-sponsibility in Science, Dr J. R. Price, the present Chairman, stressed the right and indeed the duty of CSIRO officers to "publish . . factual statements concerning scientific and tech-nical matters, particularly, of the Organization".

'However, owing to the Or-ganization's role as advisers to the Minister and through him to Government, and since pub-lic interest is frequently asso-ciated with matters which may be under notion exclutional exclusion. ciated with matters which may be under active political exam-ination by the Government, or may be so in the near future, "it is obviously undesirable for anyone expressing a personal opinion to appear to speak on behalf of CSIRO".

This applies particularly to senior members of CSIRO likely to be called on for ad-vice to the Government, who, were they to become involved in public debate, "may not only appear to be partisan; they may well lose their capacity to give impartial advice".

Hence, members of CSIRO should "restrict public com-ment on matters falling within the legitimate areas of ex-pertise of the Organization to factual statements".

This means than in speaking on matters related to CSIRO activities, "they must use their commonsence... officers of CSIRO do have to exercise caution in publicly comment-ing in other than a factual manner on matters which may be deemed to fall within the Organization's terms of refer-ence. If an officer does so, it is incumbert upon him to dissoincumbent upon him to disso-ciate his views from those of the Organization as a corporate body".

The last two sentences were omitted from a report of Dr Price's speech in "The Aus-tralian" of 21 September 1971, which had the misleading head-line "CSIRO to stay silent".

'Indeed, these sentences are the operative ones regarding public comment, since, owing to the broad spectrum of CSIRO's activities, many, if not most, issues of public con-cern relating to science are likely to fall within the Or-ganization's terms of reference.

"Essentially, when comment-ing "in other than a factual manner" officers are asked to use their commonsense, to dis-sociate themselves from the Organization and, generally, to act in a responsible manner so as to avoid embarrassment to the Minister and their Organi-zation. zation.

"This leads me to constraints v loyalty, or by apprehenby

the government, and especially in the universities and cognate institutions.

T am not aware of formal or semi-formal constraints on members of Australian univer-sities which could affect their participation in public issues relating to science, although political restraint has left a black mark in the history of at least one university.

Whether the near-complete Whether the near-complete dependence on government funding and the ever-growing involvement in government and other public activities have subtle effects on the independ-ence of the corporate body or of the individual, would be difficult to establish.

'But it is of vital importance But it is of vital importance for the university as for the community that the spirit of intellectual independence, of "institutionalized, licensed dis-sent and criticism" survive and prosper in our universities.

'I have stressed before the rapidly growing concern with the all-pervading consequences of the technological revolution.

The community is likely to become increasingly intolerant of policies to restrict informa-tion or to stifle dissent and criticism.

Clearly, there are areas in which secrecy is justified and inevitable but these are limited and can be clearly defined.

"Customs change; and we owe it to our meteorological colleagues — I am mixing my metaphors atrociously—to keep our weather eye cocked for the winds of change, as do other and less worldly professions, prominently the churches.

'And to go to the other end of the spectrum who would have expected even three years ago such a drastic relaxation of censorship that we are now allowed to see charming nudes on the ABC?

COMMUNICATION FORUMS

'Finally, we must discuss the forum on which the scientist can make his voice heard.

'Institutional rather than in-dividual channels of communi-

cation offer distinct advantages without inhibiting the initiative of professional groups or indi-vidual scientists.

vidual scientists. 'The public stands to gain from the competence and im-partiality of a recognized yet independent authority which is able to marshall, select and present evidence and con-clusions. This aspect will also be welcomed by many scien-tists, in addition to the degree of privilege, protection or anonymity which they may de-rive from collective as distinct from individual activities.

'Important qualifications are 'Important qualifications are that, in addition to competence and integrity, the institution should have initiative and enterprise, so as to gain not only the approval of the "establishmen!" in science (and government), but the confidence and support of the more critical and, as a rule, younger sections of scientists and of the community at large.

This may sound idealistic. but promising avenues can be discerned.

We have already seen two forms of official enquiry, a Royal Commission and a Gov-ernment appointed committee of enquiry, both in connection with the Barrier Reef.

'The establishment of such The establishment of such bodies of enquiry is subject to political control, as is their order of reference; but, as we have seen, subjects of consider-able scientific and public in-terest have been subjected to independent enquiry in this manner, and their number and relevance are likely to grow with public interest and pres-sure, in which the scientific community can play a part.

Second, there are commit-tees of the Parliament with procedures which approach those of a Royal Commission.

'Their present flowering is almost wholly confined to the Senate, and is due to the political composition in the upper house.

The House of Representa-tives has not developed a com-parable committee structure, but there is an ad hoc com-mittee of enquiry on wildlife conseguration conservation.

'Finally, I turn to a national institution which is representa-tive of science, is governed by

(Continued on page 3)

ment, promotion, research sup-port, etc., in organizations which are not controlled by

'I did it! I did it! I found a substitute for quality!' Courtesy 'New Yorker'. sions about effects on employ-



News In Brief

Retirement

Dr T. J. Marshall, Assistant Chief of the Division of Soils, retired on 25th March, the eve of his 65th birthday. A dinner to mark the occasion was held on 23rd March.

Dr Marshall joined CSIRO in 1929 as a soil surveyor and completed a series of surveys over the following 10 years. He went to the University of California in 1937 and completed a Ph.D. in soil physics.

On his return he devoted increasing attention to this aspect and became the head of a small soil physics research unit in 1944.

He has continued to lead this group, now greatly expanded, although retaining an interest in the wider field of the Division's activity.

He has an impressive record He has an impressive record over the past 20 years of contri-butions to soil physics, es-pecially in the sphere of soil-water relations, and has water relations, and has achieved an international reputation through it.



Dr MARSHALL

His review monograph, 'Relations between water and soil', is a book well known to soil scientists.

Dr Marshall is a Past President of the Australian Society of Soil Science, President of the Soil Technology Section of the International Society of Soil Science and a Fellow of the Australian Institute of Agricultural Science.

Professor

Mr J. R. Egerton of the Divi-sion of Animal Health has been appointed to the Chair of Veterinary Medicine at the University of Sydney.

Doctorate

Mr K. G. Newton of the Meat Research Laboratory, Division of Food Research, has been admitted to the degree of Ph.D. by the University of Queens land, for his thesis 'Studies on a Group of Actinomycetes'.

Visitor

Mr D. K. Purnell of the New Zealand Meteorological Service is in Melbourne working on the development of a Limited Area Fine Mesh Forecasting Model at the Commonwealth Meteorology Research Centre. It is anticipated he will spend approximately twelve months at the CMRC.

Credit Society **Interest Rates**

In view of the current trends In view of the current trends in interest rates, the Directors of the CSIRO Co-operative Credit Society have given con-sideration to the rates being offered by that Society for monies received on deposit.

billered by that Society for monies received on deposit. It has been decided that the interest rate for monies re-ceived on deposit for terms of more than 12 months will re-main at 7% per annum, but that, as from 1st March, 1972, and for the term of the deposit, this will comprise a guaran-teed rate of $6\frac{1}{4}\%$ per annum plus an ex gratia payment of $\frac{1}{4}\%$ per annum. Likewise for deposits re-ceived for periods of more than 5 years (when this class again becomes available) the rate will still be $7\frac{1}{4}\%$ per annum which will comprise a guaranteed rate of $6\frac{1}{4}\%$ per annum plus an ex gratia payment of $\frac{1}{4}\%$ per annum. The Directors reserve the

The Directors reserve the right to vary these ex gratia payments at any time but will give reasonable notice of any intended variation.

For deposits for periods of less than 12 months and for monies deducted from salary and placed on deposit with the Society, rates remain un-changed at 6% per annum.



SAFETY NOTES — Focus on Fire

This burn mark was the result of leaving a large desk magnifying glass on a laboratory bench close to a north facing window. In use the eye focuses to infinity and this means that if the lens is left in its working position, it is ideally set for focusing the sun's rays on to the bench. Luckily, fire did not break out because the bench top was laminex. If it had been wood, or if some papers had been left in the track of the burn mark, the circumstances might have been very

different

A similar hazard, it is timely to mention, is liquid-filled spherical glass vessels. These can also act as very efficient convergent lenses. Gil Barnes, Safety Officer.

The Manager of the Society also said that, because of new accounting procedures recently adopted, and in line with normal business practice, re-ceipts will not be issued for monies received after 1st March 1972 unless specifically requested

It is expected that shortly computer print-outs will be issued after each deposit has been received, and these will provide more information than do the present receipts.

Deadline

Contributions for the May issue of Coresearch should reach the Editor at P.O. Box 225, Dick-son, A.C.T., by Wednesday, 12th April.

SCIENCE AND SOCIETY

(Continued from page 2)

scientists, yet has close links with Government — the Aus-tralian Academy of Science.

with Government — the Australian Academy of Science. The Academy is increasingly concerned with the interactions of science and society. "It has published the widely used biology text book for schools, "The Web of Life", its committee of National Parks and Conservation greatly con-tributed to the closing of the "snow leases" in the Kosciusko area, and it has established a Committee on the Environ-ment, with working groups on topical subjects. "The report on the starfish (Australian Academy of Science, 1970) led to the gov-ernmental enquiry which was discussed earlier on, and the working groups on the use of DDT in Australia and on atmospheric effects of super-sonic aircraft have completed their reports which are in press. "The Academy work in g groups suggest a way in which the need for an independent forum with a wide-open refer-ence can be met.

The Academy has an ad-mirable institution called the Science and Industry Forum, which, in addition to establish-ing contacts between leaders in the two camps, has sponsored studies of relevance to both.

SCIENCE AND SOCIETY FORUM

SOCIETY FORUM 'I propose that the Australian Academy of Science — if pos-sible in co-operation with the Academy of the Social Sciences in Australia — form a "Science and Society Forum". 'This forum should concern itself with issues on the inter-face of science and society — specific problems arising from the application of science, and general principles of the inter-relations of science and society. 'It would consist of working groups on particular topics selected by a committee on which younger scientists should

which younger scientists should be well represented.

'It should be receptive to suggestions from scientists, authorities, organizations and the public. 'For reasons of working efficiency and economy, mem-bership of a group may be re-stricted geographically, but contributions from interested people should be encouraged. 'Funde would be accode for

people should be encouraged. 'Funds would be needed for participation, publications and a secretariat, and since there would not be a source corres-ponding to the industry contri-butions for the Science and Industry Forum, there is a need for one or more founding donors. "The Commonwealth Gov-ernment, which has shown

"The Commonwealth Gov-ernment, which has shown great interest in previous Academy enquiries, may wel-come their increased scope; and Mr Whitlam would come to realize that the Academy may have a more significant role to play than he ascribed to it in an article in Search in 1970.

1970. There are good reasons why a move of this kind is appro-priate in this period of "dis-enchantment with science", which really is disenchantment with the applications of science. With the exception of medi-cine, applied science has been almost exclusively devoted to economic production, to the "golden calf of growth". 'Now that public opinion as

"golden calf of growth". 'Now that public opinion as well as distinguished natural and social scientists are ques-tioning this preoccupation with GNP, the time is ripe for a new orientation in applied science in which science for productivity will be balanced by science for human welfare. 'One day another amendment to the Science and Industry Act may give it a new purpose and a new title, perhaps "The Science and Society Act". 'At this time, however, it is

'At this time, however, it is fitting that the two Academies representing the natural and social sciences in Australia should imaginatively and courageously explore, experi-ment, and lead.'



Adele Samuel of the Parkville Laboratory, Division of Animal Health, lived just across the way from St. Mark's Church, Camberwell, where she was to marry Dr. Peter Outteridge, also of Parkville. So, attended by colleague Judy Yelland and preceded by strewn rose petals, Adele dispensed with cars and literally stopped the peak hour traffic.

New Appointees

Mr V. A. Bettington has joined the Division of Animal Physiology where he will take responsibility for the health of all laboratory experimental animals and carry out a variety of surgical procedures in collaboration with the research scientists. Mr Bettington graduated B.V.Sc. from Sydney University in 1968 and since then he has worked in veterinary practices at Tamworth and at Sydney.

Mr M. M. Blanco has joined the Division of Applied Physics where he will work on the development and application of techniques for the precise measurement of impedance at frequencies up to I mHz. Mr Blanco graduated B.Sc. from the University of New South Wales in 1966 and completed a qualifying course for his M.Sc. in 1967. He has been working as a tutor/demonstrator at the University of New South Wales in the Department of Applied Physics. Mr T. W. Clarke has been

Mr T. W. Clarke has been appointed to the Editorial and Publications Section as editor of the Australian Journal of Physics, Astrophysical Supplements and Technical Papers in mathematics and physics. Mr Clarke graduated from the University of Sydney B.Sc. with honours in 1964 and submitted his thesis for M.Sc. at the same university in 1971.

same university in 1971. Mr R. J. Downic has been appointed to the Division of Mechanical Engineering to design and evaluate equipment concerned with cooling and solar energy utilization. Mr Downie gained a Diploma in Mechanical Engineering from the Caulfield Institute of Technology in 1968. He was formerly employed as an engineer with the State Electricity Commission of Victoria and has recently been with W. G. Crossle Pty Ltd as a design engineer.

Dr W. K.-H. Huchtmeier has joined the Division of Radiophysics as a research fellow in radio astronomy. Dr Huchtmeier graduated Ph.D. from Munster University, Germany, in 1971. Recently he has been working at the Centre National de la Recherche Scientifique (Observatoire de Paris), Meudon, France.

Mr H. Kirkman has joined the Division of Fisheries and Oceanography to work on the East Coast Prawn Project. Mr Kirkman graduated Bachelor of Agricultural Science from the University of Queensland in 1970 and has since been undertaking part-time study for a Bachelor of Commerce degree. Since 1962 he has worked in a variety of locations and capacities for C.S.R. including work on an oyster farming project in Queensland.

Tarming project in Queensiand. Dr R. L. Kitching has been appointed to the Division of Entomology to undertake an ecological study of the sheep blowfly and to investigate the possible application of genetic methods of blowfly control. Dr Kitching graduated B.Sc. with honours from the University of London in 1966 and Ph.D. from the University of Oxford in 1969. Since then he has been a post-doctoral follow with the University of British Columbia, Canada.

Canada, Mr G. A. Major has been appointed to the Division of Fisheries and Oceanography where he will work on improved techniques for the analysis of sea water and sediments for elements and compounds important to the Division's research project. After graduating B.Sc. with honours from the University of Tasmania in 1960, Mr Major taught in Tasmania for a number of years before joining E.Z. of Australia as a research chemist in 1967. For the last twelve months he has been studying for his Master of Applied Science in environmental pollution control at the University of New South Wales.

Mr M. J. Muller has been appointed to the Division of Animal Health where he will take part in research into the ecology and control of external parasites of livestock. Mr Muller graduated B.Sc.Ag. from the University of Sydney in 1971.

Mr B. M. O'Neill has joined the Mineral Physics Section where he will be involved in the design and construction of digital and analogue computers for field and laboratory research projects. Mr O'Neill gained an Associate Diploma in Electronic Engineering from the Queensland Institute of Technology in 1966 and since then has been working for AWA as an electronics engineer engaged in radar development at the Weapons Research Centre, Woomera, South Australia.

RRS

Dr J. M. O'Shea has joined the Division of Food Research at the Meat Research Laboratory in Brisbane where he will work on ways of improving the manufacturing properties of meat. Dr O'Shea graduated B.Sc. with honours from Adelaide University in 1961, M.Sc. in Chemical Engineering from the University of New South Wales in 1967 and Ph.D. from the Australian National University in 1971. Recently he has been engaged as a research engineer in the Mount Isa mines. Dr Lian-Tien Oswald has joined the Division of Plant Industry as an experimental officer to work on a research programme concerned with the chemical synthesis of biologically active compounds. Dr Oswald graduated B.Sc. in 1962 from Bandung University, Indonesia; M.Sc. in 1966 from the Swiss Federal University in Zurich, and Dr.Sc.Nat. from the same university in 1969. Following this she worked as a tutor in organic chemistry at the Indonesian Christian University then returned to Switzerland for several years as a research assistant and hospital pharmacist. Recently she has been working in the Chemnstry Section, National Biological Standards Laboratory.

Willing the W

'But, Michael, the labor market is awaiting you.'

Dr K. K. Puri has recently joined the Commonwealth Meteorology Research Centre where he will study dynamic and numerical problems associated with the development of regional and hemispheric numerical weather prediction models. Dr Puri graduated B.Sc. with honours from the University of Manchester in 1968 and received a Diploma in Advanced Studies in the Physics Department at the same university in 1969. In 1971 he was awarded a Ph.D. for studies of turbulence in fluid flow.

fluid flow. Mr B. W. Robinson has been appointed to the Division of Mineralogy to develop X-ray techniques for the identification and analysis of minerals in connection with the research programme on surface geochemistry. Mr Robinson graduated B.Sc. with honours in physical chemistry from the University of Western Australia in 1966. Since then he has worked as a part-time lecturer/ senior lecturer at the Western Australian Institute of Technology in the Chemistry Department. Miss C. A. Watson has

Miss C. A. Watson has joined the Division of Entomology where she will study the ecology of the sheep blowfly and possible application of genetic methods in blowfly control. Miss Watson graduated B.Sc. with honours from the University of Sydney in 1971. During her honours year she carried out work on the sheep blowfly.

Courtesy 'Saturday Review'.

carried out work on the sheep blowfly. Dr R. W. T. Wilkins has been appointed to the Division of Mineralogy to carry out research on the alteration of rocks by salt solutions. Dr Wilkins gained an M.Sc. in geology from Melbourne University in 1962 and a Ph.D. from Cambridge in 1965. He was a post-doctoral fellow and later a research fellow at Harvard University. Since 1968 Dr Wilkins has been a lecturer in the Department of Geology at the University of Queensland.

Visitor

Currently visiting the Division of Atmospheric Physics is Mr Rodjali from the Indonesian Meteorological and Geophysical Service.



Mr RODJALI

He will take part in the Division's micrometeorological programme.

Printed by CSIRO, Melbourne



The King St. Bridge in South Melbourne provides a semi-enclosed stadium for the Division of Building Research volley ball competition. Teams like the 'Engineering Enforcers', the 'Cuddly Clerks and Chemists' and the 'Dazzling Dames' fight it out at lunchtime surrounded above and on four sides by cars.

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CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF

NUMBER 158, MAY 1972

SIROTHERM

A new desalination process, 'Sirotherm', for purifying water for domestic and industrial use, developed jointly by ICI Australia and CSIRO, is undergoing final trials in three States.

After the discovery and early laboratory testing by the Division of Applied Chemistry, Melbourne, further research and development had been planned and carried out jointly by scientists from the two organizations.

It uses a novel ion exchange technique in standard equipment to lower the salinity of water containing up to 3,000 parts per million of salt.

Under a reseach contract jointly financed by CSIRO and the South Australian Mines Department, the Australian Mineral Development Laboratories (AMDEL) is also actively taking part in the project.

Tests in Victoria, South Australia and Western Australia indicated that Sirotherm was potentially cheaper than other large-scale desalination systems in use in this country.

The process reduced salinity in brackish water from bores, streams and lakes to levels suitable for town supply. It is not intended for sea water.

Sirotherm pilot plants have been installed in Perth, to treat bore water, in Adelaide to desalinate surface water, and at ICI's Yarraville plant, where an experimental continuous process is being tested. Throughout this part of the project, research teams from CSIRO and ICI have collaborated in an extremely close working relationship, jointly planning each stage from the early experimental work through to the installation and commissioning of the pilot plants.

Below: At Perth, this plant has produced over 2 million gallons (9 million litres) of municipal water from bore water. Millions of gallons of water have already been treated by the new process which is capable of being scaled up to capacities of many millions of gallons a day.

sallons a day. Simply, ion exchange involves, firstly, the use of an absorbing medium to remove ions from a solution and, secondly, the removal of the adsorbed ions from the medium in a procedure which regenerates the medium for further use as an adsorber. Often, as in this case, the ion exchange medium is a bed of resin beads through which the solution is passed. Most ion exchange resins are regenerated by the addition of acids or bases. The Sirotherm process is novel in that it is based on a type of resin that can be regenerated by hot water. In the Sirotherm pilot plants,

can be regenerated by hot water. In the Sirotherm pilot plants, brackish water is passed through a resin bed which adsorbs salt. When the salt content of the outlet water rises, indicating that the resin has adsorbed its capacity of salt, the bed is regenerated by passing hot water through it. This results in the removal of the salt in a concentrated effluent.

In a concentrated entuent. The first steps were taken when Dr D. E. Weiss and Dr B. A. Bolto of the Division of Applied Chemistry discovered ion exchange resins whose ability to adsorb sodium chloride and magnesium sulphate decreased markedly with rising temperature. AMDEL participated in this and later aspects of the work.

Extensive studies were made of the relationship between the chemical structure, acidity, basicity, and thermal regeneration of ion exchange resins of the weak electrolyle type. These basic principles were to act as a guide to the understanding of the complex equilibria involved and thus to resin selection. The performance of these resins was then improved by a modification which brought more water in contact with the resin at any given time.

At ICI, research by Dr H. A. J. Battaerd resulted in the capacity of the resins being greatly improved.

Over the past two years the project has been staffed roughly equally from ICI and CSIRO. Throughout this time, a group led by Mr J. C. Worboys of ICI has been developing methods of producing and testing the resins on a large scale.

Once a practical resin became available in substantial amounts, pilot plant investigations were started. These began with the study in Adelaide of simulated bore waters at AMDEL and were followed by investigation at the Yarraville works of ICI of the performance of a larger pilot plant, utilizing commercially available equipment, also on simulated bore waters.

The more recent Perth trials, conducted in collaboration with the Metropolitan Water Board, are aimed at producing a municipal water from a bore water. The resin and equipment installed at Perth were first tested in simulated studies at Yarraville, where a total of 2 million gallons (9 million litres) of water was processed. At Perth, a further 2 million gallons has been desalinated.





An ion exchange column being filled with Sirotherm resin for ICI laboratory trials.

CHURCHILL HOUSE

Last month the Governor-General of Australia, Sir Paul Hasluck, officially opened the new Churchill House building in Canberra. This building serves partly as headquarters for the Sir Winston Churchill Memorial Trust. It was one of the last buildings designed by the noted Victorian architect, the late Robin Boyd.

A feature of the building is a large 'podium' display area in front of the building.

The opening display featured the work of a number of Churchill Fellowship winners, including that of Dr. Stirling Hogarth-Scott of the Division of Animal Health.

Dr Hogarth-Scott was a Churchill Fellow in 1969 and when he was invited to take part in the exhibition he came up with the idea of a model about his field of work.

about his field of work. He then discussed the idea with Mr Robert Ingpen, a designer formerly of CSIRO, and they outlined an idea for a working model, with an explain the fundamentals of the immuno-pathological process, or more particularly the way in which research into man's response to asthma and the sheep's response to worms were being studied to further elucidate problems in immunology. Dr Allan Pierce, Chief of the

Dr Allan Pierce, Chief of the Division of Animal Health, then approached Merck, Sharp and Dohme (Aust) Ltd for financial assistance, and they contributed \$5,000 towards the project.

Dr Lloyd Rees, Chief of the Division of Chemical Physics, then arranged for Mr Tom Wignall and Mr Fred Box of the Division to do the engineering design and, along with other members of the Division, were responsible for the successful construction and installation.

A series of moving coloured lights, in conjunction with a soundtrack, explains the workings of the immunological response in man, sheep and cattle.

It is thought that many of the annual half million tourists to Canberra will see the model during its year-long exhibition at the site.

After the Churchill House exhibition the model will be moved to the foyer of the new administrative building at Parkville.

Press Conference

The Minister for Education and Science, Mr Malcolm Fraser, last month held a day-long press conference in the Head Oflice auditorium at Limestone Avenue.

About 30 journalists from around Australia attended, Most were specialist writers in either science or education.

The specialist writers in either science or education. In the afternoon the Chairman, Dr Price, introduced the work of CSIRO and then screened a new film on the Organization, The film had been hastily prepared by a combined team of writers and film makers. Alice Bugge and Keith Martin, of the Film Unit, assembled a very fast moving type of film which ranged over the activities of the Organization using a very effective threescreen technique. The 16 mm film on the central screen was reinforced by still slides on the two side screens.

With an unconventional sound track and fast moving 'TV commercial' techniques. the film appeared to make a very good impression on all who saw it.

LIMITS TO GROWTH?





'Remember all those things we thought, thank God, we wouldn't live to see? We're going to live to see them.'

Courtesy 'Saturday Review'.

Publication this month in Aus-Publication this month in Aus-tralia of the Club of Rome-M.I.T. book, 'The Limits to Growth', by Meadows, Mea-dows, Randers and Behrens, will give Australians a chance to evaluate for themselves what all the fuss is about.

'The Limits to Growth' is the hav Forrester's work at the Massachusetts Institute of Techbook nology.

Jay Forrester is an outstanding ex-computer engineer who, incidentally, holds some of the key patents still relating to computer manufacture.

He moved into the field of He moved into the held of business management, where he demonstrated the value of ap-plying the feedback principles used in control systems en-gineering, and from there into social systems simulation.

His first major publication was 'Urban Dynamics', which brought the use of computer simulation to bear on the prob-lems of the city.

Then he moved on to 'World Dynamics', a preliminary look at the use of computers to help plan the world's future. This work attracted the attention and the financial sup-port of the 'Club of Rome', a multi-national group of scien-tists, humanists and wealthy industrialists concerned at the environmental repercussions of current development, and headed by Aurelio Peccei who is, among other things, on the board of Fiat.

board of Fiat. The Club decided to support the research of a team at MIT to continue to develop the model. An international team under Professor Dennis Mea-dows has spent the last eigh-teen months refining the model.

They have produced 'The Limits to Growth' as a first at-tempt to explain to the general public what their work is all about.

This book has been widely criticized as containing little fact and a lot of supposition.

But the authors say that it should be viewed as an attempt at letting people know what they are doing to show that, whatever criterion is used in their models, if man continues his current rate of use of natural resources, his popula-tion growth, his capital invest-ment policies and his pollution of the environment, then we

are headed for an ecological

disaster. Later this year it is planned that a second book giving their methodology and data in greater detail will be published. Mr Peter Benyon of the Divi-sion of Computing Research has successfully got Forrester's early model, 'World IF, running on the 3600 Computer in Can-

berra, The Limits to Growth' was subdiced by the Club of Rome of the State of Stat

so that a large number of free copies could be distributed throughout the world to politicians

So far, a number of Australian So far, a number of Australian Federal politicians have shown interest in this work and have been to the Computing Centre to watch the model being de-monstrated. Watching the model being demonstrated, one gets the feeling of playing mono-poly on a grand scale. Firstly, the programme is cal-led up and run in its standard condition which assumes that present world policies of growth continue. Then, in further runs, changes

Then, in further runs, changes can be made to policies affect-ing any of the five major vari-ables — population; natural re-sources; pollution; capital in-vestment, or food production. A sixth variable is 'quality of life' which, however, is not strictly part of the model but serves as an indicator of the general state at any time. In each run, changes in the

general state at any time. In each run, changes in the world situation are graphically displayed on the computer's television screen from the year 1900 to 2100. For instance, punch a few buttons to see what cutting the usage rate of natural resources to a quarter would do. With the rate of natural re-source usage decreased, capital investment is able to increase further than before but so does pollution, leading to a pollufurther than before but so does pollution, leading to a pollu-tion 'explosion'. The birthrate then decreases and death rate increases as a result of disas-trous levels of pollution. When the world's population has plummeted to a low level, this is quickly followed by an increase in the quality of life for the survivors due to less crowd-ing, more capital per head, etc. (However, this last effect may not be realistic as the people remaining would probably be mainly in the 'undeveloped' countries and the remaining capital far away in the 'de-veloped' countries.)

But what is the value of all this work on computer model-ling? Jay Forrester sees it this

iing? Jay Forrester sees it this way: 'I am suggesting that we do now know enough to make use-ful models of social systems. Conversely, we do not know enough - to- design the most effective social systems directly without first going through a model - building experimental phase. But I am confident, and substantial supporting evidence is beginning to accumulate, that the proper use of models of social systems can lead to far better systems, laws and programmes.' In the area of computer

the area of computer In In the area of computer modelling generally, a number of scientists in a range of CSIRO Divisions are now either actively developing models or expressing a keen either actively develo models or expressing a interest.

NEWS IN BRIEF

Philippines Visitor

Mr Gaudioso R. Tabamo, a Chief Training Officer with the Philippines Weather Bureau is spending some time with the Division of Atmospheric Phy-sics. Mr Tabamo will also visit



Mr Tabamo

Canada and the United States on his Fellowship in Agri-cultural Micro-Meteorology from the World Meteorological Organization.

NSL Open

On 30th and 31st May 1972, in-terested people will have an opportunity to see recent de-velopments in the National Standards Laboratory and to discuss with its staff possible applications of the techniques and equipment used.

Admission tickets for after-noon or evening sessions can be obtained from the Secretary, Open Days Committee, Univer-sity Grounds, Chippendale, N.S.W., phone Sydney 660 7614.

Correction

In the April issue of Coresearch Mr I. R. Dick's qualifications were incorrectly reported. He graduated B.E. from the Uni-versity of Adelaide.

The President

At the first Council Meeting of the newly formed Australian Society for Operations Re-search, Mr W. B. Kennedy of the Division of Building Re-search was appointed as In-augural President, to hold office until March 1973.

Medium Rare?

A quotable quote from a recent paper by a member of the Divi-sion of Wildlife Research:

'Observations on the food of the fox, Vulpes vulpes (L.), in an arid environment, P. N. an Martensz.

Martensz. "... Despite the continuous availability of kangaroo as car-rion, stomachs contained re-mains from many other animal species. Many stomachs also contained pieces of grass, twigs and fruits of *Bassia* spp., and often a large quantity of sand. One contained a piece of news-paper..." paper. . . .

This may require a variation on the old New York Times' phrase to, 'All the news that's fit to eat'.

Credit Union

At the last Directors' meeting of the Laboratories Credit Union Ltd, Mr Trevor Clark was elected Chairman of Dir-ectors. The former chairman, Mr Roy Taylor, remains a member of the Board.

Heritage

The popular ABC Radio series on ecology and conservation, 'Heritage', is returning to air on 1st June.

This time the series deals with the rain forests of north Queensland, Westernport Bay, Kangaroo Island, Lord Howe Island, western New South Wales and the Kimberley area. 'Heritage' will be broadcast

in the city on the Second Net-work on Thursday nights com-mencing 1st June at 7.30 p.m. and in the country areas on the Third Network on Monday nights, commencing 5th June at 7.30 p.m.

SAFETY NOTES

Hang-up

There are very neat plastic hooks available, with a pres-sure-sensitive adhesive backing, ideally suited for hanging up glass cloths. How about all' you people who drape their glass cloths over gas cylinders, which are usually fitted with regulators, getting your pur-chasing officer to buy you one. At about 10 cents, the books

At about 10 cents, the hooks are much cheaper than repairs to a gas regulator, and certainly less hazardous than pulling over a gas cylinder.

Pointed

When buildings or rooms are being renovated or refurbished, clean up the rubbish instead of leaving it lying around. One laboratory had two cases, with-

days, of workmen in three with nails through the soles of their feet.

When demolishing old work, knock the nails over so that they are not left as a trap for the innocent unwary.

Chop-Chop

Inspecting a workshop re-cently, the guard on a planing machine was not operating satisfactorily. It could be pul-led away from the cutter head, and the tension in the spiral

and the tension in the spiral return spring was apparently not sufficient to return the guard to its safe position. Surprisingly enough, this was the same machine on which a tradesman lost a couple of fin-gers about a year ago!

Gil Barnes, Safety Officer.

Death of Dr Gregory

Dr T. S. Gregory, former Chief of the Division of Animal Health, died last month. Dr Gregory was born at Balla-rat, Victoria, in 1903. After secondary education at the Bal-larat Agricultural High School, he entered the Faculty of Vete-rinary Science in the University of Melbourne, graduating with honours in 1923. He then en-tered practice at Canterbury, New Zealand, where he spent the next two years, working principally with dairy cattle. In 1926 he returned to Aus-

principally with dairy cattle. In 1926 he returned to Aus-tralia and took up duty in Mel-bourne as a research officer of the recently formed Council for Scientific and Industrial Re-search. Here he spent two years carrying out investigations on caseous lymphadenitis of sheep, the complement fixation test for the complement fixation test for monia and bovine pleuropneu-monia and bovine tubeculosis. This latter work, which com-menced with investigations into menced with investigations into the possible vaccination of calves with BCG, led to a life-long interest in this disease. In 1928 Dr Gregory accepted appointment as senior lecturer in bacteriology in the Uni-versity of Melbourne where he remained for almost nine years. This period was devoted largely to teaching. It developed his interest in medical and general bacteriology and laid the foun-dations of many professional and personal contacts with medical research workers which were to be maintained through-out his official life. During this period, also, he spent a year at the London School of Hygiene and Tropical Medicine, obtain-ing the Diploma of Bacteriology. Towards the end of 1937 he rejoined the CSIR, working this time at the McMaster Labora-tory and also acting as part-time lecturer in bacteriology and the Vietrinary School of the University of Sydney. During the brief time which was to elapse before his research career was to be again inter-rupted, this time by the Second World War, he worked princi-pally on ovine footrat, differen-tiating it from foot abscess and developing an interest in these diseases which was to continue throughout his career. In July 1940, Dr Gregory joined the A.I.F. and became bacteriologist with the 2nd Fourth Australian General Hos-pital, serving through the seige of Tobruk, Subsequently, he became the Commanding Offi-cer of the 2nd Third Australian Mobile Bacteriology Labora-tory, which he led through the Syian Campaign. He returned to Australia in 1943 with the 9th Division, A.I.F., and joined the LHQ Medical Research Unit as bacteriologist, with the rank of Major. This was a malaria research unit based at Carins.

Early in 1946 he returned to CSIR, Parkville, where he took up once again his studies of

bovine tuberculosis and, in addition, commenced a long series of major investigations into brucellosis which helped in the eventual wide adoption of Strain 19 vaccination in Ausof

Strain 19 vaccination in Aus-tralia. In 1949-50 Dr Gregory held the office of President of the Australian Veterinary Associa-tion, and in 1953 he was awarded the degree of Doctor of Veterinary Science (Uni-versity of Melbourne). When he became Chief of the Division of Animal Health its Parkville laboratory--which

the Division of Animal Health its Parkville laboratory—which had been the centre of research into bovine pleuropneumonia, mastitis of dairy cattle, chronic copper poisoning and *Helio-tropiumeuropacum* poisoning of sheep, myxomatosis, cattle dis-eases and anaerobic diseases of sheen — occupied facilities built

sheep, involutions, cathe dis-eases and anaerobic diseases of sheep — occupied facilities built in 1937, and had had virtually no major new buildings or plant and equipment since that time. Foreseeing the need for ex-pansion of space to house re-search workers, and in consul-tation with those responsible for the planning of the new Veterinary School of the Uni-versity of Melbourne, he took successful steps to procure from industry funds, resources to the total value of £400,000 for en-largement of the Parkville labo-ratory, replacement of inade-methor common distance of the parkville labo-ratory, replacement of inaderatory, replacement of inade-quate animal accommodation, quate animal accommodation, and the acquisition and deve-lopment of 40 acres of Com-monwealth land at Maribyr-nong as an experiment station. In addition, during the whole of his period as Chief of the Division, he developed and ex-ecuted plans for a new research section which became the first in Australia competent to work in the important field of animal virology.

In the important field of animal virology. Attention was also given to the need for a parallel deve-lopment of animal health re-search facilities in northern Australia and, before he retired from the position of Chief of the Division, Dr Gregory had the satisfaction of knowing that a new laboratory would soon be built at Indooroopilly near Brisbane to replace the anti-quated Yeerongpilly laboratory. This new laboratory and its associated facilities for experi-mental animals is supported by a field studies of cattle tick, tick fever and worm parasites tick fever and worm parasites of northern cattle will be carried out. He was a member, and often

He was a member, and often an executive member, of a num-ber of international and national committees including the FAO Expert Panel on Pleuropneu-monia, the Sub-Committee for the Control and Eradication of Contagious Bovine Pleouro-pneumonia, the Technical Sub-Committee on Infertility of Committee on Infertility of Dairy and Beef Cattle and the Biennial Veterinary Conference; perhaps his most important committee work was associated with the position of Australia in respect of exotic diseases of livestock.

Nuclear Symposium

A symposium on 'The **Role of Nuclear Energy** in Australia's Development' is to be held at the Academy of Science **Building in Canberra** on 1st and 2nd June. It is under the sponsorship of the Academy of Science, the Society for Social Respon-sibility in Science (A.C.T.), and the Australian Atomic Energy Commission.

The purpose of the sym-posium is to provide a forum for exchange of ideas among those with more than a lay-

man's concern for the major aspects of nuclear energy pro-duction in Australia. Topics to be covered include

fuel and energy policies and economic considerations; tech-nical prospects and problems; environmental hazards; legal

enviroinmental hazards; legal and regulatory questions. Attendance at the conference will be limited to those who have registered (fee \$9), but re-gistration is open to all in-lerested persons. A copy of the programme and a registration form may be obtained by writing to Mr J. Deeble, Executive Secretary, Australian Academy of Science, Box 216, Civic Square, Can-berra, A.C.T. 2608.

Emergency

in the Alps

One Sunday last month as three young men from Western Australia stood on the summit of Mount Kosciusko, a small patch of snow in the distance caught their eye.

Two of the party, to whom snow was a novelty, set off to-wards the deceptively distant goal.

Caught in a sudden weather change, so characteristic of the region, they tried to find their way back through thick cloud, rain, sleet, snow and strong winds battering them all the way.

Disoriented, they drifted well off course down the steep, rug-ged Wilkinson's Creek that falls westwards towards the Murray River 5,000 feet below.

Clad only in casual clothing, rain-soaked, they were in serious difficulties. A large rock gave some shelter from the heavy rai and cold. rain, but not from wind

The young West Australians survived two days and nights in these conditions without food or shelter.

In the meantime, a massive search operation had been launched by the Kosciusko Park authorities.

Police, Park rangers and local bushmen were joined by the Search and Rescue Group of the Canberra Bushwalking Club. The searchers groped through the cloud-covered slopes, and light aircraft joined the search when the weather moderated.

On Tuesday morning two RAAF helicopters joined in.

Later that day, one sighted the missing men. Winched to safety from the steep gorge, they were whisked back to search headquarters at Raw-son's Pass as the ground parties were recalled.

Thirty-six experienced sear-chers had been placed in the field at short notice by the Canberra Bushwalking Club.

The Search and Rescue Group The Search and Rescue Group has been involved in a number of bush emergencies since its formation six years ago. The members of the group carry out training exercises each year. These include search techni-ques; map and compass work; rescue, treatment and transport of casualties; survival in the bush; and communication on the ground and with aircraft.

The group was established as search and rescue service for a searcn and rescue service for the club, which has a member-ship of 200, Its help is sought from time to time by police and other authorities for search emergencies in rugged bushland or in conditions of severe weather.

Three members of CSIRO staff took part in the recent search. They included John Wanless (Plant Industry) Harry Black (Press Officer at Head Office), and Robert Story (Land Research). Harry Black is the Field Organizer of the Search and Rescue Group.

DEADLINE

Material for the June issue of Coresearch should reach the Editor at P.O. Box 225, Dickson, A.C.T 15th May. A.C.T. 2602, by Monday,

LIBRARY MOVE



The problem: move 150 tons or 60,000 volumes of books and periodicals down two flights of stairs, then a quarter of a mile up the road and, finally, up two flights. Solution: Peter Russell, Black Mountain Librarian, takes out a Lift and Hoist Operator's Certificate, two brick hoists and a large truck are hired, plus a number of university students as labourers. Which leaves the library in a new home and Peter Russell one of the more 'highly' qualified types of librarian.



Fiona Malcolm, Reference Officer of the Library, found that wearing her Women's Lib T-shirt earned her a man's job. Here she's unloading books in the new library.



3. The new library has an unusual shape, but apparently with a purpose. The design means that readers are not surrounded by walls of books but have a feeling of space, and the triangular section allows readers to have a broad range of lighting from completely natural to fully artificial; there are windows down the sloping section of the roof, incidentally.



Australia House

An exhibition of Australian scientific research work was recently held in the windows of Australia House, London. Research re-presented covered a broad field from medical to secondary indus-trial and environmental work.

Pictured are Dr Gordon Hallsworth, Chief of the Division of Soils, and Mr Bob Croll, Scientific Liaison Officer, London. This particular window dealt with the work of the CSIRO Division

NEW APPOINTEES

Mr R. P. Netterfield has been Mr R. P. Netterfield has been appointed to the Division of Physics where he will work on the development of optical coat-ings, including multi-layer coat-ings of precisely controlled properties. Mr Netterfield gra-duated B.Sc. with honours from the University of Queensland in 1968, since when he has been working for a Ph.D. at the same university.

Dr C. M. Barton has recently been appointed to the Division of Applied Geomechanics where of Applied Geomechanics where he will work on a long-term programme of investigations in-to the influence of geometrical fabric features on the mecha-nical behaviour of rock masses. Dr Barton graduated B.Sc. from the University of Wales in 1958, M.Sc. from the University of Birmingham in 1962 and Ph.D. from the same university in 1964. He was a geologist with the British Antarctic Survey from 1959 to 1961; with the Tasmanian Mines Department from 1964 to 1965, and the State Electricity Commission of Victoria from 1966 to 1972. Dr H. G. Linge has been ap-

Dr H. G. Linge has been ap-pointed to the Division of Mineral Chemistry where he will study oxidation chemistry of particulate solids as part of research into the behaviour of Australian minerals and mineral products during mining, pro-Australian minerals and mineral products during mining, pro-cessing, storage and transport. Dr Linge graduated B.Sc with honours, in 1966, from Monash University, and Ph.D. from the same university in 1971. Re-cently he has been working as a Post Doctoral Feilow, firstly at Case Western Reserve Uni-versity of Ohio, and then at the State University of New York.

Dr R. N. Reddie has recently been appointed to the Division of Protein Chemistry where he will work on the addition of polymers to leather to improve its appearance and physical qualities. Dr Reddie graduated B.Sc. from the University of New South Wales in 1966 and Ph.D. from the same university

in 1970. He was at one time a in 1970. He was at one time a tutor and demonstrator at the University of New South Wales and lately has been Visiting Re-search Associate of the National Research Council, Washington.

Research Council, Washington. Dr B. R. Loveys has recently joined the Division of Horti-cultural Research where he will study the effect of high tem-perature on horticultural crops. Dr Loveys graduated B.Sc from University College, Wales, in 1967 and Ph.D. from the same university in 1970. Recently he has been an assistant professor at Purdue University, U.S.A., in the Department of Agriculture.



The Organization for Economic Co-operation and Development, an international body based in Paris which Australia joined last year, has carried out some extensive studies into science and science policy.

Late last year they published a report on 'Science, Growth and Society'.

Some of their conclusions are reported here:

The uncertainty and rapid The uncertainty and rapid change of social goals are caus-ing, and will continue to cause, a difficult and sometimes pain-ful re-adjustment as the scien-tific establishment strives to respond to new priorities. The levelling off of R&D resource growth is only one consequence of this adjustment. Massive pro-jects in space, defence, and as-sociated activities decline, while poals in social areas have not goals in social areas have not yet been sufficiently crystallised so that they can be related to coherent and focussed technical programmes. Thus unemployed

SUPERSONIC AIRCRAFT, POLLUTION AND ALL THAT

A certain amount of emotion, in some quarters, seems to have been generated by the Australian Academy of Science's report on Atmospheric Effects of Supersonic Aircraft'.

The report, initiated by the Academy and subsequently re-quested by the Department of Civil Aviation, was published recently.

recently. The Chairman of the Report Committee was Dr C. H. B. Priestley, Chairman, Environ-mental Physics Research Labo-ratories, and other members of the working group included Dr L. K. Bigg of the Division of Atmospheric Physics and Mr B. G. Hunt, Commonwealth Meteorology Research Centre. Forty scientists were con-sulted in preparing the report of which nine were from CSIRO. The report covered only at-

The report covered only at-mospheric effects, not noise and sonie boom.

In fact the report recom-mends a rather cautious ap-proach to the introduction of supersonic aircraft in Australia.

The Committee made the fol-lowing recommendations. Summary of Conclusions and

'On the basis of the data available to us we would not expect significant adverse cli-matic effects to derive from supersonic aircraft assumed by

technical manpower is appear-ing or may appear in some sectors. Until the new social goals have become better cry-stallised and related to tech-nical and scientific goals, the future demand for scientific and technical manpower will be difficult to forecast, and there is considerable disagreement about the long-term implica-tions of present trends. To blame the deleterions eftechnical manpower is appear-

tions of present trends. To blame the deleterious effects of technology on research and development priorities is unwarranted. These effects are consequences of broad social and economic policies. Public disillusion with the effects of the application of technology on the quality of life of the in-dividual, which has rubbed off on to science, is likely to in-crease. At present this disillu-sionment is manifested mainly in outcries about such disturb-ling effects as urban decay, polin outcries about such disturb-ing effects as urban decay, pol-lution, and displacement of labour. In addition, there is in-creasing public questioning of the ethical basis of research whose results might be used for the manipulation of the indivi-dual or society. Furthermore, the shadow of nuclear warfare and the use of increasingly sophisticated destructive 'con-ventional weapons' still remains. Thus public opinion is focusing on the negative effects rather than the benefits that society enjoys as a result of scientific discovery. discovery.

It is important to recognize that many current problems of society arise from inadequate development of technology in development of technology in the services sector, in compari-son with technology developed for the manufacturing sector. The very slow growth of pro-ductivity in government services and in the services sector generally, particularly in educa-tion and medical care, has been a major cause of inadequate social performance of the eco-nomic system in relation to in-dividual and social welfare.

Further economic growth may be necessary before the advanced countries can remove us to be flying by 1985.

However, the possibility of deleterious changes cannot be totally dismissed and accor-dingly any Australian decision on supersonic aircraft should be taken only in the light of all the qualifications embodied in this report. in this report.

in this report.
Because of the global nature of the problem, the possible need for international agreement on limitation of flying must be borne in mind.
"The following are the main more specific recommendations:
1. Stratospheric flying should be in the lower stratosphere, below about 18 km.

- 18 km.
- The aircraft industry should take all possible steps to minimize nitro-gen oxide emissions from '2. engines.
- It is imperative that It is imperative that a programme of strato-spheric monitoring be in-troduced and continued. An Australian pro-gramme, requiring co-ordination with similar programmes elsewhere, is suggested. For certain components there is a special urgency for an early start in the southern hemisphere. A standing scientific com-
- hemisphere. A standing scientific com-mittee should be ap-pointed in Australia to keep the results of both local and global moni-toring under continuing review. This should be linked with a correspon-ding international com-**'**4.

residual islands of poverty, im-prove social services such as public health, education, and urban transportation, and in-crease their aid to less developed countries. However, it is now recognized that growth, as mea-sured by the market alone, does not automatically encoded the sured by the market alone, does not automatically guarantee the best application of the re-sources created. Thus, emphasis has shifted from growth in in-creased personal incomes to growth in generating the means necessary for general social de-velopment. The new emphasis entails consideration of the qualitative aspects of economic growth and of social influence

- mittee. If necessary, Aus-tralia should take the initiative towards esta-blishing the latter. There should be intensi-fied research in Australia on the general circulation of the atmosphere, with appropriate computer support, and on photo-chemical models.
- Active encouragement should be given to the development in Australia of more expertise in atmo-spheric, including strato-spheric, chemistry. **'**6.
- spheric, chemistry. There should be support for field experiments in the stratosphere, as the opportunity unfolds. Supersonic aircraft them-selves should, where ap-propriate, provide facility for these experiments and for monitoring observa-tions. tions
- Special efforts to observe **'8**. the stratosphere should be undertaken following any future volcanic erup-tions.

Because any climatic reper-cussions, if they were to occur, would be world wide, these re-commendations should be im-plemented irrespective of the introduction of supersonic air-craft to Australian air routes.

craft to Australian air routes. 'However, if these aircraft are so introduced, it would ap-pear proper that the costs of implementing the monitoring and research programme in this country should be debited against the presumed future benefits of the introduction.'

upon the direction of invest-ment and innovation. The continuation of eco-nomic growth and the exigen-cies of new social goals lead us to expect further massive deve-lopment of technology, but in a more comprehensive and socilopment of technology, but in a more comprehensive and soci-ally oriented framework than in the past. A certain amount of catch-up may be required to reverse the deterioration that has already occurred in the quality of life. The required technological development and the advancing basic knowledge from which it must derive may demand further increases in R & D effort in the long run.





159##1972 CORESEARCH

Landing Aids for Aircraft

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF

The Department of Civil Aviation will provide \$130,000 for initial research by the Division of Radiophysics into an aircraft landing system suitable for the very dense air traffic of the future.

The Division and DCA believe that a microwave instrument landing system (MLS) suitable for inter-national use can be based on an antenna of novel design which arose from the Division's research in radioastronomy.

In the view of DCA the Division's antenna design promises to have important advantages in meeting the requirements for a new system.

for a new system. The new project comes a quarter of a century after the highly successful collaboration between CSIRO and DCA in the early post-war years when radio navigation equipment de-vised by the Division of Radio-physics was adopted by DCA for use in all commercial air-craft throughout Australia. Existing VHE instrument

craft throughout Australia. Existing VHF instrument landing systems conforming to the standards of the Inter-national Civil Aviation Or-ganization (ICAO) have been in operation throughout the world for many years.

DROUGHT STUDY

A bequest of \$18,000 to CSIRO from the estate of former grazier, Mr Arthur Sulman of Forrest, A.C.T., will finance a two-year posidoctoral fellow-ship on droughts.

The Fellow to be appointed will work under the direction of the Commonwealth Govern-ment's Interdepartmental Drought Study Group and will be supervised by Mr Ray Perry, Leader of the Range-lands Research Unit of CSIRO.

The Study Group consists of representatives of the Com-monwealth Bureau of Meteor-ology, the Bureau of Agricul-tural Economics, the Queens-land Department of Primary Industries, and CSIRO.

Industries, and CSIRO. I It was set up in 1970 by a Commonwealth/State consulta-tive committee of the Aus-tralian Agricultural Council to investigate the longer-term aspects of drought and im-prove knowledge of droughts, their recognition and occur-rence and their biological and eico no m ic consequences at e c o n o m i c consequences farmer, region, state a national levels. and

The Group considers that the main research need at pre-sent is to consolidate existing knowledge into an overall pic-ture as a basis for assessing management strategies and ad-ministrative decisions.

Initially, the study will in-volve a selected area having a single industry, a single rain-fall season and a simple soil and vegetation pattern.

But later the study could be extended to other regions representing a variety of indus-tries and climates.

These systems are considered to have fundamental limita-tions which will make the future demands of air traffic increasingly difficult to meet. The VHF system is limited to providing landing guidance along a single straight approach path aligned with the centre of the runway and at a fixed elevation angle. Modern aviation de much greater versatility. demands

In particular, a more flexible with the rising volume of air traffic, problems of noise abatement and the expected in-troduction of STOL (short take-off and landing) aircraft. Multiple approaches, curved flight paths and a variety of elevation angles will have to be accommodated by the new

system. The MLS system must also be capable of guiding aircraft on to a runway in conditions of low, even zero, visibility.

It is generally agreed in aviation circles that these factors require the use of an extremely high frequency in the microware board the microwave band.



FISHERIES CHIEF

Mr K. Radway Allen, Director of the Fisheries Research Board of Canada's Biological Station in British Columbia for the past five years, has been appointed Chief of the Division of Fisheries and Oceanography.

Mr Radway Allen, who has an international reputation as a fisheries research scientist, has acted as a consultant in fisheries matters over the years for a number of international organizations.

He is widely known for his work in applying the principles of population dynamics and mathematical modelling to fisheries research, particularly in the analysis and assessment of whaling stocks.

Mr Radway Allen was born in London and graduated with honours from the University of Cambridge in 1932. Before going to Canada eight years ago, he was involved in fisheries research in New Zealand for 25 years and was Director of Research in the Fisheries Branch of the New Zealand Marine Department from 1961 to 1964.

A Fellow of the Royal Society of New Zealand, he was ice-President of the Society from 1961 to 1963 and President the New Zealand Association of Scientists from 1951 to 1953.

GRANT FROM

NUMBER 159, JUNE 1972

CSIRO research into the production of electrode carbon from natural gas will be supported by a grant of \$100,000 from the Broken Hill Proprietary Company Ltd.

The grant will provide finance for the construction of a large-scale experimental rig at the laboratories of the Division of Mineral Chemistry, Port Melbourne.

An earlier grant of \$16,000 made by the same company for the electrode carbon project already has shown the import-ance BHP accorded to studies of secondary products from natural cas natural gas.

Electrode carbon used by Australian aluminium smelters is imported at present in the form of petroleum coke at a cost of \$2 million a year.

cost of \$2 million a year. If a fully commercial pro-cess can be developed, the market demand for electrode carbon by the end of this decade could utilize gas quanti-ties equivalent to the present natural gas needs of Mel-bourne.

BHP began its collaboration with CSIRO on the project in 1969 at the time the Division of Mineral Chemistry built a 'moving bed reactor' in its Sydney laboratory.

In this reactor petroleum coke particles heated to 1100°C. sink slowly down a column of upward flowing natural gas.

As the gas is 'cracked' by the heat into its elements, hydrogen and carbon, the hydrogen is piped off and the carbon is deposited on the descending particles.

The particles are con-tinuously re-cycled through the gas flow until they have grown to the required size.

The high quality carbon pro-duced by this novel method has been tested successfully for use as anodes in the production of aluminium.

25 Years of Research

The Bread Research Institute was an outstanding, and long established, example of an Australian research association in which industry had got together to organize research in the interests of the member firms making up the industry,' the Chairman, Dr J. R. Price, said in Sydney last month.

'This was a pattern which had been common in the United Kingdom, but it had been much slower in developing in this country.

Such research associations "Such research associations demonstrate two things," he said, 'First of all, the prepared-ness of the industry itself to support research to advance its own technology, and, secondly, the willingness of the govern-ment to help those who are prepared to help themselves in this way." Dr Price was speaking on

Dr Price was speaking on the occasion of the twenty-fifth anniversary of the Bread Re-search Institute at North search Institu Ryde, Sydney.

The occasion was marked by he unveiling of a plaque to fr William Sloan who has een Chairman of the Council f the Institute throughout its Mr of existence.

The Institute was estab-lished by the bread industry in 1947 to carry out research and development for the in-dustry and to perform an education role.

CSIRO has been closely associated with the Institute since 1951, when it commenced administering the government funds supplied to it.

In 1957 CSIRO became even more closely related when CSIRO's Wheat Research Unit was established under the direction of the Director of the Bread Research Institute, Mr Bric Bond

Officers of the unit are in fact CSIRO staff, but the Unit is closely linked in a physical and research sense with the Institute.

The Unit carries out fundathe Onit carries out funda-mental research into the chemical and physical proper-ties of the wheat grain and those processes involved in turning wheat into flour and dough Both these research groups have established important scientific reputations at the same time as they developed work of great importance to the baking industry of not only Australia but also South-East Asia.

BENEVOLENT FUND

Some 30 years ago the first Benevolent Fund for CSIRO staff was founded at the National Standards and Radio-physics Laboratories in Sydney.

ney. For a quarter of a century this was the only Benevolent Fund in CSIRO. Now, with the formation of the CSIRO Benevolent Fund---N.S.W. at an inaugural meet-ing held on 1st May, 1972, the final step has been taken to provide benevolent fund cover for all CSIRO staff through-out the Commonwealth. The inaugural meeting of

for all CSIRO staff through-out the Commonwealth. The inaugural meeting of the N.S.W. Fund was held at the Division of Textile Physics and was attended by 37 dele-gates representing the majority of Divisions and Sections in New South Wales. The meeting unanimously approved the formation of the Fund and adopted the consti-tution which had been drafted by representatives from the existing four Divisional Funds in New South Wales. An executive committee was elected at the meeting with M. J. Puttock (NSL) as President, J. J. Connolly (NSL) Secretary, and C. W. McIlveen (RAO) Treasurer. During the next few months steps will be taken to ration-alize the situation regarding funds, and the new Fund should be well established by the time of its first annual general meeting in November.

THE JOYS OF RESEARCH

I've been rearing Paropsis in our laboratory for four years now. Some technician was rearing them in here long before I came. I didn't ask anyone so I don't know how long - maybe it was five years - perhaps even twenty-five.

But I shouldn't really complain. The Boss has been studying them a lot longer than me.

Of course he's a scientist, so he always had someone like me to feed them every day, and clean up their droppings.

I reckon I must have reared at least five million Paropsis. That's a real achievement when That's a real achievement when you think about it. Not many people can say they've reared five million *Paropsis*. We are just about the only place in the world that rears *Paropsis*.

world that rears *Paropsis*. Not even the Chinese rear them as far-as we know. It makes me feel pretty exclusive when I realize there's nearly eight hundred million people in China and not one of them knows as much about *Paropsis* as I do. as I do.

Paropsis eat Eucalypt leaves. The eggs are laid on Eucalyp-tus, the first, second, third and fourth stage larvae eat

The eggs are blue on all of a blue of the ggs are blue on the stage larvae eat Eucalyptus, and just to show they don't get sick of it, the adult beetles eat it too. Paropsis don't eat all Eucalypts; they are a bit fussy. They like Red Box and Red Gum, but they won't eat leaves from Yellow Box or Stringy-bark. I don't know how they can tell the difference — they taste much the same to me. When you feed several hundred larvae every morning, month after month, you some times worder why you're do.

when you leed several hundred larvae every morning, month after month, you some-times wonder why you're do-ing it. Technical Assistants aren't supposed to wonder about such things. You're expected to believe that the excientists know what they're doing and why they're doing it. But you can't help wondering sometimes. When you've been rearing *Paropsis* for a while you start thinking like a *Paropsis*. I have to find fresh young leaves for them every day. I find a bush with some attractive leaves and I think, TII bet they like this lot', and I present

leaves and I think, TII bet they like this lot', and I present them to my *Paropsis* for ap-proval. It's something like selecting a bouquet for your girffriend. After about three years, your salivary glands start to work when you use a tree with juicy new leaves, as if you were go-ing to eat them yourself. Or if you see a nice clean, well-protected stem, you say to yourself, 'Gee, one of our females could lay a hundred eggs on that stem'. After a while *Paropsis* start

eggs on that stem?. After a while *Paropsis* start to look beautiful. You think that's strange? My Boss used to work on sawflies; those ugly black grubs that cluster in revolting groups on gum trees and spit a gunky fluid at you if they are dis-turbed. He thinks they are beautiful—but he worked on them for nearly twenty years. The Boss must have been

them for nearly twenty years. The Boss must have been considering a reclassification for me. One day he said, We're going to expand the programme. As well as Parop-sis, we are going to study another insect called Chrysop-tharta variicollis'. It sounded like we were embarking on a brave new scientific mission. He might have convinced the clerks in Head Office that I was taking on a new responsibility,

clerks in Head Office that I was taking on a new responsibility, but he didn't fool me. Despite the different names, Paropsis and Chrysophata are very similar. Chryso's feed on Eucalypts too. The beetles are a little smaller than Parop-sis, and green instead of straw coloured. You feed them just the same, wipe up their the same, wipe up their droppings just the same, and clean out their cages every day.

But the eggs look a bit differ-ent under the microscope.

There was a little more to Chryso than that. Occasionally, a 'black sheep' appeared in the Chryso family. Approximately one Chryso in twenty is black all over.

all over. This presented an interesting challenge. We decided to see if Mendel's laws of inheritance were correct. I tried mating black with black, black with green and so on. So far all our great-great-grand-daughters are producing one black in every twenty offspring.

every twenty offspring. I was disappointed that there was no intermediate form. The experiment was good fun for a while, and I really looked for-ward to finding a black Chryso. I put him in a separate dish and gave him an extra juicy leaf for brightening up my day. One day I met an old school mate of mine. He was digging fence-post holes. 'Yes,' he said, I do this day after day after day. You don't know how lucky you are working for CSIRO on all that scientific work.'

'I guess I don't,' I replied. I earnt a bit more money than

I earnt a bit more money than him. After my first year I thought that we must know all there is to know about *Paropsis*. We knew how long it took them to mature, what their parasites were, we knew their field mortality rate and much more. But the next year the Boss de-cided to check the results and get some more figures. I knew the results were right

get some more figures. I knew the results were right the first time, but other scien-tists laugh at you unless you have plenty of figures. But that year was a drought so we did it for a fourth year and proved there was no difference. After four years I started to think I'd like a change from *Paropsis*.

Paropsis.

I wondered about applying for a new job. It's not easy to find one in this age of specialization.

Nobody is very impressed when you mention in your application that you have brought five million *Paropsis* into this overcrowded world. Nobody else seems to want that kind of person. It isn't easy to change jobs when you are a technician in CSIRO either. It's not difficult if you're a clerk in CSIRO, or even a technician in the Public Service. Everybody expects them to change jobs and make appeals. appeals.

appeals. But it's not expected of us. The hierarchy think that CSIRO has something special to offer technicians so they ex-pect dedication. The old scien-tists frown on transfers. They point to all the good senior technical officers in the place. Some of them have worked for forty years in the one section. That's dedication. Some of them have gone a forty

Some of them have gone a bit peculiar too, but that's supposed to be irrelevant. Perhaps I'm being unfair about my Boss and his *Paropsis* sis work. He can't help it. He just likes *Paropsis*, and you've got to admit they are damn good insects for population dynamics work. My Boss is a very thorough scientist—I can guarantee he never publishes a paper before he is sure of his facts. To be truthful, he does try to vary the programme a bit, and occasionally there is a highlight.

and occasionally there is a highlight. One day Mack noticed a dead ant in the cultures. He threw it out. The next day he was amazed to find another dead ant in the cultures. So he

put a *Paropsis* and a fresh ant in a test tube and soon the ant died.

The chemist found that nasty little Paropsis secreted hydro-gen cyanide as a defence

mechanism. We had noticed that every We had noticed that every time you went near them they raised their tails and made a smell like almonds. We hadn't realized they were really squirt-ing HCN at us. I want the safety officer to realize that if I die before my three score years and ten — or

three score years and ten -I contract some pec I contract some peculiar disease — it might have some-thing to do with the fact that I've had five million *Paropsis* Hydrogen spray me with Cyanide.

Napier Mitchell (Entomology).

Unions Meet

Earlier this year an official meeting was held between officers of the Technical Asso-ciation and the CSIRO Officers Association for the first time. At this meeting over a dozen subjects of mutual interest were discussed — both Associations have fixed policies on some, others will be discussed at forthcoming branch meetings. Transfers between Divisions and the possibilities of re-trenchments caused by lack of industry funds were mentioned. Staff amenities, personal files and four weeks annual leave were discussed. Changes in superannuation

The office set of the set of the

accumulated sick leave be made on retirement. It was thought O.A. and T.A. delegates in Divisions could benefit by informal discussion on subjects of mutual interest.



'There are in fact four very significant stumblingblocks in the way of grasp-ing the truth, which hinder every man however learned, and scarcely allow anyone to win a clear title to wisdom; namely, the example of weak and unworthy authority, long-standing custom, the feel-ing of the ignorant crown, and the hiding of our own ignorance while making a display of our apparent knowledge. Every man is involved in these things, every rank is affected. For every person, in whatever walk of life, both in ap-plication to study and in all forms of occupation, arrives at the same conclusion by the three worst arguments; namely, this is a pattern set by our elders, this is the custom, this is the popular belief: therefore it should be held.' Roger Bacon — Opus Majus, 13th Century.

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SAFETY NOTES

An Earthy Subject

Many portable electrical tools and appliances are used under arduous conditions. Regular inspections are neces-sary to ensure they are maintained in safe working condi-tion. In addition to a visual check for mechanical damage, insulation resistance and earth continuity must be tested.

A small portable instrument which sequentially performs these tests is available. According to the manufacturer, it produces unambiguous results and can be used by unskilled staff.

A noteworthy feature of the equipment is that the earth continuity test current is applied for a period sufficient to fuse an inadequate earth line. Therefore, a poor earth con-nection should be detected without the necessity for dismantling the appliance.

The instrument appears to be a worthwhile investment for the safety conscious. Further details may be obtained from the Head Office Safety Officers.

Not a Plug for Safety

A hazardous situation was discovered in a laboratory re-cently. It was found that some equipment containing a variac transformer could give full voltage output at zero scale setting. The equipment had previously performed satisfactorily when bench tested in the workshop.

The culprit was found to be the double adaptor used. This was of the obsolete type shown in the photograph. As can be seen, the internal active and neutral connections to one outlet of this adaptor are transposed.



A thorough search of the Division brought more of the adaptors to light. Perhaps there are some lurking in your domain at work, or at home. How about having a search and consigning any you find to where they belong — in the scrap bin.

The use of any type of plug/socket adaptor should be avoided. It is much safer to use individually switched outlets. Most single outlets can be easily replaced with multipoint one

Crossed Lines

While on the subject of transposed active and neutral con-nections, this was the basic cause of a recent, potentially fatal, accident in one of our Divisions.

A member of the staff was attempting to suspend a reflector lamp from the metal framework of a glasshouse. He switched the lamp off at a multipoint outlet which was connected to the supply via a flexible cord and a fixed single point outlet in another part of the glasshouse.

With the lamp in one hand he then climbed up on a bench and grasped the glasshouse framework with the other hand. Immediately a current passed to earth through his arms and across his chest, clamping him to the frame and lamp.

An assistant disconnected the supply by pulling out the plug from the multipoint outlet. By chance, his first choice from the numerous cables draped around, was the correct one.

Subsequent examination revealed that the Edison screw lampholder did not completely shroud the metal of the lamp base. Also, the fixed outlet was not wired as recom-mended; active and neutral were transposed. Consequently, the multipoint outlet switches were in the neutral line and the metal of the base was connected to the unswitched active line. Others please note and check!

The accident highlights the reason for disconnecting electrical equipment when cleaning or making adjustments to it. For example, when changing a light globe or cleaning the stove at home, withdraw the fuse or trip the circuit breaker at the meter box. Never rely on the wall or appliance switch.

News In Brief

Honorary Member

Mr J. G. Bolton of the Divi-sion of Radiophysics has been elected a Foreign Honorary Member of the American Academy of Arts and Sciences.

Academy Fellows

Academy rellows Dr J. R. Anderson (Chief of the Division of Tribophysics), Dr N. K. Boardman (Division of Plant Industry), Dr A. C. Hurley (Division of Chemical Physics) and Mr A. M. Thomp-son (Division of Applied Physics) have been elected Fellows of the Australian Academy of Science.

Council Member

Dr John Philip, Chief of the Division of Environmental Mechanics, was recently elected to the Council of the Aus-tralian Academy of Science. He was also recently ap-pointed Chairman of the National Committee for Hy-drology and a member of the National Committee for Geodesy and Geophysics.

Institute Medal

Dr Albert Rovira of the Divi-sion of Soils has been awarded the Medal of the Australian Institute of Agricultural Science.

Rennie Medal

Dr T. H. Spurling of the Divi-sion of Applied Chemistry has been awarded the Rennie Memorial Medal of the Royal Australian Chemical Institute for 1971, jointly with Dr J. A.

Elix. The Rennie Memorial Medal is awarded annually to a mem-ber of the Institute, under the age of 33, 'who, in the opinion of the Council of the Institute, has contributed most towards the development of some the development of son branch of chemical science'.

Studentship

Studentship Mr P. B. Scholefield of the Merbein Laboratory of the Division of Horticultural Re-search has been awarded a Dried Fruits Research Student-ship. He will spend three years at the Botany Department of the University of Melbourne. The field work of his project, responses of sultana vines to harvest pruning, will be done at Merbein. at Merbein.

Higher Degrees

Mr F. D. Shaw of the Meat Research Laboratory, Division of Food Research, has been awarded a M.V.Sc. at Queens-land University for the thesis —'A study of some physio-

logical and biochemical indices logical and biochemical indices of fattening in cattle being fed rations of wheat'. **Mr N. J. Thomson** of the Division of Land Research has been awarded a Ph.D. by the University of New England for a thesis entitled: 'Intra-varietal variability in *Gossy-pium hirsutum L.*, its quantifi-cation and importance in cot-ton breeding'.

Jum Initiation L., its qualitätion of the cation and importance in cotton breeding'. Mr G. G. Vickery of the Editorial and Publications Section has been awarded the degree of Doctor of Philosophy by the University of Adelaide for his thesis 'The free radical' substitution of ferrocene and the stability of ferrocenyl-methyl radical'. Mr W. I. Robertson of the Division of Atmospheric Physics, Cloud Physics Section, has been admitted to the degree of Ph.D. by the Australian National University, Canberra, for his thesis 'Wave pocket scattering and time delay'.

Credit Union

Credit Union Mr Kevin Loughry (Applied Physics), a foundation member of the Board of the Labora-tories Credit Union, recently resigned from the Board after eighteen years' continuous ser-vice as a Director. Mr Loughry will continue as one of the Credit Union's representatives on the Sydney Regional Com-mittee of the Association of Southern Credit Unions. Dr Bruce Sheldon (Animal Genetics) has been appointed to the Board to replace Mr Loughry.

Mr Trevor Clark (Regional Administrative Office, Sydney) has succeeded Mr Roy Taylor (Applied Physics) as Chairman of the Board. The Laboratories Credit Union, the first formed of the three CSIRO credit unions, has a current membership of 1,250 which represents 60% of the eligible membership. The total funds invested in the Credit Union now exceeds \$700,000.

\$700.000

Laboratories Co-op

Mr John Gdowski, Manager, Laboratories Co-operative Limited, is now located in the Head Office building, Lime-

Head Office building, Lime-stone Avenue, Campbell – room 436 – phone 48 4521. Over the past few months there have been a number of changes in the Board which now comprises: Chairman, Mr Reg Munyard (Land Research); Treasurer, Mr Bevin Pope (Head Office); Secretary, Mr Rinus Bakker (RAO Can-berra); Mr Tony Culnane



Lindsay Joshua (centre) from Numbulwar in eastern Arnhem Land and Andrew Lack (right) from Oxford are seen here at the Darwin Laboratory of the Division of Wildlife Research being trained in the preparation of wildlife specimens by John Wombey. Later, on returning to Arnhem Land, Lindsay sent the Laboratory a traditional bark painting of a fish as a memento of his stay with them.

(Head Office); Mr Ray McInnes (Entomology); Mr Phil Rawlin-son (Land Research); and Mr Martin Smith (Plant Industry).

Canberra Ball

The 1972 CSIRO Canberra Ball will be held on Friday, 21st July, 1972, at the Park-royal Motor Inn. Dr and Mrs Price will attend.

President

Mr M. Black of the Rural Sciences Laboratory, Perth, has been elected President of the Australian Institute of Refrigeration, Air-Conditioning, and Heating.



A report on the advantages and disadvantages of the use of DDT in Australia was released recently by the Australian Academy of Science.

According to the report, 'The use of DDT is highly advantageous in some cir-cumstances but there are almost always some attendant disadvantages, some of which are inherent in the widespread use of any toxic substance. Where toxic substance. Where exactly the balance lies between the advantages and disadvantages will depend largely on the circum-stances of each use.

However there certainly is no evidence to suggest that, be-cause one country totally or partially bans the use of DDT, other countries should neces-sarily follow suit. The pest species concerned, the nature of their effects, and the state of the economy of each country will be among the im-portant factors in any decision.⁷

portaut factors in any decision.' The report was prepared for the Council of the Academy by a Working Group under the Chairmanship of Dr Doug Waterhouse, Chief of the Divi-sion of Entomology. Other members of the Group were Dr A. Bell (New South Wales Department of Health), Professor L. C. Birch (Uni-versity of Sydney), Mr A. Dun-bavin Butcher (Victorian De-partment of Fisheries and Wildlife), Mr T. W. Hogan (Victorian Department of Agri-culture), Mr J. T. Snelson (Commonwealth Department of Primary Industry), and Mr R. Primary Industry), and Mr R. M. Watts (New South Wales Department of Agriculture).

The report concluded with a majority report that was sub-scribed to by all members of the working group except Pro-fessor Birch, and a minority report by Professor Birch. The two reports are as follows:

MAJORITY REPORT Conclusions

- Conclusions
 As in many other countries, DDT has played a very important part in pest control in Australia for a quarter of a century.
 About 1,000 tons per annum of DDT is currently used in Australia, although the amount appears to be diminishing.
- 3.
- although the amount ap-pears to be diminishing. Most of the DDT is used on a few agricultural pests, principally army-worms and pests of cotton and tobacco. Acceptable insecticides alternative to DDT are more expensive and often more toxic to non-target organisms, even when they are less persistent,
- organisms, even when they are less persistent. Pest management methods that do not rely entirely or heavily on the use of DDT or other pesticides should be sought with greatly increased vigour and resources. The way in which DDT has been regulated in Aus-tralia has led to less abuse than in many other coun-tries. 5.
- 6.
- tries. The levels of DDT and its derivatives in foodstuffs for local and overseas

(Continued on page 4)



Courtesy 'Saturday Review',

159-1972



'I'd like half a pound of anything you have that doesn't contain tars, resins, pesticide residues, polysupersaturated fats, artificial sweeteners, softeners, foaming agents or chemical additives . Courtesy 'Vancouver Sun'.

DDT in Australia

(Continued from page 3) consumption are well within permissible inter-national limits.

- Total diet studies indicate DDT levels comparable with UK and USA and well below the acceptable daily intake.
- Human fat analyses indi-cate levels comparable with those of the lower residue levels for other countries.
- The only demonstrated effects of DDT on the general human population 10. are
 - (i) the storage of DDT and its derivatives in the tissues and their progressive excretion; and
 - and
 (ii) an increased production of microsomal enzymes in the liver but, to the time of review, this has not been shown to be detrimental detrimental.
- 11. There is insufficient in-formation available con-cerning the effect of DDT cerning the effect of DDT on most non-target or-ganisms in Australia. There is, as yet, no evidence that it has had deleterious effects on the population of any bird or mammal in Australia, but further in-vestigations are certainly required.
- required. DDT persists a longer time in the environment than many other synthetic organic chemicals. Its half-life appears to be of the order of 2 to 3 years in soil and distinctly shorter on plants or in litter. 12. litter.
- Many current uses of DDT in Australia appear to have no important dis-13. advantages.
- advantages. There has been a gradual phasing out of the least desirable uses of DDT in Australia and regular re-views of remaining uses should continue. It is clearly desirable to replace pesticides that are toxic to non-target organisms pro-gressively with those that are less toxic and the less specific with more specific pesticides. 14. pesticides

Recommendations

- DDT should continue to be used in Australia against those pests where the advantages of such use clearly outweigh the dis-advantages. However, these uses should be reviewed regularly, taking into ac-count possible long-term effects on man and any adverse effects on wildlife. Greatly increased empha-sis and support should be placed on the Pest Management approach to pest control. This ap-proach may or may not involve the use of pesti-cides. 1. DDT should continue to
- Further information should be obtained in Australia on the effects of DDT and other- pesticides on non-target organisms. 3.

MINORITY REPORT

With the information compiled in the emotination complete in the report I have no argu-ment. My disagreement is on a philosophical issue of what is appropriate to infer from this data.

this data. The inference of the com-mittee is that, on the basis of lack of evidence of deleterious effects of DDT in Australia, and of long-term effects of DDT on man, the use of DDT be continued. However, I place more importance in mak-ing my judgment on: (a) the owned evidence of the

- the ample evidence of the deleterious effects of DDT (a)
- the antiple evidence of DDT on non-target organisms in other countries. Lack of evidence of such effects in Australia may well be due to lack of information on the subject; the widespread presence of DDT in human tissues in people all over the world including in Australia, the evidence that DDT affects microsomal activity in vertebrates even at low levels, and the lack of evi-dence on the long-term effects of such dosage in man. (b) man.

On the basis of (a) and (b) particularly I do not believe it is wise to advocate the con-tinued use of the persistent in-secticide DDT in Australia. Instead, I recommend the phas-ing out of the use of DDT in

Australia and replacement with alternative methods of control even though the cost in the short term may be consider-ably greater. This would in-volve reducing over the next 12 months or so the list of recom-mendations for the use of DDT in Australia from the present list of 100 or more species, to a much smaller list of the order of 3 or so species (as was done recently in California) and eventually to none. none.

MARATHON

Norm Duff of the Editorial and Publications Section's Printing Unit has been selected to represent Australia in the over - 40 World Marathon Championship in Cologne next Sectember

September. Norm has won three State titles and represented Victoria many times.



NORM DUFF

Although severely injured when hit by a truck while on a training run in 1968, de-termination plus 2000 exercises a day ensured a quick re-covery. Norm expects to run the 26-mile marathon in about 2 hours 25 minutes.

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NEW APPOINTEES

Mr L. M. Adams has been ap-pointed to the Division of Mechanical Engineering where he will work on experimental verification of design tech-niques and the development of equipment in the general field of air-conditioning. Mr Adams received a Diploma in Mech-anical Engineering at the Caul-field Institute of Technology in 1966 and has recently com-pleted a Fellowship Diploma of Fuel Technology. He has been employed as an engineer in the Briquette Utilization Research Centre in the State Electricity Commission of Vic-toria.

Mr R. Appels has been ap-pointed to the Division of Plant Industry where he will work on investigations into the biochemistry of histones. Mr Appels graduated B.Sc. with honours from the University of Adelaide in 1969 and since then has been completing work for a Ph.D. at the same uni-versity. versity.

Mr R. I. Blombery has joined the Division of Tribo-physics to take part in a pro-gramme aimed at improving the fracture and abrasive wear-resistance of carbide-faced tools used in rock-drilling and allied operations. Mr Blom-bery graduated B.Sc. with honours from the University of New South Wales in 1966. Since then he has completed requirements for a Ph.D. at the same university where he has been a Teaching Fellow at the School of Metallurgy.

Dr G. Buselli has recently been appointed to the Mineral Physics Section of the Mineral Research Laboratories where he will be studying the use of solid state techniques in the identification of the chemical composition of rocks. Dr Buselli graduated B.Sc. with honours from Adelaide Uni-versity in 1966 and Ph.D. from the same university in 1971. He has recently been a second-ary teacher in the Education Department of South Australia. Department of South Australia.

Mr P. Clingeleffer has joined Mr P. Clingeleffer has joined the Division of Horticultural Research to participate in the programme of research involv-ing mechanical harvesting of grape vines and evaluation of various trellising and pruning systems for drying and wine grapes. Mr Clingeleffer grad-uated B.Agr.Sc. with honours from the University of Tas-mania in 1972.

Mr D. M. W. Daly has been appointed to Head Office in the Agricultural and Biological the Agricultural and Biological Sciences Branch to work on liaison within CSIRO and be-tween CSIRO and Government Departments. Mr Daly grad-uated B.Sc.Ag. from the Uni-versity of Queensland in 1965 and until recently has been with A.C.F. and Shirleys Fertilizers Limited.

Mr D. R. Dixon has joined the Division of Applied Chemistry to assist with re-search studies on water re-clamation from domestic sewage and the upgrading of the final effluent. Mr Dixon graduated B.Sc. with honours from the University of Mel-bourne in 1967. Since then he has been working for a Ph.D. at the same university.

Mr R. L. Drinkrow has been Mr R. L. Drinkrow has been appointed to the Mineral Physics Section where he will be engaged in studies of elec-tromagnetic techniques in mineral exploration. Mr Drink-row graduated B.Sc. from Auckland University in 1962 and M.Sc. with first-class honours in radiophysics from the same university in 1965. Since 1967 he has been a lec-turer at the University of Papua New Guinea.

Miss E. A. Green has re-cently been appointed to the Central Library to assist in the library's services. Miss Green received her Diploma in Librarianship from the Royal Melbourne Institute of Tech-nology in 1971.

Miss Joan Knowles has been appointed to the Division of Entomology where she will in-vestigate aspects of insecticide resistance and the genetics of insect pests of stored grain. Miss Knowles has recently graduated B.Sc. with honours from Monash University.

Mr. J. N. McKenzie has joined the Division of Chem-ical Physics and will be re-sponsible for the design and maintenance of new and exist-ing services for all research facilities within the Division. Mr McKenzie graduated B.M.E. from the University of Melbourne in 1951. Since then he has worked as a design draftsman with Monsanto Chemicals Ltd, a mechanical designer with Braun Trans-world Corporation, project en-gineer with G.M.H., and chief engineer with G.M.H., and chief engineer with G.M.H., and chief engineer for Major Furnace and Combustion Engineers.

Miss J. B. Macklin has been appointed to the Division of Mineral Chemistry as editor where she will assist in the editing of papers and reports. Miss Macklin graduated B.Sc. from Glasgow University in 1956. Since then she has been a technical writer and editorial assistant with May and Baker and Unilever Limited. Re-cently she was a dispenser at the Children's Hospital, Cam-perdown. Miss J. B. Macklin has been

Mr C. J. Maclean has joined the Mineral Physics Section where he will participate in re-search directed towards the use of structural concepts in mineral exploration. Mr Mac-lean graduated B.A. with honours from Macquarie Uni-versity in 1971. Recently he was employed as a geologist with Earth Resources Corpora-tion.

Dr A. Ono has been ap-pointed to the Division of Radiophysics where he will be particularly concerned with research into cloud physics and acrosols in the stratosphere. Dr Ono graduated B.Sc., M.Sc. and Ph.D. from Tokyo Uni-versity. He previously spent three years, from 1966 to 1969, with the Division of Radio-physics and has been until re-cently Senior Research Scien-tist with the Japanese Meteor-ology Agency. ology Agency.

Mr R. W. Simpson recently commenced at the Division of Atmospheric Physics where he will work on the Common-wealth Meteorology Research Centre's large-scale numerical model of the Southern Hemis-phere. Mr Simpson graduated from the University of Queens-land in 1968 and since then has been working in the Physics Department for his Ph.D. at the same university.

Deadline

Contributions to the July issue of Coresearch should reach the Editor at P.O. Box 225, Dickson, A.C.T. 2602, by Wednesday, 14th June.

CORESEARCH

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FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF

NUMBER 160, JULY 1972

SPACE DISCOV A molecule of a rare chemical has been discovered in a vast cloud near the centre of our galaxy. A combined team of researchers from the Division of

Radiophysics and Monash University Department of Chemistry have detected the rare molecule, called formaldimine, using the Parkes radio telescope. The discovery of formaldi-mine was made by **Professor Ron Brown and Dr Peter God**-frey from Monash University, and **Dr Brinn Robinson** and **Mr Malcolm Sinclair** from the Divi-sion of Radiophysics. It was Professor Ron Brown who coined the term 'salesto-

This discovery adds to the small but growing list of important molecules that have now been found in the depths of space. Enormous concentrations of complex organic molecules are found in regions of the galaxy where stars and planets are still

The molecules so far found are the basic building blocks of the amino acid and protein molecules of living matter.

This suggests that carbon based life, similar to our own, could evolve in other parts of the galaxy.

Formaldimine exists only fleetingly on earth and only in the last six months have chemists succeeded in making it in the laboratory.

Chemists at Monash Univer-sity had to use special equip-ment to identify it because it survives for only a few seconds in the laboratory.

in the laboratory. Scientists from CSIRO and Monash University travelled to the Australian National Radio Astronomy Observatory at Parkes (27-28th May) to use a highly sonsitive microwave re-ceiver installed at the 210-feet diameter radio telescope.

Faint signals received from near the centre of the galaxy have matched perfectly the lab-oratory fingerprint of formaldi-

mine and showed beyond all doubt that the molecule exists in space.

The power received by the radio telescope was only one million-million-millionth of a watt.

Yet the signal was clear enough to show that the cloud of formaldimine is about 500 times bigger in diameter than our solar system.

Although this cloud consists mostly of hydrogen, the amount of the new chemical is about equal to the weight of the earth. The cloud is part of a larger mass of gas that is contracting slowly and is likely to form a new star in 50,000 years' time.

Collaboration between checontaboration between energiest mists from Monash University and radio astronomers from CSIRO in the last nine months has resulted in the detection of two other organic molecules in the depths of space.

Their first success was the dis-covery of thioformaldehyde last September_followed by the detection of acetaldehyde in December.

'galactobiology' is just around the corner. As one newspaper reported, this sort of find adds weight to the speculations that Sir Fred Hoyle made in his famous book 'The Black Cloud'. In that book a large cloud of intelligent mat-ter 'parasitised' our solar system to obtain energy. The technical achievements necessary for this discovery have made the Division of Radio-physics pre-eminent in the field of microwave technology. As reported in the last edition of Coresearch, this has led to some down-to-earth co-operation in down-to-earth co-operation in the development of a new in-strumented landing system for the Department of Civil Aviation.

who coined the term 'galacto-chemistry' to cover this field of research. Perhaps a new term of 'galactobiology' is just around the corner

Three molecules detected in space recently by the Division of Radiophysics. They are, left to right: acetaldehyde, thioformalde-hyde and the newly-found formaldimine. The reflecting surface of the radiotelescope has recently been considerably upgraded. The white-painted section is precise enough to operate down to a wavelength of one centimetre, ten times shorter than the wavelength originally specified for the instrument. Photo by Ken Nash.





According to my calculations, we won't be able to prove that what we saw is what we think it is for another one hundred and forty-six years, four months, twelve days, eleven hours, twenty-two minutes and fifty-three seconds."

Courtesy 'Saturday Review'.

BIRTHDAY HONOURS

In the recent Queen's Birthday Honours list Miss Betty Doubleday was awarded the O.B.E. and Mr John Etheridge the B.E.M.

Miss Doubleday is the Chief Librarian and located in Mel-bourne. After completing an-M.A. degree at Melbourne Uni-versity, Miss Doubleday worked as a Publicity Officer. In 1951 she joined CSIRO as Librarian in Head Office.

In 1955, Miss Doubleday be-came Chief Librarian.

Since that time Miss Doubleday has developed a library system which is unique and is the largest single collection of literature on science and tech-nology in Australia.

Amongst her many activities, she has also been President and elected as a Foundation Fellow of the Library Association of Australia.

Mr Etheridge joined the CSIR as a junior assistant in the Divi-sion of Animal Health in 1937.

Following the accidental in-troduction of Contagious Bovine Pleuro Pneumonia into Vic-torian cattle in 1958, the cattle industry of Australia was faced with a problem of incalculable cost. Mr Etheridge played a key part in the development and pro-duction of the vaccine which now seems to have eradicated



Mr ETHERIDGE

the disease. There has not been a recorded case for a number of years.

In 1967 Mr Etheridge was seconded to the FAO Labora-tory at Pendik in Turkey. There he organized the technical ser-vices of the laboratory and the training of a number of Tur-kish technicians in techniques, some of which were developed by Mr Etheridge at Parkville.



The library system differs

The library system differs from that of most other libra-ries in that its holdings are not housed together in one single collation. Instead, they are housed in some fifty different libraries throughout the Organi-zation, in order to keep the literature close to the scientist who is most likely to use it.

Miss Doubleday has also an outstanding record of achieve-ment in advancing the profes-sion of librarianship in Australia.

RESEARCH AT THE ALICE

The habits of termites, the diets of dingoes, the movement of sand dunes, the behaviour of cattle and the regrowth of mulga are just some of the aspects of the rangelands ecosystem being studied by the researchers at Alice Springs of the Division of Wildlife Research and the Rangelands **Research Unit.**

A small resident team of scientists and technicians is backed up by the larger resources of the groups in Canberra.

Over two-thirds of Australia is arid or semi-arid rangeland, yet relatively little is known about this vast area when compared to the more humid coastal fringe.

The Rangelands Research Unit, under the leadership of Mr Ray Perry, is concerned with the natural resources of the rangelands, the pastoral industries they support, the develop-ing recreation industries, and conservation of flora and the fauna.

To do this work, a highly integrated approach has been adopted by the group, who come

from backgrounds of wildlife ecology, plant and animal phy-siology and hydrology.

Dr Max Ross, the Officer-in-Charge of the laboratory, stresses that the success of this work depends on the integrated approach. By keeping animal, plant and soil researchers in touch with what is going on, a much more successful ecological approach is possible.

Bill Low, who is in charge of the cattle behaviour research, is a Canadian, but familiar with the cattle country. He worked for his Ph.D. on the King Ranch in Texas, where he was inte-rested in the behaviour of a piglike animal called the collared peccary.

primitive, or at present wild, species of beef cattle as a gene-

A good demonstration of the eed for a genetic pool quoted

by Professor Markert, is the case of the rabbit. With the in-

troduction of myxomatosis, the rabbits of Australia were all but

wiped out and their persistence is due to the survival of a range

Professor Markert is involved into research aimed at 'clonal' replication of animals. By this

he means the transplanting of nuclear materials from one ani-

mal cell to another, which leads to replication of the genetic

material without the normal re-

Professor Clement Markert, right, and Dr Max Ross, Officer-

in-Charge of the Rangelands Research Unit at Alice Springs.

productive process,

such an emergency.

available.

Helping him in this work are Rod Hodder and Kevin Jones, from Queensland and the Nor-thern Territory. Both are ex-perienced cattlemen; Rod spent a number of years managing a property in the area,

Two men whose names are I wo men whose names are virtually synonymous with CSIRO in this part of Australia are Bob Winkworth (better known as 'Winky') and Bob Mil-lington. They have been in-volved in research in this area area the 10500 rate used in the since the 1950's and work in the broad area of hydrology, and the responses of plants to water in this arid area.

The interests of Max Ross also cover the broad plant growth and production field.

The smaller herbivores, the termites, are being studied by Colin Lendon and Bobbi Low. They are looking at the distri-bution also of kangaroos and the diets of these native herbi-vores. It seems probable that the termites at least consume a high percentage of the annual

production of plant material. But the work of this group is not confined solely to the cattle industry. The scientific staff have also been assisting in the preparation of a natural re-sources inventory of the Simpson's Gap National Park, to the west of Alice Springs.

It is hoped that this inventory will provide a sound basis for development of the Park will enable the impact of the and tourism on the area to be as-sessed more accurately.

CATTLE GENE POOL

Professor Clement Markert, a recent visitor to the Rangelands Research Unit at Alice Springs, said that immediate steps should be taken in Australia to protect the world pool of cattle genes.

tic resource.

need

Professor Markert was, until recently, the Chairman of the Biology Department at Yale University in the United States. He is an expert in the field of developmental genetics and reproductive biology.

'A great danger facing animal A great canger facing animal breeders,' said Professor Mar-kert, 'is that we are tending to produce a more and more homogeneous population of cattle. As selection for the, at present, more desirable breeds of cattle gets more intense and the use of artificial insemination becomes more widespread, there is a real danger that variation in the number of genes available to cattle breeders is being reduced.'

In other words, it is possible that we could ultimately end up with a relatively uniform range of cattle and there is a danger that the pool of genetic material that is currently drawn on may diminish.

This could have repercussions if ever new strains of disease were to crop up or agricultural practice were to change such that we required new genetic resources.

Professor Markert advocates the establishment of a 'reservoir' of genetic material in Australia. This could be done by setting aside an area of, say, the Northern Territory for a cattle station, the prime purpose of which would be to maintain the various of genes that enable some to cope with this disease. If such a catastrophe as this **ECOSENSE** ever hit the Australian cattle population it would be essential Cattle Research staff are playing have a sufficient range of

a leading role in existing and genetic material to cope with newly established ecocentric bodies, including the Capri-cornia National Park and Wild Professor Markert was visiting the Alice Springs area at the end of a period of sabbatical ife Preservation Society, The Rockhampton Society for Social Responsibility in Science (RSSRS) and Zero Population leave spent in Australia. His own field of research, he feels, will have a lot to do with the reduction of genetic material Growth.

A successful photographic competition depicting pollution in Central Queensland was organized, and encouragement given in the formative stages of the Friends of the Environment Club at the Rockhampton State High School.

Two officers recently participated in an inspection tour of the red mud disposal scheme at the Queensland Alumina plant in Gladstone.

The RSSRS has received generous support and encour-agement from its sister organization in Canberra. A represen-tative of the Canberra Society is to address the Rockhampton group at the end of May. The RSSRS is only the fifth body of its kind so far formed in Australia

John Frisch was recently appointed to the Rockhampton City's Fitzroy River Pollution Committee. His interests are the kerosene taint in fish and the operation of the fish ladder at the Fitzroy River Barrage.

Dr Peter Springell was elected Royal Automobile Club of Queensland Central Zone Councillor. His interest is in combating pollution from cars and the rational use of vehicles in cities.



'I thought I'd seen it all, but that takes some beating.' A typical reaction from the locals when the latest 'scientific breakthrough from CSIRO' was launched north of the Alice recently.

A cow on wheels? Yes, a cow on wheels is just what it is. A new solution to footrot perhaps? Or a development in beef transport? Although some of the local residents were a little sceptical, other denizens of the Macdonnell Ranges took to Kunoth Queen with alacrity. A dingo was seen chewing her left ear the morning after her appearance in the paddock.

Seriously though, Kunoth Queen is part of a research project aimed at evaluating night detection methods for wildlife studies.

aimed at evaluating night detection methods for wildlife studies. Peter Potrusevics and Paul Thomas were in Alice Springs to test out a range of detection devices including infra-red equipment and highly sensitive photomultipliers. In order to test the equipment under real conditions it was necessary that the animal observed had a coat with similar reflective properties to that of a real cow and that it moved under control through a range of terrain similar to that in which the instruments would be used. So a test site was pegged out in Kunoth Paddock, on Hamilton Downs Station.

Kunoth Queen is in fact a real cow skin mounted on a wooden carpenter's horse type of arrangement. By moving her in a set pat-tern up and down a fixed line, tests of the power of the various instruments can be made from different ranges and in different light conditions.



Above: 'Peter had a little cow ...' Peter Petrusevics towing Kunoth Queen with Paul Thomas riding shotgun on a trial run during daylight.

Below: Eating carrots is no substitute for the apparently fiendish night vision devices being tested by Paul Thomas, left, and Lindsay Best (Wildlife Research).





NEWS IN BRIEF

Silver Medal

Silver Medal Dr R. M. Smillie, Leader of the Division of Food Research's Plant Physiology Unit, was given the P. L. Goldacre Award of the Australian Society of Plant Physiologists for 1968. Since then, the Society has struck a silver medal and this was presented to Dr Smillie at the annual general meeting held in May 1972. The award is made for re-search work of merit in any branch of plant physiology and is restricted to persons under the age of 35. In this instance it was given for work covering the discovery of a new flavour pro-tein, electron transfer co-factor and research on chloroplast bio-genesis.

genesis.

Fellow

Dr F. A. Blakey, Assistant Chief of the Division of Building Re-search, has been admitted, by invitation, as a Fellow of the Australian Institute of Building. This is considered a high honour as it is extremely rare for a member to be admitted directly as a Fellow as a Fellow.

Econuts Unite

Econuts Unite The Ecological Society of Aus-tralia plans to hold a two-day symposium in Sydney, imme-diately prior to the 1972 ANZAAS Congress. The title of the symposium is 'The City as a Life Support System'. Amongst the speakers are a number of CSIRO people talk-ing on subjects like 'An analysis of energy flow in the Sydney region', 'Nutrients and materials balance of a city', and 'Structure of the city-system, a working model'. Enquiries should be directed to Professor Derck Anderson in the School of Botany at the Uni-versity of New South Wales, Kensington.

ABC Film

An ABC FIIII An ABC Rural Department film crew recently visited Alice Springs, where they made two programmes on the work of the Rangelands Research Unit. One film was made about the cattle behaviour studies and in-cluded action sequences shot on Hamilton Downs station during a muster. The other was about termites. termites

Seen here are the Director, Barry Pitman, on right, watch-ing as a sequence on feeding 'captive' termites is demon-strated by Colin Lendon of the Rangelands Research Unit, back the armera loft to camera, left.

Dr Peter Crawford, of the Apor refer Crawford, of the Ap-pointments and Evaluation Sec-tion in Head Office, has left on secondment by the Department of Education and Science, for Paris.

For the next three years he will be Councillor (Scientific Affairs) in the Australian Dele-gation to the OECD.

Japanese Visitor

Japanese visitor Mr Tatsuo Hamada, from the Japanese Ministry of Agricul-ture and Forestry, has recently commenced a twelve months' study leave with the Division of Nutritional Biochemistry. Mr Hamada will be carrying out work on the energy and mineral metabolism of runnin-ants during his visit.

ants during his visit.

Retirement

Retirement Miss Stella Gilbert of the Cen-tral Library in Melbourne has recently retired. Miss Gilbert was awarded the British Empire Medal in the last New Year's Honours list. In 1934 Miss Gilbert joined what was then CSIR as a Senior Typist in Canberra. After work-ing as Secretary to the late Dr D. F. Martyn, she was seconded during the war to the personal staff of the Hon. J. J. Dedman, who was at that time Minister in Charge of CSIR and Minister for War Organization of Industry. Miss Gilbert returned to the

Minister for War Organization of Industry. Miss Gilbert returned to the Organization in 1943. Amongst her many duties since that time, Miss Gilbert was largely respon-sible for the development of the distribution lists of all our publications publications.

Conneillor

Mr F. D. Beresford of the Highett Laboratory of the Divi-sion of Building Research has been elected to the Council of the Concrete Institute of Austhe C tralia.

Obituary

Obituary The death occurred recently of Professor Edward James Fer-guson Wood, who formerly worked in the Division of Fish-eries and Oceanography for twenty-six years. Professor Wood was educated at Brisbane Grammar School and later at Queensland Univer-sity where he graduated B.Sc. with first-class honours in Botany and Plant Pathology in 1927. He graduated M.Sc. in 1929 and subsequently attended Melbourne University, graduat-ing B.A. in 1932. While he was



The most successful Open Days yet held at the National Standards Laboratory attracted large numbers of visitors from industry, universities and government departments. As well, nearly 2,000 school students attended on the afternoon sot aside for them. As this photo shows, some were a little dubious about the outcome of this glass-blowing demonstration by Mr A. Bell of the Division of Physics.

attending Queensland Univer-sity he held a Department of Agriculture Cadet Scholarship for two warr for two years.

Agriculture Cadet Scholarship for two years. He commenced duty with the Fisheries Investigation section of the CSIR on 1st September 1937, initially located at Mel-bourne University until the Cro-nulla laboratory was set up. During the Second World War he went on to the study of marine algal products, mainly agar, and made extensive sur-veys of Gracilaria beds around the Australian coast. This was followed by work on the Tas-manian bull kelp, Macrocystus. From 1956 until he left the Division of Fisheries and Oceanography in 1963 he in-vestigated the distribution and identification of phytoplankton in Australian waters. He pio-neered the use of fluorescence microscopy in these studies. After leaving the Division,

After leaving the Division, he took up the position of Pro-fessor of Marine Microbiology at the Institute of Marine Science, University of Miami, Florida, where he worked until 1970 1970

During the thirty-three years he was working as a marine microbiologist he published over eighty papers and four books.

Washington

Dr Peter Muecke has left for Washington on a two-year ap-pointment as the Scientific At-tache. He will replace Mr C. D. Garrow.

Poet at Large

Mrs Marjory O'Dea, Biographer in Head Offlee, has been invited to attend the International Poe-try Festival and Symposium in Yugoslavia next month. This is the first time that Aus-tralians have been invited to take part in the Festival and, along with another Australian poet, Rosemary Dobson, she will read from three of her works.

works. Mrs O'Dea's trip is being

sponsored by the Yugoslav and Australian Governments. Whilst in Yugoslavia she in-tends to study some folk legends for their suitability for transla-tion as children's stories. Later this year Mrs O'Dea's second children's book will be pub-lisbed lished

During her seven weeks over-seas she will also be researching material in London and inter-viewing people for the bio-graphy of Sir Ian Clunics-Ross, on which she is currently working. The Yugoslav Festival has previously attracted a number of renowned poets including Auden and Yevtushenko. This year the Nobel Prize Winning Poet, P. Neruda from South America, will also be present. So, Mrs O'Dea's invitation is an honour for both herself and

an honour for both herself and Australia.

THE BIOLOGIST SINGS TO ITS MATE

These poems are two units from a ten-part sequence. In the first, the biologist looks at its mate; in the second, the bio-logist looks down its microscope.

1 Your epidermis rises like a scum. Each cell, a prey to keratin, is dead. You, though becoming, are become And, at each instant, are instead. Yours is a crumbling carapace Of trunk and limbs and head and face. When stroked, and seeming warm, alive and svelte, In truth is dead as any dodo's pelt. And, if I plumb your eyes to find Some life within, the life I find is mine (In its small eyes a smaller You to blind) So blind the way we go, as we entwine, A me in you, a you in me, Towards a miniscule infinity.

2 We may with Alice never pass Through Dr Dodgson's looking glass Or follow Galileo's gaze Into greater galaxies — Nor should I care to lead you through The strange untrue or distant true — But I would take you by the hand — Withdraw you to some still and crystalline strand — To wander in a cool, disturbing tropic On frail and fractured microscopic Islands fringed with opalescent sands, Through brittle fields in geometric lands, Would we could printless pass To reach the shelter of a calm crevasse: Or scale a smooth precipitous track Into minutae, never to come back . . . 2

Marjory O'Dea



NEW PYE LAB

The Minister for Education and Science, Mr Malcolm Fraser, recently opened the new Division of Wildlife Research Laboratory in Darwin.

The laboratory cost \$318,000 of which \$103,000 came from the F. C. Pye Trust Fund.

This fund was established in 1962 following the sale of the property 'Geraldra', which was given to CSIRO by Mr F. C. Pye, a prominent New South Wales grazier.

The main laboratory building has an area of about 6,700 square feet and is designed to house a research staft of eight and a supporting staff of seventeen. The establishment of the F. C. Pye Wildlife Research Laboratory at Darwin means that, for the first time, the Division can station a team of biologists permanently in the tropical areas of north Australia. It will also enable the Division to strengthen its collaborative efforts with the Primary Industries Branch and the Forestry, Fisheries, Wildlife and National Parks Branch of the Northern Territory Administration.



A Close Shave

A word of warning to all those people who wear spectacles or grow beards.

It is impossible to get a close fit around the face with the face mask of a respirator. Outside air will invariably be drawn in around the sides of the mask if breathing resistance of the canister is reasonably high.

Such people should only use an air-supplied mask, which places the mask under positive pressure.

The Long and the Short

Samson's strength lay in the length of his hair. Not so those who work near moving machinery.

One of our long-hained staff recently had his hair caught in a drill in a workshop. If a workmate had not acted quickly in stopping the machine, our friend would have looked like the result of a visit from an irate Red Indian. The law is very specific on this point; the New South Wales Regulations are as follows: 'No person—

(a) whose hair is not cut short, or covered, or securely fixed and confined close to his head by a net or otherwise, or

(b) who is wearing loose ribbons, loose laces, or other such loose articles of dress

shall be employed in a factory at, near or about any moving machinery, or in any room or part of the factory where he may have occasion to pass close to such machinery.

Be wise, keep it short or keep it confined.

Multipoint Power Outlets

Last month's advice about the ease of replacing single point electrical outlets with multipoint ones might have given the wrong impression. It is NOT a do-it-yourself job; the changeover must be made by a licensed electrician, who will ascertain that the use of a multipoint outlet will not overload the circuit.

Gil barnes, Salety Oncer.

Deadline

Contributions to the August issue of Coresearch should reach the Editor at P.O. Box 225, Dickson 2602, by Monday, 17th July.



The new king prawn research vessel 'Penaeus' undergoing speed trials on the Brisbane River recently. The 38 feet long vessel has been built for the Division of Fisheries and Occanography. The vessel was designed and built in Brisbane, has a top speed of 14 knots and features a double rig for experimental prawn trawling. Photo courtesy 'Brisbane Courier-Mail'.

Taking off from Lake Burley Griffin, in Canberra, this float plane is one of three which will be chartered by the Division of Fisheries and Oceanography. It will be used in the Gulf of Carpentaria to sample otherwise inaccessible rivers of the area. In these rivers juvenile banana prawns can be found and part of the project is to estimate populations for predicting seasonal catches. The planes are assembled in Canberra and look rather incongruous sitting on their floats at the airport before transport to the lake. Photo courtesy 'Canberra Times'.



APPOINTMENTS TO STAFF

Miss Josephine Bastian has been appointed to the Division of Food Research where she will assist in the editing of papers and reports. Miss Bastian graduated B.A. from Sydney University in 1952 with firstclass honours in English literature and M.A. from London University in 1958. Since then she has been a Teaching Fellow at the Department of English Literature, Sydney University, and Acting Principal of the Women's College at the same university. Recently she spent 14 months in New Guinea where she assisted her husband in a study on heat tolerance and acclimatization to heat among New Guinean villagers. Miss Bastian has worked as a freelance journalist for some years.

lance journalist for some years. Dr J. S. Downton has been appointed to the Division of Horticultural Research where he will work on the carbohydrate metabolism and biochemical relationships of grapevines and fruit trees. Dr Downton graduated B.Sc. with honours, in 1965, from the University of British Columbia and Ph.D., from the same university, in 1969. Since then he has been working as a Research Fellow at the Australian National University. Dr P. M. McCulloch has been appointed as a Research Fellow at the Division of Radiophysics where he will work in the field of radio astronomy. Dr McCulloch graduated B.Sc. with honours from the University of Tasmania in 1967 and Ph.D. from the same university in 1970. He has previously held a CSIRO Honours Studentship and a Senior Postgraduate Studentship.

Studentship. Dr R. B. Roberts has been appointed to the Division of Physics to work on the development and use of equipment for measuring thermal expansion at high temperatures. Dr Roberts graduated B.Sc. (1965) and M.Sc. (1967) from Queens University, Canada, Since then he has been working for his Ph.D. at the University of Western Australia.

Australia. Dr D. F. Smith has been appointed to the Division of Fisheries and Oceanography to carry out studies on the dynamics of populations of Australian fish. Dr Smith graduated A.B. in Chemisity from Goshen College, Goshen, Indiana, in 1958; M.S. from Purdue University in 1962 and Ph.D. from the same university in 1966. He has previously worked in Australia as a Research Fellow at the Institute of Medical Research, and at the Royal North Shore Hospital in Sydney. Until recently, he was Assistant Professor in the Department of Biological Sciences, Brock University, St Catharines, Ontario.

Mr G. Szendi-Horvath has been appointed to the Division off Tribophysics where he will supervise machining experiments and work on metrological problems associated with instruments, tooling and machine tools. Mr Szendi-Horvath graduated with a Dipl.Ing.Mech. from the Technical University, Stuttgart, in 1963. Since then he has worked in research and development with the Siemens Works in Germany and as a design draftsman with several engineering companies.

engineering companies. Dr A. E. Wright has been appointed as a Research Fellow in the Division of Radiophysics. Dr Wright graduated B.Sc. with honours from King's College, London, in 1965 and Ph.D. from University College, London, in 1968. Since then he has had various posts at York University and at the University of London Observatory, Hatfield Polytechnic, Hatfield.

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161##1972

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF-NUMBER 161 AUGUST 1972

PIPED LIGHT **Tribophysics Development**

The 'wired city' as part of the 'global village' has been brought one step closer with the development of a new method of carrying communications signals, developed by the Division of Tribophysics.

After two years of work Dr Graeme Ogilvie and Mr Rod Esdaite of the Division, have produced an optical fibre sy-stem that consists of a very fine fused quartz tube that contains tetrachlorethylene.

This chemical is well known as a dry cleaning agent, al-though for this use it is in a highly purified form.

The idea of piping light along a tube was first thought of by Baird, the inventor of television, back in the early 1920's, al-though he was only interested in it as a means of directing light accurately.

For many years now the use of guided light as a com-munications medium, has been studied by various research groups,

Usually though these other researchers concentrated on the use of coated glass fibres.

use or coated glass fibres. But glass absorbs too much light energy and for a practical communications systems the amount of energy absorbed has to be very small, otherwise sig-nal losses make the system un-workable.

Graeme Ogilvie and Rod Es-daile have been working on the properties of organic crystals for a number of years.

Amongst these organic cry-stals were materials like purified camphor, which is optically transparent. Out of this work arose the notion that these materials could be used as a communica-

tions medium. About a year ago the pos-sibilities became apparent and since then they have been work-ing on the technical details.

The new optical fibre has been I he new optical fibre has been made available to the Australian Post Office, for its research labo-ratories to evaluate the fibre's potential in the development of Australia's telecommunications

network.

In successful tests, the signals comprising a full TV channel, have been transmitted along one of the new light guide fibres over a distance of one-third of a mile.

But this is well below the potential according to Graeme Ogilvie, who says that a single light beam could carry the equi-valent of more than one million telephone conversations.

LOW LOSS

He also says that the loss of signal is sufficiently low to make a practical system with repeater stations about every five miles, and this is a considerable im-provement on the current co-axial system used.



Although its bore is finer than a human hair, the optical fibre can transmit more information than existing wide-band micro-wave and co-axial communications systems.

The production of the fibres, and the terminal and repeater equipment, is technically feas-ible in Australia at the moment. tible in Australia at the moment. The cable is made by drawing out a fused quartz tube to be-tween one and five thousandths of an inch, external diameter. Although it sounds rather a fragile structure it is in fact quite resilient and the Aus-tralian Post Office have a sub-stantial research team on the technical development of the system.

system.

They are interested because not only can a guided light sy-stem carry vastly more infor-mation than a similar sized elec-trical system, but it is also virtually free from interference and less susceptible to authorized interception. un-Cont'd Page 4.

Dr Graeme Ogilvie and Mr Rod Esdaile at the Press Demonstration of the fibre optics system. On the left is a drum around which is wound a coil of the liquid filled fibre carrying the signal to the small television set in the centre.

Division Changes

The Environmental Physics Research Laboratories have been re-structured to include a Division of Cloud Physics.

The Division has been formed from the former Cloud Physics Section located at Epping, New South Wales and the re-organi-zation will involve the appoint-ment of two new Chiefs of Divisione Divisions,

One Chief will be in charge of the new Division of Cloud Physics, the other in charge of the present Division of Atmo-spheric Physics.

Up till now the Chairman of the Environmental Physics Re-search Laboratories, Dr C. H. B. Priestley, has acted also as Chief of the Division of Atmospheric Physics.

Applications have been called for the two new Chief of Divi-sion vacancies.

The move will strengthen the The move will strengthen the total research effort concerned with physical processes control-ling weather, the experimental modification of weather as in rainmaking, the inter-action of plants and their environment, and the atmospheric aspects of nollution. pollution.

Rainmaking activities con-ducted by a number of coun-tries were based upon research, techniques and equipment pio-neered in the Cloud Physics Section.

The Environmental Physics The Environmental Physics Research Laboratories under the Chairmanship of Dr Priest-ley now include three research Divisions: the Division of At-mospheric Physics, Melbourne, the Division of Environmental Mechanics, Canberra, and the Division of Cloud Physics, Svdney Sydney.

The laboratories of the Divi-sion of Atmospheric Physics are located at Aspendale, Victoria.

Jointly with the Bureau of Meteorology, the Division also maintains the Commonwealth Meteorology Research Centre in Melbourne.

in Melbourne. This Centre is engaged in computer-based studies of large scale weather dynamics, with emphasis upon understanding global climate processes and im-proving the time scale of wea-ther forecasts. The Division of Atmospheric

The Division of Atmospheric Physics carries out a wide range of research including studies of turbulence, convection and boundary layer problems of the atmosphere, the dynamics of severe storms and other weather phenomena, mathematical study models of atmospheric pro-cesses, agricultural meteorology, evaporation, radiation, ozone and other upper atmosphere studies, and global pollution. The new Division of Cloud Physics studies the basic pro-cesses of cloud and rain forma-tion and conducts research into

tion and conducts research into convection, turbulence and the nature and distribution of par-ticles in the streambars

In the field of cloud seeding, it studies the mechanics and techniques of artificial rain stimulation, conducts rainmaking experiments over large areas and provides advice and training in rainmaking techniques. The Division of Environ-mental Mechanics is engaged in the development and use of phy-sical and mothematical tech

the development and use of phy-sical and mathematical tech-niques for studying the basic mechanisms of transfer pro-cesses in the natural environ-ment, with particular emphasis on the environment of plants and those processes of energy, water and CO_2 transfer im-portant to plant growth.



OCTOPUS

Mr David Tranter of the Division of Fisheries and Oceanography has recently studied a full life cycle (egg to egg) of the blue ringed octopus. This animal has gained notoriety with the death of a number of people from its venomous bite. The mother carries the eggs in a 'Skirt' formed beneath her body by her arms and web during

broodin

The picture shows a newly-hatched embryo on the right and an egg capsule on the left. The juveniles

feed on the remnants of the yolk from the egg after hatching. The iridescent blue rings which characterise the species did not appear until the octopus was about six weeks old. The young grew rapidly in size and began to breed four months after hatching. The blue ringed octopus appears to have a unique pattern of mating behaviour, amongst those octopuses observed in this laboratory.

INTERVIEW – A Scientist at Stockholm

Sir Otto Frankel recently attended the UN Conference on the Human Environment, held in Stockholm. Prior to the Conference he had acted as a Consultant to the Secretariat on Genetic Conservation. Sir Otto is Senior Research Fellow in the Division of Plant Industry. In this interview Max Bourke asked him how the Conference was organised:

O.F.: To start with, there was of course a great deal of pre-paratory work by a preparatory committee on which 27 nations were represented.

Australia was not among them but we usually had an ob-server at these conferences.

server at these conferences. That preparatory committee, together with the secretariat which was in Geneva, set the framework, the subject matter, the procedures of the confer-ence and it was already well known beforehand that there ware to be three committees which would deal with the six subject matters which had been selected.

The three committees, plenary session and a working group on the declaration of the human environment were in fact the organs of the conference.

These committees and bodies met in three separate places, the greatest distance between them was something like 2 kilo-metres and there were physical difficulties of contact between them which were overcome by a bus system and by television which connected the three. You could plug in at any of the three places into any of the other sessions so that the press which was located in the old parliament building where there were also many other organiza-tions, two of the committees and These committees and bodies

tions, two of the committees and

tions, two of the committees and particularly the non-govern-mental organizations which were represented. They were all in the old par-liament building and they could keep in touch with the other two buildings, one the new parlia-ment building — a very modern office building — and the other the trade union centre where there was the largest of the halls concerned.

M.B.: At the same time as this conference was going on, there was an underground conference going on too?

O.F .: Well, there were in fact at least two other things — one was the environment forum which had in fact been sponsored by the Swedish Government, to the tune I think of \$90,000 or \$100,000.

That was in fact, from the public's point of view, much more interesting than the con-ference itself. It had the more interesting speakers. M.B.: Like who?

O.F.: Oh, like Barry Commoner, Paul Ehrlich, Barbara Ward, You see, people who could not address the conference did address the forum.



., a brave attempt which be money in the bank for mav the future . .

M.B.: There was also a more radical group meeting at the same time too?

O.F.: Yes, there was the people's forum which was a free-for-all and that was largely hippy in-fluenced.

M.B.: Is the environment any safer as a result of the conference?

O.F.: This is a somewhat naive question, and I can't quite answer it as naively as this.

First of all, there was a pro-cess of the conference which itself probably made an impact.

you are sitting together as relatively senior representa-tives of your government with others for something like ten days and hear many political views expressed, probably much hear advergut the they had been more clearly than they had been expressed before, that itself expressed before makes an impact.

SAFETY NOTES

Lead in Pencils

There may be no lead in the lead of your pencil, but beware of the lead in the paint on the outside. At one of our Divisions, four pencils of different makes were selected at random and the lead content of the paint determined. Figures varying from 0.2 to 1.9 mg of lead were obtained

So, take heed, you pencil chewers — the thickest dob of paint is always at the chewing end.

Implosion

We recently had a severe injury caused by the implosion of a wide-mouthed Dewer flask. These glass flasks are extremely dangerous, and quite fragile. If they cannot be shielded by a metal or other solid jacket, apply adhesive tape to prevent the scattering of glass in the event of a mishap. Always wear a face shield, or at least a pair of safety goggles, and gloves if possible

Pets and Children

There is a growing tendency in some laboratories for staff to come in at the weekend to do a spot of work. Very admir-able, as long as they don't bring in their young children or dog as well. The laboratory is no place for pets or young children — they are exposed to enough danger in the normal routine of their lives without exposing them to the fascination of a laboratory and its contents.

J. W. Hallam, Safety Officer.

The conference itself passed most of the recommendations placed before it. Now, some of these may, and probably will, make a direct im-pact in relation to a variety of topics which came before the conference. conference

conference. Well, take a negative one — there was a moratorium de-clared on whaling; a ten years' moratorium recommended—not declared, recommended to the International Whaling Commis-

International Whaling Commis-sion. It had no chance of being accepted, but it probably shed a seed, and perhaps a pretty large seed, for the future and it may have helped the Whaling Commission. In fact, the Commission met since then — I haven't seen the outcome but I hear that the impact was not large. Well, you see, this may have been a brave attempt which may be money in the bank for the future.

may be mo the future.

M.B.: Well, as a scientist looking at the conference, were the matters on the environment dis-cussed in a genuine scientific sense or did political considera-tions override them?

O.F.: No, of course not in a scientific sense. The background material had been prepared with the assistance of scientists. I myself was one of them so I know what happened to my own subject.

own subject.

own subject. It was largely presented the way I wanted it presented but somewhat mixed up because non-scientists had edited the final material, and there had been fed in some subjects which came from other sources and one or two of them were non-

one or two of them were non-sensical. The people who put it to-gether were as politically minded as they were intent on using their own consultants, so the background — let me em-phasize this — was largely tech-minal and scientific. nical and scientific.

M.B.: You presented a paper which caused a considerable amount of interest and was the basis of some positive recom-mendations on genetic conservations.

O.F.: Oh, I didn't present the of the position papers which in part went into the conference recommendations.

recommendations. There were fourteen recom-mendations — probably some-thing like a dozen of them based on my paper — but I was in-vited, at the recommendation of the United States delegation, to address one of the three com-mittees — the committee that dealt with environmental as-pects of natural resources management. management.

My few minutes' talk was really more emotional than scientific, but it really told dele-gates what this area was about and what it meant for them and their children and grand-children children.

This really meant more for them than if I had given them a technical lecture.

M.B.: Were you happy that some of your scientific recom-mendations were in fact used as the basis for political recom-mendations that came out of the conference?

O.F.: Extremely happy. This is quite a breakthrough because, you see, this is quite sympto-matic of what is likely to hap-



Sir Otto Frankel talks to Max Bourke.

pen with the conference recom-

mendations. This is the answer or one answer to your question "Would the environment be safer?" It will now be up to organiza-

It will now be up to up an inter-tions, governmental and non-governmental, and to indivi-duals to use recommendations that have been passed. It is only in this way that the conference can come to life

It is only in this way that the conference can come to life. No decisions binding on governments were expected to be made or were made, but principles, working principles— some of them quite detailed— were recommended to govern-ments, and to the Secretary-General of the UN for action in co-operation with governments, or to governments with the as-sistance of UN agencies. So, built into these recom-mendations are future action programmes, some of which can start early next year provided

programmes, some of which can start early next year provided that the UN agencies, govern-ments, non-governmental or-ganizations and individuals use these opportunities. And also the environment fund of \$100 million which is envisaged (not yet fully sub-scribed but is virtually certain to be) which is regarded as a sort of seed fund. But \$20 million a year, per-haps in some years more than that, can be a useful catalyst to bring action about which is sup-ported by government and other

ported by government and other organizations



"... extremely happy. This is quite a breakthrough ..."

M.B.: I understand that some of the third world countries, parti-cularly, took a position which said: "It's all very well for you developed countries to cut back developed countries to cut back on your environmental wastage --we haven't even reached the stage of, let's call it civilisa-tion and development, that we are spoiling our environment— and we want to get to that stage."

O.F.: Let me make this quite clear. Your question is really asked in a narrower sense than

it was treated. You are thinking of pollution or waste of resources and so forth.

The conference itself thought

In be conference itself thought in broader terms and this pola-rization between the rich and the poor extended to every area. It extended to education, to poverty, to everything that con-cerns Man.

In fact the conference — and especially the poor countries — placed the emphasis on Man and his needs, present and future, and pollution and waste of materials came into the con-ference as viewed through Man's interests.

Man's interests. Poverty and educational needs and so forth received a great deal of prominence — much more than an Australian en-vironmentalist would ever think it possible — and that, I think, is a very excellent addition to the environmental concept that Man's social environment was brought into the picture as part of the physical and biological the physical and biological oſ environment.



Dr W. J. Scott, Assistant Chief Dr W. J. Scolt, Assistant Chiel of the Division of Food Re-search and Officer-in-Charge of the Division's Meat Research Laboratory at Cannon Hill, Brisbane, has retired.



A graduate in Agricultural Science from the University of Melbourne, Dr Scott joined the original Meat Research Labora-tory at the Brisbane Abattoir in 1933, and worked on microbiological factors important in the successful export of childed beef. When the Division of Food Preservation and Transport trans-ferred to Sydney early in World War II, he turned to problems of the processing of foods for the armed services.

the armed services. Post-war, Dr Scott began the detailed investigation of micro-bial water relations, which rapidly brough him interna-tional recognition. In 1957 the degree of D.Sc. was conferred upon him by the University of Melbourge

upon him by the University of Melbourne. A two-day Symposium on Present and Future Develop-ments in Meat Research was held at Cannon Hill during June, to mark Dr Scott's retire-ment. This was attended by more than 150 persons from CSIRO, the Australian Meat Board and the meat industry, and centres in Great Britain. New Zealand and the United States States

States. Dr Scott's position as Officer-in-Charge will be taken by Dr D. J. Walker of the Division of Nutritional Biochemistry who will be taking up his new duties in Santomber in September.

SHOALHAVEN ECOLOGY

To the south-east of Canberra a group of scientists from the Ecology Section of the Division of Plant Industry are carrying out a study on the ecology of a large and important water catchment system.

The area under study is the upper Shoalhaven which sur-rounds the headwaters of the Shoalhaven River.

This area has become im-portant in New South Wales re-cently, with the commencement of a major water conservation and hydro-electricity scheme on

The New South Wales Water The New South Wales Water and Sewerage Board, in conjunc-tion with the Electricity Com-mission, have let contracts for the building of a large dam on the river. This dam is to pro-vide water for Sydney and the south coast of New South Wales as well as electricity for the

south coast of New South Wales as well as electricity for the State grid system. The Tallowa Dam, as it is called, will meet the area's water needs until the end of this century. At a later stage a dam is planned for the Upper Shoal-bourn at Welchame Beef haven at Welcome Reef. As a catchment this is inte-

resting because it represents a departure from the traditional practice in this State, of having a closed catchment. In this case the catchment has a mixed usage including agriculture and forestry.

During the late 1950's a com-During the late 1930's a com-prehensive survey of this region was carried out by the Division of Land Research. This infor-mation has been of fundamental importance to the current pro-ient ject

For four years now the Eco-logy Section has been working on the Upper part of this area in the broadest possible manner.

Under Alec Costin, when he was Assistant Chief, and Richard Groves, the Section Chairman, a group of hydrolo-gists, plant and animal re-searchers and even a microbio-logist have been called into the project. project.

Alec Costin and Les Wright are looking at the effect of soil moisture use on different soil types throughout the catchment

Frank Dunin with the assist-ance of Wybe Reyenga, has developed one of the most autodeveloped one of the most auto-mated catchments in the coun-try. They want to know the inputs and outputs of both energy from the sun, and water, on to a small site near Krawa-ree. With this information in hand, models of the energy and water rationships can be actab.

hand, models of the energy and water relationships can be estab-lished for this site. Alan Aston, who is involved in the modelling work, hopes that this work will enable pre-dictions to be made about various sections of this area as they come up for development. With a viacous programme of they come up for development. With a vigorous programme of clearing of the native vegeta-tion for both forestry and for agriculture, it is important to be able to predict the effects this could have on the area as a water actionment water catchment.

After clearing two major becies of grasses occur natur-ly, but they seem to have a relatively complex relationship. Burning off, grazing and the addition of fertiliser all affect the ratio of one grass to another. Richard Groves has been try-

ing to establish why one of these species becomes dominant under one set of circumstances and vice versa on a different site.

vice versa on a different site. Sheep and cattle grazing have been carried on for many years on a limited scale. Now large areas are being opened up for pasture improvement and with-out proper management this could obviously have serious implications in regard to silting up of the dams in the area. Eddie McKay and Lachie Myers, of the Ecology Section, are both engaged in projects to

are both engaged in projects to develop better grazing man-agement for the native pastures, and the introduction of new species for this relatively high, summer rainfall zone. John Leigh and Murray Hol-

John Leigh and Murray Hoi-gate have examined which plants the ever-fussy sheep pre-fers in this area. They found that almost insignificant small plants constituted the preferred part of the sheep's diet on both the native and sown species, where the sheep had a choice. In a site on the uplands of the valley surrounding the Shoal-

valley surrounding the Shoal-haven River, Eddie Pook is looking at the hydrology of the forested country. Large parts of this area are being cleared for re-afforestation under pine. The major part of the valleys run off comes from these high hills and Eddie has to put up with snow-falls in winter and heavy rain in summer. summer

One of the more unusual parts of this study is that being car-ried out by Jack Shepherd and Annette Smith, on the ecology of a fungus, *Phytophthora cin*-

namomi, This fungus causes a variety of economically important dis-eases of both native and exotic forest trees. Recently it has been found that changes to the been found that changes to the environment, such as roadbuild-ing, are associated with the in-cidence of this fungus. It is thought that the change in drainage produces a more favourable wet area for the de-velopment of the fungus and the site at Shoalhaven provides an ideal location to test this out. There are small catchments run-ning down off the hills, some of which have been infected with

ning down off the hills, some of which have been infected with *Phytophthora*, whilst others have not. From the work of this group a picture of the factors affecting the whole of the Shoalhaven catchment should emerge, and this will allow the planners to take better informed decisions in the management of the area.

Navel Inspection

CORESEARCH has recently completed a survey to look at itself.

itself. The Editor wishes to thank all those in the four Divisions who took part, for the answers to the questionnaires. The comments will greatly as-sist in the future planning of the measure.

Any member of staff who cares to comment at any time on the content or nature of the magazine or its articles is wel-

Letters will be published if the author wishes it and any contributions of a literary, humorous or commentary

humorous or commentary nature would be gladly received. A number of people who an-swered the questionnaire felt

that there was not enough news about what goes on in Divisions at all staff levels.

at all staff levels. The reasons for this are quite simple, the Editor of Coresearch has no idea of what goes on in Divisions at all staff levels. So you budding authors and journalists sharpen up your Olivettis or Remingtons and let's hear from you hear from you.





On the valley floor a neutron moisture meter is used to measure soil Don Platts (kneeling), Richard Groves and Wybe Revenga water. carry out a measurement at one site in the instrumented catchment.



Wybe Reyenga calibrates the instrument used for measuring peak run-off on the instrumented catchment site in the Upper Shoalhaven at Krawaree.



In a pine forest on the upper edges of the Shoalhaven Valley, Eddie ook carries out soil moisture measurements.

MEDAL

Nominations and applications are invited from members of the research staff of CSIRO aged less than 41 years on the 1st January, 1973, for the biennial award of the David Rivett Medal.

The award for 1973 is to be made for outstanding research in the field of biological sciences carried out over the past 10 years and is based upon pub-lished work.

A substantial part of the work must have been performed while the candidate was an officer of the cand CSIRO.

Each candidate must submit Each candidate flux submit to the General Scoretary, CSIRO Officers' Association, 314 Albert Street, East Melbourne, Vic-toria 3002, before 31st Decem-ber, 1972, the following docuber, 19 ments:

- (a) a statement of not more than 100 words setting out in general terms the nature of the candidate's work.
- a list of his papers pub-lished since 1962, or to be published before the award, (b)

(c) copies of these papers.

A Committee appointed by the Council of the CSIRO Offi-Association will cers' select cers' Association will select from among these candidates (and from other officers of CSIRO at its discretion) a list of not more than 10 candidates for examination for the award.

The Council of the CSIRO Officers' Association, with the advice of the Australian Aca-demy of Science, will appoint as examiner a Fellow of the Aca-

He will examine the state-ments and published work of the candidates on the list pre-pared by the Committee and will recommend to Council, if he

thinks fit, a recipient for the award from among the candidates.

The Medal will be presented Officers' Association on the oc-casion of the Sixth David Rivett Memorial Lecture to be held in 1973

BOOK

RIVETT

A book called "Fighter for Science: David Rivett" has re-cently been sent to the printer and will be published in November

November. Written by the well-known journalist, Rohan Rivett, it tells of his father's association with CSIR during its first twenty-four word

CSIR during its first twenty-four years. Rohan Rivett has made a special arrangement with his publisher that the book will be available to members of staff at a considerable discount. It is anticipated that the book will retail for well over \$5.00, but it should be available to staff for less than \$3.75. Anyone interested in receiv-ing a copy at this special price should contact Mr G. R. WIL-LIAMS, Assistant Secretary, Head Office, Limestone Avenue.

TALK

Recently Miss Wendy Par-sons, Press Information Officer in Head Office, was asked to talk to the Rivett Primary School on the origin and the man behind their school's name. Rivett is a relatively new sub-urb on the southern side of Canberra.

Canberra. Wendy spoke to about 40 children and parents and as a result arrangements are being discussed to produce a facsimile of the Rivett Plaque from the Laboratory of the Division of Chemical Physics.

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APPOINTMENTS TO STAFF

Dr D. L. Brutlag recently joined the Division of Plant Industry where he will collaborate in re-search studies of the molecular



D. Brutlag

structure and function of eukar-yote chromosomes. Dr Brutlag graduated B.S. from the Cali-fornian Institute of Technology in 1968 and has recently been working for his Ph.D. at Stan-ford University.

Mr J. T. Bullivant has been ap-Mr J. T. Bullivant has been ap-pointed to Head Office to the Staff Section's Appointments and Evaluations Group. Mr Bullivant graduated B.Sc. from the University of New South Wales in 1967 and has sub-mitted a Ph.D. thesis to the same university where it is be-ing examined. He has been a research officer with the New research officer with the New South Wales Public Service Board and an Assistant Lecturer at Mitchell College of Advanced Education.

Mr R, J. Evans has recently joined the Division of Environ-mental Mechanics as Editorial and Information Officer. He is a graduate in science of the Australian National University



R. Evans

and, appropriately, brings to his new post experience as script-writer for Monty Python's Flying Circus,

br S. W. Cowling has joined the Rangelands Research Unit where he will undertake studies of nutrient cycling and its role in the maintenance of soil fertility in arid communities.



New Appointment

Dr J. R. Yates, a Senior Re-search Scientist, has transferred from the Division of Protein Chemistry to become Leader of Chemistry to become Leader of the Industry Section at the Meat Research Laboratory of the Division of Food Research, Cannon Hill, Queensland. Dr Yates succeeds Mr L. E. Brownlie who has been ap-pointed Assistant Technical Dir-sector. of the Australian Meat

cctor of the Australian Meat Board.

Americans

Mrs Beverly Kittinger of the American Wives Club is trying to compile a list of American's resident in the A.C.T. She would be pleased to hear from any male or female Americans by phoning Canberra 81 2991.

Cowling graduated B.Sc. and LIF cowing graduated B.Sc. and Ph.D. from the University of New England in 1964 and 1969 respectively. Recently he has been a Lecturer in Biological Sciences at the University of Waikato, Hamilton, New Zea-land.

Dr G. A. Dulk has joined the Division of Radiophysics where he will carry out research in solar radio astronomy. Dr Dulk graduated B.S. from the United States Military Academy in 1955, M.S. from Purdue Uni-versity in 1959 and Ph.D. from the University of Colorado in 1965.

Mr R. G. Friday has recently joined the Division of Applied Geomechanics where he will study physical properties of naturally occurring rock masses. Mr Friday graduated B.E. and M.Eng.Sc. from the University of Melbourne in 1960 and 1964 respectively. He worked for the Hydro Electric Commission of Tasmania from 1961 to 1965 and since then has worked for North Broken Hill Ltd.

Mr J. J. Finnigan was recently appointed to the Division of Environmental Mechanics. He will work on the experimental programme being developed in the Division to the set of th the Division's large, low-speed wind tunnel. Mr Finnigan is



J. J. Finnigan

a graduate in Aeronautical En-gineering of the University of Manchester and comes to CSIRO from Hawker Siddeley

Dr R. W. King has joined the Division of Plant Industry where he will investigate the physiology of flower induction and other physiological factors associated with the yield poten-tial in economic plants. Dr

King graduated B.Sc.Agr, from the University of Sydney in 1965, M.Sc. from the Australian 1965, M.Sc. from the Australian National University in 1968 and Ph.D. from the University of Western Ontario in 1971. biologist in the Division from 1965 to 1968 and has recently been a Research Associate at Michigan State University.

Dr J. G. McIvor has recently joined the Division of Tropical Pastures where he will study pasture agronomy in 30-50 inch rainfall environments in north Queensland. Dr McIvor gradu-ated B.Agr.Sc. from the Uni-versity of Melbourne in 1969 and has recently been working for his Ph. D. at the same uni-versity. versity.

Dr A. O. Nicholls has joined the Woodland Ecology Unit to study the ecology of temperate woodlands represented on Army Training Areas. Dr Nicholls graduated B.Sc. from the Uni-versity of New England in 1967 and has recently completed his Ph.D. at the University of Mel-bourne.

PIPED LIGHT

Cont'd from Page 1

PATENTS

An interesting development has arisen concerning the Patenting of this invention. From the literature Ogilvie and Esdaile know that similar work is going on in the Bell Telephone Laboratories in the USA

U.S.A. What they do not know is the stage of development of that work.

work. The only way to test this is to go ahead and file Patent Appli-cations for the development and see if over time, there are any objections to the Patent, up-tod

held. It may take several years be-fore the rights to the invention are resolved if Bell or any others have in fact come up with a similar idea.

a similar idea. Still the researchers of the Tribophysics laboratories will not be sitting around worrying about that, as there is much to do in the technical development stages



ECOBALANCE

A new book, published by Heinemann, has been co-writ-ten by two members of the Division of Applied Chemistry.

Called 'Nature in the Balance' it is already an instant hit, hav-ing sold out in the paperback edition even before publication.

edition even before publication. The book is written by Hart-mann, Norman, Triffett and Weiss, and although it was aimed at high school science students it is a book for all those with a layman's knowledge of the concepts of ecology, pol-lution and conservation, who want to know more about the problems of today.

Many people are so bam-boozled by the terminology of such misused words as 'ecology' that a rational understanding of the environmental issues, being discussed so widely, is beyond them. This book should do much to solve that problem.

It is a clearly written book that is voluminously illustrated, and although some of the grap-hic work is not terribly clear, the publishers say that the second printing, now under way for the paperback, clears up this criticism.

Dr Don Weiss (the man be-hind 'Sirotherm') and Mr Alfred Triffett are both from the Divi-sion of Applied Chemistry in Melbourne. They, and the other authors, acted as a committee of the Victorian Branch of the Royal Australian Chemical In-stitute in the preparation of this book. book.

The book begins with a run-through of the 'Delicate Web of Life'.

This part explains the inter-actions of the water cycle, energy from the sun, the nitro-gen cycle and food chains.

Part two deals with human growth and human needs. Dealgrowth and human needs. Deal-ing with the 'Population Bomb', the book would gladden the heart of the Zero Population Growth people.

One of the features of this book is that it uses, wherever possible, Australian data for all the issues being discussed and as such it will be a handy reference for all those lecturing to people on environmental issues.

Part three and four may be called 'doomsday' and 'counter-

doomsday', as they deal respec-tively with man's waste and his potential control of these wastes.

potential control of these wastes. The tone is set in the intro-duction to this section: 'Future anti-pollution measures will be quite futile without population control; however, there is a vast and developing technology available to which must be used in conjunction with population control if man is to survive. Some years ago, Sir Winston Churchill made this eloquent and prophetic comment: "It would be a tragedy if the sun-rise of technology were to be the sunset of mankind!"' The final part — 'Man's re-

the sunset of mankind!"' The final part — 'Man's re-lationship with his environment' — is a guide to dealing with the issues raised in the body of the book. It looks at environmental management, pollution and the law and pollution and society. This next is a more society.

This part is a more sophis-ticated version of that little booklet put out by the Canberra Branch of the Society for Social Responsibility in Science called 'What Can I Do?'

'Nature in the Balance' con-cludes with a quote from Kor-mandy (the author of 'Concepts of Ecology'):

The concepts must give ground to an ecological con-science, to a love, respect, ad-miration, and understanding for the total ecosystem of which we are part; our course otherwise is one of collision, an inexorable Armageddon.'

By putting it this way I sup-pose this book comes into direct conflict with the views of John Maddox, Editor of 'Nature' and author of the recent book 'The Doomsday Syndrome', who has no great love for the apo-colyptists.

Anyhow the authors should be able to discuss this with him in the near future as he will be in Australia this month for the ANZAAS Congress.

'Nature in the Balance' seems to me an admirable reader on environmental issues for Australians.

It is available in the hardback edition for \$3.50 and a new edi-tion of the paperback should be available shortly for \$1.95.

Max Bourke.

Printed by CSIRO, Melbourne



'If you can see the weather centre from here it means rain.' Courtesy New Scientist.

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF -- NUMBER 162 SEPTEMBER 1972

PATENT PARTNERS CHOSEN 1. For Piped Light - A WA 2. For Polyunsaturated Meat and Milk

In the last edition of Coresearch we reported the development of a 'piped light' communications system by the Division of Tribophysics.

Now, following an advertisement seeking tenders, an Australian company has been appointed to co-operate in the commercial development of the project.

Amalgamated Wireless (A/asia) Ltd submitted a satisfactory proposal for working on the commercial development of a communications system based on the use of guided light beams. AWA will work in close cooperation with Dr Graeme Ogilvie and Mr Rod Esdaile of the Division, as they were behind the initial development.

As well, the Australian Post Office will share the interest in the development. The Post Office is interested in the application of the super-fine fibres to the development of Australia's communications network.

The guided light beam system has the ability to carry more information in a hairwidth fibre than is currently carried by wide-band microwave or co-axial cable systems.

As a number of other countries are known to be working on such a system, there could be extremely good commercial prospects for the first company to go on the market with a viable guided light communications system.



INVENTOR'S AWARD

Mr A. F. Moodie and Mr C. E. Warble of the Division of Chemical Physics have had an invention highly commended by the judges of the John Lysaght Australian Inventors Award.

Along with the co-inventor, Mr Hank de Bruin, of Flinders University, they will receive a certificate of commendation.

The award was made for the invention of a reaction bonding technique. This reaction joins ceramics and metals in a very hard bond and could lead to new techniques in a variety of industries.

Mr de Bruin found some years ago that an extremely strong joint could be created between pieces of ceramic and graphite, by means of a reaction with each or either side of a platinum sheet. This was followed up by electron microscope studies by Messrs Warble and Moodie, which showed that the extremely strong bond involved in such reactions can be used to join a wide range of materials.

Dalgety Agri-Lines

A commercial licence agreement has been signed between CSIRO and a new company for the development and commercial production of polyunsaturated meat and milk pro-

This follows some years of work on the polyunsaturated products by the Divisions of Animal Physiology and Food Research.

ducts.

At the Prospect Laboratory of Animal Physiology, a team of researchers led by Dr Trevor Scott, has been examining the feasibility of using dietary control to make sheep and cattle produce more polyunsaturated lats in their body tissues.

By feeding animals supplements of polyunsaturated vegetable oil which has been treated to prevent breakdown in the rumen or first stomach, these scientists have been able to get both cattle and sheep to produce nearly ten times more polyunsaturated body fat.

Three to four pounds of supplement per day fed to a beef animal over a period of six to eight weeks prior to slaughter converts the level of polyunsaturated fats in the meat from about 2-4 per cent to 20-25 per cent.

In milk the conversion takes place within 48 hours of feeding the animal the supplement.

At the Dairy Research Laboratories of the Division of Food Research at Highett, a programme of evaluating the milk, cream and butter products made from these animals, has been undertaken.

The agreement for the commercial development was decided after a number of companies replied to an advertisement calling for interested companies to take part. The agreement is with a new company called Dalgety Agri-Lines Pty Ltd, of Sydney. This company was formed as a joint venture between the Dalgety group of companies operating in Australia, New Zealand and the U.K., and the Agri-Lines group of companies operating in New Zealand and the U.S.A.

The new company will coordinate the technical, financial and manufacturing resources of the parent companies in bringing the CSIRO invention to commercial production.

Between them the companies had a wide range of relevant experience particularly in the fields of feed supplement manufacture, animal production, food processing, and marketing and merchandising.

merchandising. The development programme proposed by the company will include oil-seed selection and testing, design and construction of equipment, manufacture of the feed supplement, animal feeding practices, meat and milk processing techniques, distribution and marketing of the polyunsaturated products, quality control, and further research and development.



UK MINISTER

The Right Honourable Miss Margaret Thatcher recently visited a number of Divisions on a tour of Australia.

on a tour of Australia. Ms. Thatchor is the Secretary of State for Education and Science in the U.K. At the Division of Computing Research she was met by the Acting Chief, Dr Claringbold, and Mr V. D. Burgmann of the Executive. After the functions of the Division were explained to her, Ms. Thatcher was shown around the computing facilities.

ABOVE: Ms. Thatcher with Mr Burgmann (left) and Mr John Russell.

RIGHT: Mr Russell explains the computer hardware.



72/73 BUDGET

The 1972/73 Budget brought down by the Government provides \$77,522,400 for CSIRO's Annual and capital expenditure, of which \$63,810,000 will be provided directly by the Government, \$10,695,146 by Agricultural Indus-try Committees and \$3,017,254 by various other contributors.

Treasury Funds

Of the amount of \$63,810,000 from Treasury appropriation, \$56,834,000 will be for salaries and general running expenses, \$6,256,000 for capital expendi-ture and \$720,000 for repairs to buildings.

buildings. The allocation for salaries and running expenses repre-sents an increase of \$4,425,493 over the actual expenditure for 1971/72. However, the effective increase is \$6,270,000 after allowing for non-recurrent ex-penditure items, such as the 27th payday, included in the 1971/72 figures. The increase will cater for the following re-quirements:

- Increments, reclassifications, provision for additional pay-ments in lieu of furlough and salary adjustments arising from Arbitration Determina-tions is expected to absorb \$2,442,000.
- · The planned development of projects initiated in earlier years will absorb \$430,000. The most important activities in this category are mineral exploration, rock mechanics and grain storage.
- and grain storage.
 Eight new projects for which \$244,000 has been provided will be commenced during the year. These are geochemistry investigations, control of the screw-worm, management of the water bulfalo, agronomy of protein grain crops, resource utilization of the Darling Ranges, production and use of edible plant protein, urban building and design, and engineering aspects of grain storage.
 Additional support for pro-
- Additional support for pro-jects regarded as high priority northern prawn investiga-tions, expansion of computing research activities, and eco-logical effects of bushfires — will cost \$305,000.

- An amount of \$851,000 has been provided to assist in the redeployment of 70 members of staff whose salaries in the frame of frame. past have been financed from past have been innanced from wool, wheat, dairy, meat and tobacco funds. Because of the rising costs of research, the funds concerned are no longer able to support the research work at the 1971/72 levels of activity. activity.
- An amount of \$280,000 has An amount of \$250,000 has been set aside to meet in-creased grants for such bodies as the Standards Association of Australia, the National As-sociation of Testing Authori-ties, and research associations.
- To cope with increased run-To cope with increased run-ning costs, extra service charges resulting from the oc-cupation of new buildings and requirements for ancillary staff, a sum of \$1,718,000 has been provided for distribu-tion over a large number of Divisions and Sections. This includes provision for the establishment of 50 new posi-tions for the support of cur-rent research programmes. The canital allocation from

The capital allocation from Treasury sources is divided into two categories — those works under the control of CSIRO and those handled by the Depart-ments of Works and Interior.

ments of Works and Interior. The first group of items totals \$1,925,000. This will be spent on developmental work at field stations, \$400,000; the purchase of major items of laboratory equipment, \$700,000; the acqui-sition of additional scientific computing equipment — mainly data loggers — \$540,000; the development of a new area of land provided for the Ginnin-derra Field Station, \$60,000; and \$225,000 for the first batch of new equipment to update CSIRO's computer network. Of the \$3,700,000 provided

Of the \$3,700,000 provided for building projects under the control of the Department of

Summary of Estimates of Expenditure for 1972/73

Telimotea

	1972/73 \$	1971/72 \$	Decrease \$
Under CSIRO control:			
Salaries and general running expenses Buildings, works, plant and development items	56,834,000 1,925,000	52,408,507 1,539,866	4,425,493 385,134
Total under Direct Control of CSIRO	58,759,000	53,948,373	4,810,627
Under Department of the Interior control: Acquisition of sites and buildings	414,000	320,657	93,343
Under Department of Works control:		0.016 700	
Buildings and works	3,700,000	3,346,729	353,271
Furniture and Fittings	217,000	101,000	55,545
Repairs and maintenance of buildings	720,000	609,353	110,647
Total CSIRO — Treasury funds	63,810,000	58,386,767	5,423,233
Contributory Funds:			
Salaries and general running expenses	13,047,000	12,117,077	929,923
Buildings, works, plant and development items	665,400	1,049,225	383,825
Total Funds CSIRO — All Sources	77,522,400	71,553,069	5,969,331

Works, \$2,000,000 will be needed for buildings under con-struction at the end of 1971/72, whilst the remaining \$1,700,000 will cover new works to be com-menced during the current financial year. The major items in the current year's new works programme are: the National Standards Laboratories to be erected at Bradfield Park, New South Wales, \$15,500,000; a new laboratory at Highett, Vic-toria, for the Division of Build-ing Research, \$690,000; exten-sions to laboratory accommoda-tion at North Ryde, New South Wales, for Division of Animal Genetics, \$350,000; Library and Services Building at Garden City, Victoria, for Division of Mineral Chemistry, \$255,000; new Herbarium Building at Black Mountain to meet re-quirements of Plant Industry, Land Research, etc., \$240,000; and laboratory, workshop and office building at Parkes, New South Wales, for Division of Radiophysics, \$210,000.

Other Funds

The joint Commonwealth/ Agricultural Industry funds pro-vide a large part of the finance available to CSIRO from non-Treasury sources.

Treasury sources. Some months ago, the Mini-ster for Primary Industry ad-vised that the maximum amount CSIRO could expect from Wool Funds during 1972/73 was \$8,000,000. In the light of this information, a budget of \$7,995,000 was prepared, com-

prising \$250,000 for capital items and \$7,745,000 for sala-ries and general running ex-penses. This allocation will be supplemented by \$750,000 Trea-sury funds provided as part of CSIRO's general budget for the current year. current year.

The principal capital items to be financed from wool funds are textile processing plant (\$93,000) and major items of scientific equipment (\$54,000) to be used by the Wool Research Labora-tories. For the wool production research programme, provision has been made for develop-mental expenditure at both the Longford (\$30,000) and Chis-wick (\$14,500) Field Stations at Armidale, New South Wales. A sum of \$25,000 has been in-cluded in the budget proposals for the purchase of a liquid scintillation counter for the Division of Animal Physiology. The Australian Meat Re-The principal capital items to

The Australian Meat Physiology. The Australian Meat Re-search Committee has agreed to provide a total sum of \$1,773,100, c or m prisin g \$1,758,600 for salaries and general running expenses and \$14,500 for capital purposes. The main capital purposes. The main capital item is \$12,000 for a prefabricated resi-dence to be erected at the Wil-lowbank Field Station, Division of Entomology. of Entomology.

The Australian Dairy Pro-duce Board was unable to pro-vide sufficient funds to meet CSIRO's proposals for 1972/73 and was forced to make some re-ductions in the Organization's dairy research programme. A

budget of \$274,032 has been approved, of which \$192,532 is for dairy manufacturing research and \$81,500 for dairy farm research.

The funds provided by the The funds provided by the Wheat Research Council total \$193,164, which will be used entirely for salaries and general expenses. Last year's allocation was \$203,694.

was \$203,694. The Tobacco Research Com-mittee has provided \$282,100 for 1972/73 which will maintain at a reasonable level the current programme of work at Mareeba and Canberra. The funds will be used entirely for salaries and general running expenses. The approved allocation for 1971/72 was \$277.400. was \$277,400.

was \$277,400. The Fishing Industry Re-search Committee has agreed to provide in 1972/73 a total sum of \$125,500 for research asso-ciated with the fishing industry of which \$100,000 is to support the northbern prawn research programme.

programme. The Dried Fruits Research Committee, established in CSIRO an amount of \$46,150 for 1972/73 for research into dried vine fruits and dried fruit trees. The funds will be used for general running expenses.

For the first time, the Organi-zation is to receive funds from the Chicken Meat Research Committee for research projects directed at improving the chic-ken meat industry. An amount of \$6,000 has been allocated in 1972/73 for salaries and general running expenses running expenses.

ONGRESS CANBEBRA NTOMBLOGY



With over 1,300 participants from 60 countries the 14th International Congress of Ento-mology was held in Canberra last month.

last month. The President of the Con-gress was Dr D. F. Waterhouse, Chief of the Division of Entomo-logy. The Congross was held at the Australian National Univer-sity and involved a considerable

amount of work for many bers of the Division of Entomology.

The President's wife, Ms. D. F. Waterhouse, was the Chairman of the Ladies' commit-D tee and again many wives of members of the Division worked long hours preparing a pro-gramme for visiting wives.

Some hundreds of papers were presented and numerous exhibitions and excursions took place. The National Library sponsored a very handsome ex-hibition entitled 'Insects and Man' Man'.

The symbol chosen for the Congress was the red buildog ant, which was one of the 210

eviously unknos insects collected by Sir Joseph Banks on the east coast of Australia, during Captain Cook's first voyage around the world in

1770. At the Congress the first public screening of a new film from the Film Unit, called 'Dung Beetles Down Under', was held. The film, directed by

Roger Seccombe, was widely praised.

praised. Pictured: Left, Dr Hárry Wharton, O-i-C of the Long Pocket Laboratories at Indooro-pilly, with F.A.O. delegates to the Congress. Right, Mr Bill Bailey of the Canberra Laboratories of the Division of Entomology with some student delegates.

IN BRIEF

Doctorate

Mr D. K. Milne of the Division of Radiophysics, has had the degree of D.Sc. conferred on him by the University of N.S.W. The award was made for his extensive publications under the tille of "Studies of Galactic Padia Sources" Radio Sources"

Mueller Medal

Dr D. F. Waterhouse, Chief of the Division of Entomology, was awarded the Mueller Medal at the 44th ANZAAS Congress.

The Mueller Medal is named after the outstanding botanist of Australia's early years, Baron Ferdinand von Mueller. It is awarded "to the author of im-portant contributions in anthro-potant contributions in anthropological botanical, geological or zoological science published within Her Majesty's Domi-nions, preference being given to work having special reference to Australasia".

Dr Waterhouse, who is a con-sultant to F.A.O. and W.H.O., has published widely in the fields of physiology, biochemistry and toxicology of insects. He was also recently the President of the 14th International Congress of Entomology.

Visitor

Mr Hyeong Jin Son of Korea has been awarded a Colombo Plan Fellowship to work with the Division of Atmospheric Physics for a period of 12 monthe months.



Mr Hyeong Jin Son

At the same time, Mr Son will also be studying at the Univer-sity of Melbourne.

Mr Son is a Research Officer with the Central Meteorological Office in Korea.

Credit Union

The Chairman of Directors of the Laboratories Credit Union, Mr T. C. Clark, has announced an increase in the interest rate payable on deposits. Mr Clark said that as from 1st July 1972 the interest rate on de-posits will be 64% p.a. As well, interest will now be paid quar-terly instead of half-yearly and if depositors re-invest their in-terest the money will earn at terest the money will earn at

terest the money will earn at 6.4% p.a. Mr Clark has also reported another successful year for the Credit Union which resulted in a surplus of \$5,252. The annual meeting of the Credit Union will be held at the Division of Food Research, North Ryde, at 5.45 p.m. on Wednesday, 27th September. September

Cotton Move

The cotton research pro-gramme has been reviewed and a decision to base further work at Narrabri has been made. One of the reasons for transferring the work from the Murrumbid-gee Irrigation Area to north-western N.S.W., was because in recent years there has been only a vory small acreage of cotton planted in the area. At the invitation of the

At the invitation of the N.S.W. Department of Agri-culture the work will in future be centred on their research sta-tion at Narrabri.

Libraries

During Australian Library Week a seminar will be held on Saturday, September 16, at the Australian Institute of Man-agement, in Melbourne. The seminar designed to be of in-terest to managers and libra-rians will explore the question of bridging the gap between manrians will explore the question of bridging the gap between man-agement, industry, and informa-tion. A team of leading speakers in this field have been assembled and people interested in attend-ing should contact the Library Promotion Committee of Vic-toria at G.P.O. Box 5233BB, Melbourne toria at G Melbourne.

Superannuation

A new scale of Units of Pen-sion has been announced by the Superannuation Board. They came into effect on July 27th, and follow increases in salary levels. The Regional Ad-ministrative Officers have made arrangements for adjustments to be made where appropriate.



Mr R. V. Dunkle, pictured right, of the Division of Mechanical Engineering, is on secondment to the Department of Foreign Affairs for six months as a Colombo Plan expert at the Institut Tecknologi Bandung, Indonesia. Before his departure he was presented with a portrait and he is seen here with the artist, Mr Alan Rodgers, of the Division.

Food and Research-Policy - Institute Medal Winner

The possibility of striking advances being achieved in food production through control of some of the minute organisms in the soil is raised in an article in the current issue of the Journal of the Australian Institute of Agricultural Science.

The writer, Dr Albert D. Rovira of the Division of Soils, was recently awarded the Aus-tralian Institute of Agricultural Science's Medal.

For over 20 years he has been doing research work on the rela-tions between plant roots and the micro-organisms in the soil.

He says that two years ago he started experiments in the field which, in the first year, lifted wheat production by 20 bushels an acre.

Last year extended trials in two States with this technique for fumigating the soil increased yields in a 'spectacular fashion' at each of four sites in Victoria and South Australia. There ap-peared to be many factors re-sponsible for the yield increases, and their relative importance would vary from site to site.

But the importance of these But the importance of these soil-fumigation trials, if con-tinued over several years Dr Rovira says, is that they should indicate how much the produc-tion 'ceiling' can be lifted over a range of soil and climatic con-ditions. When this has been done, if the increases in yield warrant it, a start must be made in looking for economic ways of modifying the soil organisms to achieve maximum produc-tion. tion.

Explaining the importance of success in this work, Dr Rovira says the fumigation trials have shown that, even in areas of high production, where normal yields range from 30 to 40 bushels an acre, fumigation will lift yields by from 20 to 50 per cent.

This means that at least 20 per cent of the production potential is lost simply because of an unfavourable soil situation.

Translated into terms of wheat production, it means that, of a total Australian harvest of 400 million bushels, the 80 mil-lion grown in Victoria is being produced only to compensate for the damage done by soil oreanisms. organisms.

In future, it will be neces-sary to produce more and more food on limited areas to meet the needs of a 'very over-popu-lated planet'. This might reach the extreme situation of the need to grow three crops each year on the one piece of land, as was now done in India. 'In this situation', Dr Rovira writes, 'it will be essential that we understand the biology of the

soil as well as its chemistry and physics.

While I agree with the pre-sent policy of spending more money on environmental re-search, I deplore the thinking which is leading to less effort on agricultural research, Clean air and unpolluted landscapes will be of little value to future gene-rations unless they have food; and, as far as I can see, food means growing plants in the most efficient manner. This will only be achieved when we understand more fully the com-plexities of the relationships between plant roots and micro-organisms. 'While I agree with the pre-

'At present our research is much too closely linked to the winds of economic change. Considering the wheat industry as an example, with its quota system, current thinking is to reduce research on wheat be-cause increased production would be an embarrassment.

'Nothing could be more ridi-culous. Surely, even at the moment, all farmers would like to produce their current quota on 20 per cent fewer acres.

'Also, when the crunch really comes and we have to feed both our own enlarged population while helping to supply hordes of people elsewhere, we will need every possible technique to increase total production efficiently efficiently . .

'Finally, I think it is short sighted policy to direct our re-search towards immediate prac-tical goals of local interest. A good piece of basic research with practical relevance can be applied to the over-populated countries to help solve their food problems as well as to our own problems. own problems.

'Thus, our science becomes international and of benefit to others as well as ourselves and, providing our fundamental re-search is linked with realistic field problems, then the expen-diture is justified both in terms of our national interest and also in terms of our converting the terms in terms of our commitments to helping the developing coun-tries increase their food production.



Photograph by Neil Hamilton.



A Force In The Land

Jack Branson, of the Division of Applied Physics, looks over the model of the instrument for measuring the primary standard of force on which he has been working for the last three years. This is a one-eighth scale replica of the instrument currently being built in England for the National Standards Laboratory. The full size machine will be installed at the new Bradfield Park complex when it is completed next year.

complex when it is completed next year. The measurement of primary force is required for assessing the performance, under load, of portable force measuring devices. Basically the instrument consists of stacks of weights of different denomi-nations which can be applied in selected combinations to load the device being tested. A model was required so that the staff of NSL could become familiar with the requirements of this machine and its mode of operation. For one thing, the machine in its full size will require a working area of about forty feet in height which includes thirty feet for the instrument plus room for an overhead crane. Mr Branson has the model in an operational stage and is working on the development of the power system for the instrument.

Indonesia Trip

party of CSIRO A people have recently returned from an eight weeks project in Indonesia.

The object of the visit was to examine the possibilities of a joint research project with Indonesia to be financed by the Australian Department of Foreign Affairs as part of the Foreign Aid programme.

Members of the party were Ray McVilly, Deputy Finance Manager; Alan Charles, As-sistant Secretary; Phil Relf, Architect, all attached to Head Office, and a former member of CSIRO, Professor David Robin-con, now Perfessor of Animal Son, now Professor of Animal Science at the University of California, Davis Campus.

Mr Gurnett-Smith, Secretary, gricultural and Biological Mr Gurnett-Smith, Secretary, Agricultural and Biological Sciences Branch, took part for ten days as he had done a pre-liminary study of the area. An officer of the Department of Foreign Affairs, Mr Alan Black-burn, was also in the group.

burn, was also in the group. After a preliminary period spent assessing the research needs of the country, recom-mendations and a plan were worked out in a four-week period spent in Djakarta. Dur-ing the survey period they covered two-thirds of the length of Java, the main island of the group and the largest centre of population and also visited South Sulawesi and Bali.

Over three-quarters of the population of Indonesia live on Java and about three-quarters of the animals are found there. of the animals are found there. This produces a situation where there is little room for free ranging animal husbandry such as we know it, and most of these animals are hand reared by either stall feeding or being tethered and fed. There are some areas suitable for exten-sive grazing outside Java though, particularly on the is-land of Sulawesi, which is the Indonesian name for the island formerly known as the Celebes.

A highlight of Ray McVilly's tour seems to have been a visit to a restaurant on Sulawesi where they were served boiled duck eggs as part of a large meal.

Things went smoothly until the third egg Ray opened ap-

peared rather soft and very dark in colour. With some difficulty he managed to get it down to be told that he had been very fortunate because that was the best egg there. It seems that these eggs are hard boiled, salted and then stored for five to six months, by which time they should be soft and dark coloured. coloured.

On another occasion, a visit to a restaurant where snakes were on the menu led to Alan Charles being shown around the snake collection where he saw a fifteen feet long python, but unfortunately their party was not big enough to warrant the cooking of this animal. Other dishes of note on this gastronomic tour of Indonesia were quails' brains and frogs' legs which Alan Charles describes as quite common items on the menu.

Although ram fighting is considered good sport in Indonesia, the members of the group felt that improvement of the fighting quality of these animals was not likely to be one of the aims of the new research institute.

Mr Charles added that improving the quality of frogs' legs or breeding longer snakes might be worthwhile. Any improve-ment of animals in this area must take into account the local forms of animal husbandry and types of livestock, such as duck and goat production which provide a large part of the meat eaten.

The project will be a co-operative effort with the Dir-ector-General of Animal Hus-bandry and one of its aims will be to train Indonesian scientists to operate at CSIRO skill levels.

The Indonesian Government has promoted rice production successfully over the last five years and Indonesia has almost reached self-sufficiency in rice.

Part of this success has stemmed from the research of the International Rice Research Institute. Indonesia now wants to promote animal protein production, but lacks a research base from which to operate, hence this proposal.

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The 44th ANZAAS Congress has just been held and the three thousand plus participants have reeled back to their laboratories and lecterns.

Is this meeting the ultimate science experience or some hideous congressional creature from the black lagoon?

Does the Congress actually serve the purpose it set out to do?

In 1888 when the first Con-In 1888 when the first Con-gress was convened at Sydney University, there was a very real need for a meeting to bring together the scattered scientists and academics from the seven colonies of Australasia.

colonies of Australasia. There was a very real need to meet to inform each other what was going on at a scientific level, because of the limited number of learned bodies and scientific journals available for publica-tion of the antipodean re-searcher's results.

Then a mere 800 people gathered to hear a few days of papers presented at a leisurely pace.

Today the statistics read like a page from the Guinness Book of Records.

Over three thousand enrolled, nine hundred plus papers, up to twenty concurrent semi-

nars, scattered over two hundred acres, all at a cost of conserva-tively \$60,000, etc., etc. And that of course is not all because there are a further twenty or so specialist meetings held around the same time.

held around the same time. This year some hundreds of CSIRO people took part as either speakers or participants. They ranged from conveners of symposia such as Dr Max Day (who convened a well-attended symposium called 'Whither the Wool Country), to purphase presenting considirt

"Whither the Wool Country"), to speakers presenting specialist papers in individual sessions. Mr Ray Perry of the Range-lands Research Unit ran a lively symposium on 'Our Arid In-terior', made even more lively when one of his speakers un-fortunately collapsed whilst presenting his paper. Dr Allan Walsh, Chief of the Division of Chemical Physics, was the President of Section I, Physics.

was the President of Section I, Physics. The ANZAAS Congress is changing, and change it must because the conditions under which it originated are vastly different from today. For many of the researchers attending ANZAAS the oppor-tunities for cross-cultural ex-perience are unique. Where else can a physicist or geologist en-rol for a conference legitimately and listen to papers on socioand listen to papers on socio-logy, education or anthropo-logy?

Next year the Congress will be held in Perth.



4th September.



RESEARC CIRCULATION AMONG MEMBERS OF CSIRO STAFF NUMBER OCTOBER FOR -----163. 1972

163##1972

New Computer

Final negotiations are in progress for the purchase of a large capacity computer by the Division of Computing Research.

The new machine, a Control Data Cyber 76, when installed will be one of the largest and fastest machines in the world.

fastest machines in the world. After five years of opera-tion it became obvious that the present installation was nearing saturation usage and in 1967 various committees were set up to investigate the expansion of computing facilities. The users of the current com-puter system include, besides CSIRO, government depart-ments such as the Bureau of Mineral Resources, the Bureau of Agricultural Economics, the Departments of Supply. Works and the Tariff Board, account for about 35% of the time and universities for about a further 5% of the time. 5% of the time.

Dr Peter Claringbold, the acting Chief, said that the Diviacting Chiel, said that the Divi-sion of Computing Research supplied a service to meet the commercial applications, scien-tific and technical computing needs of the users, not for the services such as stores, pay-rolls and inventories which are done on commercial computers.

For the new installation about seven million dollars will be spent over the next three years on computing equipment and buildings.

The new Cyber 76 machine will be coupled to the existing Control Data 3600 which will now act as a "front end" for the new network. The high-speed link between the two computers will be car-ried out with a minimum of disruption to the network users. The new network when com-The new network when com-pleted, will be one of the most versatile in the world for "re-

pleted, will be one of the most versatile in the world for "re-mote" computing. Together with the installation of the Cyber 76, at least twenty more communication nodes (which are remote computers with job entry and interactive equipment) will be installed for Divisions in metropolitan areas, away from actual city centres and in country towns. Canberra, Sydney, Mel-bourne, Adelaide, Brisbane, Perth, Townsville, Rockhamp-ton, Griffith and other centres with access to Australian Post office DATEL Services (STD or leased line) will be able to use the network. They will be able to draw not only on a computing sy-

ney with be able to draw not only on a computing sy-stem with the ability to exe-cute an average of filteen mil-lion instructions per second but also on a set of technical data bases of massive propor-tione

A large and successful symposium to discuss the uses of . remote sensing has recently been held.

The Mineral Physics Section of the Minerals Research Laboattories held the symposium at North Ryde, from September 20 to 22nd, About 140 people from various CSIRO Divisions, government departments, indus-try and universities attended.

The main aims of the sym-posium were to gather together people interested in remote senpeople interested in remote sen-sing to exchange opinions, and to obtain an accurate idea of the expertise available within Australia. It also enabled the Mineral Physics Section to make known its activities and, in particular, to publicise the proposed Australian pro-gramme to use information from NASA's Earth Resources Tech-nology Satellite (ERTS).

nology Satellite (ERTS). Dr Ken McCracken, Officer-in-Charge of the Mineral Physics Section, was vory pleased with the outcome of the three days' events. "It was a very useful initiation of con-tacts between the many people working in the field, some of whom didn't even know of one another's existence" he said. "One of the results of this sym-posium has been the greater awareness of the possibilities for the second satellite, ERTS-B. I am convinced that there will be a greater participation in proposals for the ERTS-B programme."

In a practical session, various In a practical session, various demonstrations were given to illustrate the procedures used in remote sensing. The ERTS viewer was displayed using simulated ERTS imagery, ob-tained by NASA with a U-2 flying at 65,000 feet. The multi-spectral photographs obtained in previous Mineral Physics programmes were on show, as was image density evaluation equipment used in searching for geological features on



Mr Gary Suter, of the Mineral Physics Section, de-monstrating equipment for eva-luating the ERTS infra-red imagery.

REMOTE SENSING

ERTS photographs and for scaling infra-red images.

scaling infra-red images. Dr Mike Duggin was parti-cularly gratified with the re-sponse shown by industry. He was impressed by the number of people attending and their wide geographical distribution. A lively interest in proceedings was shown and a fascinating diversity of applications for re-mote sensing was apparent. In particular there emerged a de-sire for further and continuing contact between people working on remote sensing in Australia.

---- Jenny North.

Leader For Meat Research

Dr D. J. Walker, a biochemist with a wide reputation in animal science, has been appointed Officer-in-Charge of the Meat Research Laboratory at Can-non Hill, Queensland,

Dr Walker will also hold the position of an Assistant Chief of the Division of Food Re-search.

The Meat Research Labora-The Meat Research Labora-tory carries out research on the preservation, utilization and processing of meat and on the biology, biochemistry and fine structure of muscle. The Industry Section, with extension officers based in Queensland, Victoria and Wes-tern Australia, is active in Itai-son with meatworks, abattors and processors throughout Aus-

and processors throughout Australia

The appointment follows the

In appointment follows the retirement of former O.I.C., Dr W. J. Scott. Dr Walker was formerly Leader of the Microbial Bio-chemistry Section of the Divi-sion of Nutritional Biochemis-try in Adelaide.

He has recently spent six months in collaborative work with animal physiologists and microbiologists of the Depart-ment of Scientific and Indus-trial Research in New Zealand.

Recently, Dr Walker has in-vestigated biochemical factors in the relationship between pro-ductive performance and dif-ferent animal feed types.

He has also been involved in a collaborative study of the effects on sheep meat of saline drinking water.

Dr Walker graduated B.Sc. (Hons) from the University of Sheffield in 1955 and gained his Ph.D. from the same university.

He is at present a member of the committee on microbio-logy and nutrition of the Inter-national Union of Nutritional Sciences

manship

Top Apprentices

Physics have received Bronze Medallions from

the Victorian Apprenticeship Commission. They

are Robert Cathie and Patrick Francis and they received their awards for the outstanding exhibits

Two apprentices from the Division of Chemical



In addition Robert Cathie was awarded the W. P. Sher Craftsmanship Award, \$250 and a trophy, for contributing the most outstanding exhibit of craftsmanship in wood-work-ing, metal-working and like trades

Robert, who is aged 20, is a 2nd year Instrument Maker, whose interest in his trade be-gan when he started making and rebuilding slot cars.

rebuilding slot cars. Nowadays motorbikes are more in his line, but his in-terest in fine craftsmanship is still carried on in his work. For his Exhibition piece he made a Demountable Reverse Cycle Valve to be used in air-conditioning packaged units and is fully demountable for maintenance.

conditioning packaged units and is fully demountable for maintenance. The basic design of the valve was provided by Divisional En-gineers, but design detail and manufacture, including the finish, have been exclusively carried out by Robert. Patrick Francis, who is 19, and a second year Precision Optical Finishing Apprentice, made an Amici Roof Prism for his Exhibition piece. This involved the production first of all of a highly accurate ig with faces flat to one-mil-lionth of an inch. The jig was used to make three roof prisms, which make up an Amici Prism for image inversion. *Cont'd Page 3*

Cont'd Page 5

manufactured by them in their respective trades. Robert Cathie, winner of the Bronze Medallion for Crafts-





SCIENCE AND THE PUBLIC

Recently several reports released by the Australian Academy of Science have stirred considerable public debate and controversy. They have raised questions of just how well scientists communicate with the public.

Sir Rutherford Robertson is President of the Academy of Science, recently appointed as a member of the Advisory Com-mittee on Science and Technology and a former member of the Executive.

In this interview Max Bourke began by asking him how he felt scientists should go about talking to the public.

Sir Rutherford Robertson: The important thing for scien-tists to do in the beginning is to behave like scientists always should, i.e. to get the factual material correct, and make sure that any aspect of it that is sus-ceptible to scientific investig-ation can be thoroughly investi-gated by the people who are best equipped. One of the problems in controversy at the present time is the tendency for people to express opinions when they are really ill-informed opi-nions rather than authentic opinions of people who have expreience in the particular iteld. M.B.: So that you think that Sir Rutherford Robertson:

M.B.: So that you think that scientists still are able to ex-press opinions on matters out-side their field?

R.R.: No, the attitude of the Academy is that we try to avoid people expressing opinions on subjects outside their

Obituary

Sir Samuel Wadham,

one of Australia's bestknown agriculturalists died recently in Mel-

bourne.

bourne. Sir Samuel was a former member of the Advisory Coun-cil and Emeritus Professor of Agriculture from the University of Melbourne. Besides the hundreds of stu-dents of agriculture who went through his department he was known for his standard work with Professor G. L. Wood, "Land Utilisation in Australia." Sir Samuel was born in Lon-don and after attending Cam-bridge University he went to Melbourne University where he was Professor of Agriculture tor thirty years, from 1926. Besides being on the CSIRO Advisory Council he was also on the Martin Committee on Tertiary Education and the Commonwealth Migration Plan-ning Council.

own fields, and that's the whole purpose of the way the Academy sets about getting reports on scientific subjects. What the Academy does is to take the people it thinks most suited to a particular specialist field and get them to look at the relevant data, do a bit of investigation in the sense of surveying literature and talk to people who know. Then they make a report as a body of people most suited to that particular field.
 M.B.: Two reports that have caused controversy, the DDT Report and the SST Report, have produced a schism in science in Australia. One group says the report is accurate and the other group says the report is not.

R.R.: This is the sort of thing that is happening in science all the time, isn't it?



"... you must read a report as a whole."

M.B.: It presents a real quan-dary for the average layman and the politician. R.R.: Yes, exactly. It does. I agree. It puts these people in a quandary. The problem, I think, is that in science we are quite often unable to say that every scientist can agree on the interpretation in an area where the evidence is incom-plete. Quite often you will find that people will say this is the

where the evidence is inform-plete. Quite often you will find that people will say this is the best interpretation we can put on it with the evidence that is available to us. The scientist is often much less definite there, or less dog-matic, than the man in the street. The man in the street will often open his mouth about anything that he has given five minutes though to and be very dogmatic about his opinions and feelings. But the closer you get to your scientific subject, quite often, the more you see the incom-pleteness of the evidence and the more cautious you become. So that it is proper for scien-tists adopting scientific attitudes

to say sometimes that they can be very definite that the evi-dence is complete enough to be very definite that the evidence is complete enough to treach this conclusion. At other times they can be equally definite that the evidence is so incomplete that no conclusion can be reached; sometimes it's intermediate between the two.
M.B.: Do you think there was a bad presentation of those two reports in that it seemed easy for people to read the wrong things into the reports?
R.R.: I think the reports?
R.R.: I think the reports themselves are quite alright in that respect because you must read a report as a whole. I think that the way in which the press publicity about the reports went out was wrong and I think that the Academy might have done a better job there had we realized all the difficulties that were going to be in the controversial area. When I say the things were wrong, I mean that we should have been rather more aware in the Academy of the need to see that the press material was appropriate to the particular difficulty.
M.B.: Did the Academy make any attempt to encourage the goole involved in the reports

any attempt to encourage the people involved in the reports to speak to the press, to speak to the public in other words?

to the public in other words? **R.R.**: No, because we didn't think it was going to blow up in the way that it did; we might have made a bad judgement about the way to do it. But looked at objectively, what the Committee on the Atmospheric Effects of Supersonic Aircraft Effects of Supersonic Alrcraft did was to agree among them-selves that, as this was some-what controversial, it might be better for them not to talk as individuals to the press for a time after the reports were released. That in advance looked to

released. That, in advance, looked to be quite a sensible suggestion. They weren't suppressing any-thing; they were simply saying as one of the problems that you face in mass media is that of stimulated controversy, it might be better not to have to face that until we had seen the general impact of the report on the scientific community rather than on the lay public. What happened was that the techniques used by reporters in the mass media, tried to blow up the controversy.

of course, because our chaps on the Committee had said they on the Committee had said they were going to wait a decent period before commenting, and didn't depart from that, the ten-dency of the media was to make that decision to look a sinister thing in itself, which it wasn't at all. M.B.: What about the role of the Academy as a political

at all. **M.B.**: What about the role of the Academy as a political force, what do you see develop-ing in this area? **R.R.**: Well, I think in an Academy of Science, any other body that is like an academy of science or the Royal Society of London, the first obligation is to interpret science in the proper scientific attitude. This is something that we have to do in relation to the public, in relation to politi-cians and in relation to popele making decisions. As I said before, you must make sure that your scientific facts are right, that you provide the scientific information, that you are resistant to decisions that are based on the wrong scientific information or deci-sions that are based on anti-scientific impressions or emo-tions. I think the Academy should be bringing neonle back all the

I think the Academy should be bringing people back all the time to seeing that informed opinion, that of people who know, is the opinion that you should be taking notice of, not that of just anyone that grabs a microphone and shouts his head off. head off M.B.: Well, the Academy's

billion went, the Academy so opinions are not issued very re-gularly. People are looking for their leadership and are look-ing to informed opinion more and more from scientists.

Cont'd Page 4



And Decision Functions

by M. G. Kendall

King Henry VIII was at cards in the Tower And his manner was gracious and bland, Until one of his aides put him up to six spades And left him in, playing the hand.

By the look on his face they could see the King's Grace Was encountering serious trouble, The strain was increased when his Fool, sitting East, Thought it funny to venture a double.

His Majesty countered and counted his trumps And looked dummy over and o'er. The whole of the court knew quite well he was short And they edged a bit nearer the door.

No man could be ruder than bluff Harry Tudor Whenever he felt so inclined. "Will some of you nits shake the wine from your wits And assist me to make up my mind?"

Three senior counselfors answered the call With a certain reluctant compliance. There was one Statistician, one Mathematician And an expert in Management Science.

"Now hither to me, ye wise counsellors three, And help your liege lord in distress. If the spade queen may rest, or with East or with West, Should I play for the drop or finesse?"

The Court Statistician went down on one knee To assist the King make up his mind. "This is clearly a case for the methods of Bayes But the problem's not fully defined,

For I must admit, Sire, that, not knowing the prior Probability function that fact is I really can't testify which course is best if I Have to apply it in practice."

The Mathematician went down on one knee To help the King make up his mind, "Now one of the aims of the theory of games Is to settle a case of this kind,

But I learn with regret that the subject, as yet, Has found little or no application. The pay-off type matrix won't show how to play tricks In any real-life situation."

The Management Scientist bended the knee To help the King make up his mind. "The orthodox schools (seach a series of rules For dynamic decisions designed,

Their exponents talk much of risk functions and such And even write books on the Art. But I cannot deny that it's hard to apply And I haven't a clue how to start."

"So then useless are ye, my wise counsellors three, To help your King out of a mess. If the spade queen may rest, or with East or with West, I suppose I shall just have to guess."

King Henry arose from his rubber of bridge With a black and a duratening frown, For he wrongly had guessed that the queen lay with West And he went a good four hundred down,

So the heads of three counsellors rolled on the Green As a lesson to all humankind That the lore of decision needs wholesale revision To help a man make up his mind.

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For A Mathematician Who Makes A Crowd

For clever monkies; golden balls; Gruff billie goats; blind mice and bears; By-sailing ships on Christmas morn; French hens, Magi, musketeers; From-school small maids and penny operas; Enfountained coins and fairy wishes; Bags-full of baa-baa-black sheep's wool; Little pigs and littler fishes; Angles and pods and planes and cycles; Unlucky clover; fleur de lis; Troikas; ritumvirates and tridents; A perfect number three may be, But not for you. And not for me, Though different may the proving be.

-Marjory O'Dea.

SAFETY NOTES



The Eyes Did Not Have It

These safety spectacles belonged to a member of one Division. He took the precaution of putting them on before handling a chemical compound which turned out to be handling a chemic extremely unstable.

The message is clear for you to see. Keep it that way by showing the same safety awareness as the owner of the spectacles.

Gil Barnes, Safety Officer.

The News in Brief 1957, he transferred to the Re-gional Administrative Office, Sydney, as second-in-charge of the Registry Section. In 1964, he was promoted to Leader of the Salaries Section and, in 1966, became Clerk-in-Charge of the Staff Section, which posi-tion he held at the time of his death.

Fellows

Two new Fellows of the Aus-tralian Institute of Agricultural Science are from CSIRO. They are Dr C. S. Andrew of the Division of Tropical Pastures and Dr Donald Martin of the Tasmanian Regional Labora-tory. tory.

Dr Andrew is widely recog-nised as a leading authority in the field of plant nutrition. He has been particularly involved in research into the problems associated with the improve-ment of pastures in tropical Australia. In this, following a study period in the United States, he has been using radio-active phosphorous to trace the use by tropical legumes of the plant nutrients in the soil. His work has been described as "vital to the exploitation of the tropical legumes". He already holds the Medal of the AIAS. Dr Martin is an expert on

Dr Martin is an expert on problems involved in fruit storproblems involved in fruit stor-age and control of the factors which cause apples to deterior-ate after picking. He has a world reputation in this field, and holds an Associateship of Honour from the Royal Horti-cultural Society in Britain, which is the highest honour it gives to British subjects not liv-ing in Britain.

Visitor

Visiting the Division of Ani-mal Physiology at Prospect, N.S.W., is **Professor Herman B.** Chase from Brown University in the U.S.A. He is on sab-batical leave for six months from his university and is here as a Special Research Fellow of the U.S. National Institute of Health to investigate the hair Health to investigate the hair growth cycles in several species of local marsupials.

death.

CSC

Awards

Australia.

Master

Cont'd from Page 1

Kevin was a fine athlete in his youth, excelling in hand-ball and Australian Rules foot-ball. He had been a director of the Laboratories Credit Union since 1967.

The Commonwealth Scienti-fic Committee meets in Can-berra from October 23 to November 5.

The Chairman of this meet-ing is Mr C. S. Christian of the Executive. Over thirty dele-gales are expected to attend from twenty of the member countries

from twenty of the member countries. One of the major objectives of the CSC is to ensure the ful-lest possible co-operation be-tween the Government Civil Scientific Organizations of the Commonwealth. Following this meeting Mr D. G. Thomas will become the permanent Secretary. He has until recently been with the Division of Plant Industry.

Awards Dr Norman Adams of the Division of Animal Health has been awarded the American As-sociation of Avian Pathologists Research Award for 1971. The award is made annually for the most significant contri-bution to avian pathology. At present Dr Adams is working at the Institute of Agriculture in the University of Western Australia.

Australia. Dr Alan Walsh, Assistant Chief of the Division of Chemical Physics has been awarded the Maurice F, Hasler

awarded the Maurice F, Hasler Award in Spectroscopy. The award is made by the American Society of Applied Spectroscopy and provides an honorarium of \$1,000 to the recipient. The purpose of the award is to recognise and en-courage achievement in the origination, improvement or application of spectroscopy in chemistry or physics.

Mr R. L. Dunstone of the Division of Plant Industry has been awarded the degree of Master of Science by the Aus-tralian National University for a thesis entitled, "Some Phy-siological Aspects of Evolution in Wheat".



This is his second research visit to the Prospect Labora-tory, the former one being in 1964-65 when his work was

1964-65 when his work was mainly on sheep. At Brown University, Dr Chase is Director of the Insti-tute of Life Sciences and is also Head of Population Biology and Genetics in the Division of Riological and Medical and Genetics in the Division of Biological and Medical

His research has been pri-marily in Physiological Gene-tics, Experimental Dermatology, and Radiobiology.

Obituary

Kevin, a West Australian, joined Head Office in 1946, after serving as a fighter pilot with the RAAF in Britain. He was with the Division of Forest Products from 1947 until, in



The eleven-man Science and Technology Advisory Committee has recently been announced by the Minister for Education and Science. Four scientists and seven industrialists make up the committee.

These are its terms of reference:

1. The Committee shall be concerned with matters relating to Australia's efforts and needs in civil science and technology and shall report and make re-commendations to the Govern-ment on: ment on:

- (i) the development and application of science and technology to national needs and objectives now and in the future;
- (ii) new areas of science and technology which are of importance to Australia including fields of indus-trially and commercially oriented research and de-velonment; velopment;
- (iii) the balance, adequacy and effectiveness of national effectiveness of national efforts in various fields of science and technology, and means for improving efficiency in the use of resources;
- (iv) the relative importance of efforts in those fields of science and technology which may contribute to national economic and social development and national economic and social development and welfare or to the advance-ment of scientific know-ledge, including the priori-ties that should be as-signed to specific major nrojects: projects;
- (v) the effective development and utilization of scientific and technological manpower;
- (vi) the compilation of statis-tical and other informa-tion on the national effort in science and technology which should be obtained as an aid to the continuing assessment of national ef-forts and to the formulation of Government poli-cies in relation to civil science and technology;
- (vii) any other matters that may be referred to it by the Government.

The Committee shall not be concerned with fields of medical research which are the responsibility of the National Health and Medical Research Council, nor with fields of de-fence science except to the ex-tent that these may be related to the foregoing.

 The Committee shall report to the Prime Minister through the Minister for Education and Science. In addition to reporting from time to time on specific matters, it shall pre-cert commelly a report on its annually a report on its sent activitie

3. Subject to the approval of

the Minister for Education and Science, the Committee shall be empowered to engage con-sultants and to appoint expert sub-committees to report to it on specific questions.

on specific questions.

 The Committee shall consult with other bodies as may be relevant with a view to ensuring liaison on matters of mutual interest and to avoiding duplication of effort so that each body may discharge effectively its own particular functions and responsibilities.



'Look Pop! Environment.'

In his spare time Patrick has built a 48" Newtonian Tele-scope that took over seven months to complete. He will also be making the mechanical equipment to go with this high precision instrument precision instrument.

Top Apprentices



Patrick Francis Both of these apprentices, besides their regular course work will be doing a Technicians' course.

Sciences

Mr Kevin Johnson, who worked for CSIRO for 26 years, died recently after being in ill-health for some time.

BTOBEY

Courtesy 'New York Times',

SCIENCE AND THE PUBLIC

Cont'd from Page 2

Cont'd from Page 2 **R.R.**: I think you are right; the Academy won't be making a weekly press release and say-ing that the great issues of science are this, that or the other thing this week. But I think its right for the Academy to say from time to time we have now looked into a particular matter through the activities of a group of people we think most suited to that in-vestigation. Their conclusions are as follows; this might be an



". . . get the factual material correct

Academy report or it might be Academy report or it might be an Academy press release; at times I'm sure we should get the appropriate scientists to-gether and say they are pre-pared to discuss their conclu-sions with representatives of the press, television or radio. **M.B.:** Is this likely to happen more frequently than it has in the past?

the past'

R.R.: I think it could happen more frequently than it has in

the past. This is not so much a change in the Academy as it is a change in the importance of science in our daily lives so this kind of comment from scientists is becoming increas-

ingly inportant. If the Academy is going to preserve the balance in saying we want informed opinions on these things, we will have to be involved more often than in the

Involved more often than in the past. **M.B.**: What about in a dir-ectly political sphere, do you ever see the Academy becoming involved in political lobbying as the United States Academy of Science has? **R.R.**: To start with there is a definite constitutional differ-ence between our Academy and the United State Academy of Sciences. The United States Academy of Sciences was estab-lished in 1863 specifically to give advice to the United States Government; that requirement is not in the Charter of the Australian Academy of Science is free to advise or ceitiding Conversion

The Australian Academy of Science is free to advise or criticise Government or any-body else; that is an important difference between the two. As far as the Academy is con-cerned, I have suggested it should plav a role in informing the community as a whole. I think it should also play a role in interacting with politicians who are seeking information on scientific subjects. M.B.: More as a clearing house for information for them?

house them?

R.R.: Well as a clearing house for information, but also in letting the politician feel that someone who knows has



said to him, "If you listen to these men you are likely to be listening to the opinions that are the best informed opinions in that field." in that field.

in that field." **M.B.**: Science seems to be under attack, the anti-science wave seems to grow year by year rather than diminish. Do you think that the Academy should act as an active political lobbyist to support science? **R.R.**: I am sure that it will be always supporting science. How far it should do that is a matter of judgement. It is true that science is under attack from some people, in

attack from some people, in many cases mistakenly, because

what they really want to attack, although they haven't thought it through clearly, is techno-logy gone wrong. Technology, after all, is a blood-brother of science, but isn't science itself. And where technology has gone wrong then obviously it ought to be criticized and put right by good scientific investigation. But whether the Academy ought to be standing up all the time as a loud voice for science, I think is another matter. I think the Academy is probably better employed in rebutting specific instances when people are saying the wrong things about science or the wrong things about technology. **M.B.:** How often does it do that? **B.R.:** I don't know that it is

M.B.: How often does it do that? **R.R.**: I don't know that it is doing it at all at the moment and I think actually of course you don't want to do this until the attacks are serious. At the moment a lot of anti-science is coming from, let's face it, a "lunatic fringe". I think you would agree on that. And if you just go on arguing with the lunatic fringe, for example people who say things like wo, would be much better off if we didn't have all this modern hygiene, and forget about the diseases like typhoid that were rife in the community before modern hygiene, you are just wasting your breath. You give publicity to their cause rather than letting the good sense of the community rebut it for itself. I think if people come up that

the community rebut it for itself. I think if people come up with wrong proposals the Aca-demy ought to say when it be-lieves a thoroughly unscientifi-judgement is being made. **M.B.:** Do you think the Aca-demy has any role in seeing that science in general and per-haps specific organizations in particular, get a larger slice of the Australian budget? **R.R.:** I think the Academy has a role here in seeing that balanced view is taken. I don't think that the Academy would want to say that we want an

think that the Academy would want to say that we want an increase in expenditure on science just to have an increase in expenditure on science. For example, if you take scientific research which has now become a very expensive occupation . . **MB**: And an industry in

M.B.: And an industry in itself

R.R.: And an industry in it-**R.R.:** And an industry in it-self — well I'm sure that re-sponsible people in science and responsible people in the Aca-demy are not going to say that money should be spent on any old piece of scientific research. They are going to say that money should be spent on ad-vancing our knowledge by first-rate scientific research and that will be money well-spent. But

money spent on third-rate scientific research is probably not well-spent; we could afford to do it as a nation only if we didn't have more urgent things than third-rate scientific re-search demanding our money. I think many people would be entitled to say that old-age pensioners and better hospitals and better primary schools might have higher priority than poor scientific research, poor quality scientific research. M.B.: But, at the same time there are very active groups

quality scientific research. M.B.: But, at the same time there are very active groups lobbying for increased tariff protection, for instance, science does not have a lobby that is standing up and pushing for it. R.R.: I don't know that science as such should have a lobby. I think what scientists should do if they are being responsible is say, wherever they see science can be used better for the welfare of the community, and I mean that in the broadest sense, both material welfare, "we should have more science". But they should be responsible enough to put it in its right priority in relation to the other things that are for the welfare of the community. And I hope the Academy will always be responsible in giving advice on those things.

Write it to me

There have recently been a steady flow of letters to the Editor of Coresearch, and the authors may wonder why they are not published. The reason is simple, they are sent anonymously. Letters to the Editor will be published but only if they are signed in the first instance by a member of staff, although pseu-donyms will be used in print, if the author wishes. The name of the author of a letter will only be known to the Editor of Coresearch. Any topic of interst to the

Any topic of interest to the staff that may stimulate discussion is welcome so long as the Editor can be sure that it comes from a bona fide member of staff.

So write it to me, now.



Contributions to the November issue of Coresearch should reach the Editor at P.O. Box 225, Dickson 2602, by Monday, 16th October.



163-1972

RESEARCH FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF -- NUMBER 164, NOVEMBER, 1972

164##1972

EXECUTIVE CHANGES

Two new appointments to the Executive have been announced. The retirement of Mr C. S. Christian in December this year and Mr E. P. S. Roberts, in March next year, will cause the vacancies.

Dr A. E. Pierce has been appointed to the full-time posi-tion to replace Mr Christian, and Mr W. J. Vines will replace Mr Roberts on the part-time Executive.

Mr Chris Christian com-menced with the Organization in 1930. He was the first Chief of the Division of Land Research and Regional Survey (as it was then).

It was then). The systems of land resource surveys developed in those years had placed Australia in the forefront in the technology of rational resources mapping forefront in the technology of national resources mapping. During this time Mr Christian gained a wide reputation as the 'father' of arid zone research in both Australia and India, where he played an important role in the establishment of the Arid Zone Research Institute at Jodhpur. Mr Roberts will ratice after

Mr Roberts will retire after thirteen years on the Executive. He is a well-known Queensland grazier.

Dr Pierce's early research was directed to trace element deficiencies, particularly copper and cobalt, in sheep.

His pioneering work at the Central Research Laboratory of the U.K. Ministry of Agri-culture and Fisherics led to the development of an entirely new type of immunological test now in world-wide use.

in world-wide use. Working in the U.S.A. under a Welkcome Fellowship, he stu-died the mechanisms of animal immunity and developed tech-niques for separation and iden-tification of the bovine globular proteins involved in the im-munity process munity process

He returned to the U.K. in 1950 to lead a new Agricul-

Mr W. J. VINES



tural Research Council Unit at the Lister Institute of Preven-tive Medicine in London be-fore moving to the Institute of Animal Physiology. Here he made important new discussion convention.

discoveries concerning the mechanism of protein transfer through membranes, particu-larly in the case of the new-

In 1964 he received a Merit Research Award from the Agri-cultural Research Council for

research which was concerned with the relationship between structure and function of proteins with particular reference to immunological mechanisms in domestic animals and in

Dr A. E. PIERCE

poultry. In 1954 Dr Pierce came to Australia as Ian McMaster Fel-low to survey protozoon disease problems in domestic animals research, and carried out further research in Australia in 1962-63.

Dr Pierce, who is 52 years of age, was born in London. He graduated M.R.C.V. in 1941 from the Royal Veterinary Colfrom the Royal Veterinary Col-lege, U.K., gained the Diploma of Veterinary State Medicine in 1942 and was made a Fellow of the Royal College of Veterinary Surgeons in 1948. He gained an M.Sc. degree from the Univer-sity of Wisconsin in 1949 and obtained his Ph.D., London, in 1954, and D.Sc., London, in 1964. He was made a Fellow of the Australian College of Australian College of Veterinary Scientists in 1971.

In 1966 Dr Pierce became Chief of the Division of Ani-mal Health in Melbourne. He has edited and contributed to a number of scientific text books and has published over 50 scientific nonres 50 scientific papers.

Mr Vines, 56, was born at Terang, Victoria, and was edu-cated at Haileybury College, Melbourne.

Mr Vines became a senior executive of a well-known Aus-tralian firm, Lewis Berger and Sons, holding directorships in the Australian and London offices of that company.

Cont'd Page 2

A plea for freer and more effective communication between scientists and the public was made by the Chairman, Dr J. R. Price, in Canberra last month, at the opening of the 7th Meeting of the Commonwealth Scientific Committee.

The Commonwealth Scientific Committee (CSC), which consists of representatives from national scientific research ornational scientific research or-ganizations of Commonwealth countries, meets every two years to discuss means of ensuring the fullest possible collabora-tion in scientific matters be-tween members of the Com-monwealth.

Some 30 delegates from 18 Commonwealth countries at-

Commonwealth countries at-tended the meeting. CSIRO was host to the meet-ing which was held in the Or-ganization's Conference Centre at Head Office. Mr C. S. Chris-tian of the Executive was Chairman of the meeting. During big opening address to

During his opening address to the meeting, Dr Price said that governments today recognized the need to invest in science and technology in order to and technology in order to achieve national goals and to use science and technology to deal with many of their prob-

The development of national science policies aimed at pro-viding a framework within which a country could develop and deploy its scientific re-sources to maximum effect was therefore something which was becoming more and more dis-cussed, debated and argued about.

about. Many countries had set up bodies of one sort or another in an attempt to ensure that governments were kept as well-informed as possible on scienti-fic issues which were relevant to the political decisions they were called upon to make from day to day. day to day.

Dr Price said, however, that it would be a mistake to think that the development of accept-able science policies depended only on interaction between governments and their scientific devices the property ways the advisers. In recent years the general public had begun to pay a great deal more attention to the objectives and priorities of research programme

Society as a whole had be-come concerned about the directions in which it was heading and with the detrimental side-effects which often resulted from over-emphasis on growth as an end in itself.

as an end in itself. The public was voicing its opposition to development pro-jects which might lead to soci-ally undesirable consequences. This opposition constituted an increasingly vocal and powerful feedback influencing the decisions made by govern-ments. ments.

Scientists and science admini-strators had to recognize the danger of over-reaction in such situations, as expressed in the philosophy that 'all change is bad'.

Such over-reaction could seriously inhibit developments that in fact the community sorely needed.

sorely needed, Scientists and science ad-ministrators had to oppose the view that science and techno-logy were necessarily bad and they had to convince others that in many circumstances what was needed was more science, not less. 'As science administrators'.

'As science administrators', Dr Price told the meeting, 'we have a responsibility to assist both politicians and the public to gain a clearer understanding of how science and technology can best be used in the national interest, and, much more diffi-cult for us as well as for others, an understanding of the com-plex interrelations between sci-

plex interrelations between sci-ence and society. 'But while we have a respon-sibility to try to do these things we must recognize that we, as science administrators, cannot do them on our own, 'What we have to do is to encourage free and effective communication between scien-tists themselves and the general public and politicians.

public and politicians.

Cont'd Page 2

Mr C. S. Christian, the cur-rent Chairman, and Dr R. N. Gonzalez from Jamaica, who is the past Chairman of the Commonwealth Scientific Committee.





born

lems

SOME REFINEMENTS

L. M. Janifer and F. W. Kantor² report their observation of the fgm decay of the carriage excited state under controlled conditions in the reaction

Cg*→Cg + fgm (I) where

Cg*= carriage (excited state) Cg = pumpkin (ground state) fgm = fairy godmother particle

Their article contended that a pumpkin is reised to its excited state (carriage) by the absorption of a single fgm particle and that the excited state docays to the ground state by the emission of a single fgm particle [fairyon].

A careful search of the literature cited as the basis for their study reveals that in every case reported, collision of the fairyon with other perticles in a definite order always precedes its absorption by the pumpkin.

pumpkin. In the most clear-cut and accurately reported tabulation, the fairyon was observed to collide with six mice, a dog, a horse, and a collection of rags before its absorption by the pumpkin was possible.

possible. Each of these particles was also raised to an excited state as the result of the transfer of finite quantities of energy. These reactions were:

 $mur + fgm_0 \rightarrow mur^* + fgm_1$ (2)

 $can + fgm_1 \rightarrow can^* + fgm_2$ (3)

 $equ + fgm_2 \rightarrow equ^* + fgm_3$ (4)

 $fab + fgm_3 \rightarrow fab* + fgm_4$ (5)

and finally

 $Cg + fgm_4 \rightarrow Cg^*$ where

mur and mur* are, respectively, the ground state (mouse) and excited state (horse) of the mouse particle (muron)

(6)

can and can^{*} are, respectively, the ground state (dog) and excited state (footman) of the dog particle (canion)

equ and equ* are, respectively, the ground state (horse) and excited state (coachman) of the horse particle (equon)

fab and fab* are, respectively, the ground state (rags) and excited state (gown) of the fabric particle (fabron)

particle (tabron) fgm₀ is the fairy godmother particle (fairyon) of full energy, and fgm₁, $2 \dots 4$ are degraded or scattered fairyons of lower energy. This observation has been interpreted by other workers³ as evidence that the absorption of a fairyon by a pumpkin is a resonance phenomenon and occurs only within a narrow range of fairyon energies.

It has also been reported⁴ that quantum considerations demand that the degraded fairyons fgm, $2, \ldots, 4$ each lie at energy levels which are in integral multiples of $/2\pi$ below the unscattered particle fgm₀.

Some investigators consider the two particles mur* and equ to be identical, but recent work⁵ has shown them to be mirror images of each other because of a difference in parity.

In most cases, the energy difference of the incident and scattered fairyon $(hV_0 - hV_1)$ exactly equals the difference in energy of the ground state and excited state of the struck particle (Emur* - Emur).

Since the reaction involves two colliding particles and two diverging particles, momentum is conserved. The single exception appears to be the final absorption of the fairyon by the pumpkin. Clearly a third particle must be involved in this reaction to conserve momentum.

momentum. There has been some speculation that the cinderon, or maiden particle, is requisite for this reaction to proceed, but vactor analysis of the momentum shows that after the absorption of the fairyon by the pumpkin, the cinderon and carriage do not move apart as in the classical situation, but they move together, and the cinderon becomes loosely bound inside the field of the Cg*.

Moreover, the cinderon seems to be periodically emitted and reabsorbed by the carriage until the final decay process occurs. At this time, it is almost certain that the cinderon and fairyon are emitted in cascade.

The order and orientation of this double decay are not known with certainty, and it is suggested than Janifer and Kantor repeat their experiment using an array of cinderon detectors inside their untenable position shield.

tenable position shield. Unlike the fairy godmother particle which cannot penetrate sin but has a finite probability of tunnelling through the lechery barrier, the cinderon is totally reflected by both surfaces and cannot be detected outside the shielding.

A suitable detector for the maiden particle is Pc I (Km) (Kingium-activated Princium lodicie) in a pressurized, hyperthermal pure carbon (diamond) annulus.

An enquiry received at Head Office

Ray D. Lloyd Roger L. Aamodt William W. Wagner Department of Spiritual

Physics Ethereal Institute Transylvania

The application of a strong magnetic field perpendicular to the axis of the untenable position shielding might enable the investigators to determine the order of the double decay as well as the spins and orientation of the amitted particles and their conditions of isotropy. This could be accomplished if separate readout de vices are connected to each famcinderon detector pair which has been wired in delayed coincidence.

Another variation would be to cool the entire apparatus to liquid introgen temperatures to see if the time between the emission of the two particles can be increased, thereby enabling the direct observation of the hitherto unknown short-lived intermediate state lying between the excited state (Cg*) and the ground state (Cg) of the pumpkin.

of the pumpkin. We expect that the experiment will show the fairyon to be emitted first, since the temporary release of a virtual cinderon from the carriage for periods exceeding 10²³ sec apparently is not associated with the triggering of the fairyon-cinderon cascade.

Suitable diffraction gratings placed outside the shielding will enable the investigators to determine the energy of the emerging fairyons.

tairyons. If any are observed to possess energies near the maximum (fgmg), the question must then be put in terms of energy conservation in that somewhere, the excited states of the other particles equal in number to those originally involved must also have decayed to the ground state in reverse order for all of the energy to have been released. This observation could prove to

This observation could prove to be of tremendous importance in explaining the scattered reports of the spontaneous transformation of horses into mice, etc.

Note added in proof:

Our wives have been compleining that they frequently find upon opening their clothes closets, some of their expensive, beautiful clothes have been transmuted to rags.

Courtesy of

The Journal of Irreproducible Results Official Organ of the Society for Basic Irreproducible Research Pictured: Mr Peter Dawe, left; Dr D. Miwa, Secretary of FID/CAO and his assistant Mr T. Kuroda, with Mr Gratton Wilson. Mr Wilson is President-Designate and Mr Dawe Secretary-Designate of the Organization.

DOCUMENTATION

The Second General Assembly of the Commission for Asia and Oceania, International Federation for Documentation, was held in the CSIRO Conference Centre, Head Office, from 9th to 11th October. The International Federa-

Cont'd from Page 1

Executive Changes

EACCUTTE Unlatiges From 1961 to 1969 he was Managing Director of the International Wool Secretariat and in 1969 was awarded the C.M.G. for his services to the wool industry. As Acting Chairman of the Australian Wool Commission, Mr Vines is a member of the Australian Wool Board. He is also a member of the International Wool Secretariat Board.

In addition to his appointment at Dalgety Australia Ltd, Mr Vines is also a Director of several other Australian companies and is a grazier in southern Queensland,



'This presents not only difficulties of communication but of the definition of guidelines which will enable scientists working in governmental or semi-governmental laboratories to recognize how and where his duty as a private citizen may be at variance with his duty as a responsible government employee.'

Dr Price concluded by pointing out that science administration was far from being a routine activity which could be dealt with by recourse to a set of rigid rules.

It was something, he said, which must change continuously adapting itself to changing circumstances, and developing new strategies in order to cope effectively with the ever-changing needs of society.

On 30th October delegates went on a one-week tour of research laboratories and agricultural field stations in Victoria, New South Wales and Queensland.

In Brisbane they took part in a seminar on animal production in tropical and sub-tropical areas. tion for Documentation (ITD) was founded in 1895 to promote and co-ordinate the activities of organizations aud individuals on a world-wide basis concerned with the collection, organization and dissemination of information, particularly in the fields of science and technology. It has its headquarters in the Hague and membership is drawn from nearly sixty countries and international organizations. CSIRO is the national member for Australia. The Commission for Asia

The Commission for Asia and Occania (FID/CAO) was formed as recently as 1968 to promote the objects and activities of FID in the region, and to develop national documentation and information services in the countries concerned. Australia was represented at the Inaugural General Assembly of FID/CAO held in Tokyo in 1970 by CSIRO's Chief Librarian. Miss Doubleday remains official Australian delegate to the Comission, but its executive functions have moved from Japan and are now filled by Mr. L. G. Wilson (President) and Mr P. H. Dawe (Secretary).

mains official Australian delegate to the Comission, but its executive functions have moved from Japan and are now filled by Mr. L. G. Wilson (President) and Mr P. H. Dawe (Secretary). Amongst the countries represented at the Canberra meeting were Japan, Indonesia, Hong Kong, Korea, and Thailand. Mr Ralph McBurney, Directors of Canada's Technical Information Service, National Research Council who is the President of FID, also attended the meeting.

President of FID, also attended the meeting. At a time when there is an ever-widening recognition of the importance of effective information and library services and an increasing world-wide concern that such services be developed in a co-ordinated manner, it is felt that the Commission can play a useful role in developing a better understanding of activities and needs relating to library and information services and sources in the Asia region.

DEADLINE

Contributions to the December issue of Coresearch should reach the Editor, P.O. Box 225, Dickson, 2602, by Monday, 20th November.

Dear Sir, High School IA and I would like you, if you Could, to send me some information on what if your company does. I am doing a project in science for Mrs T____ the teacher and

n science for Mrs T--- the teacher and need some information on the work you do thank you.

am only a small girl 4Pt high

Yours M	Sincerely - 112	years



Social Notes



Mrs Mary Singleton, 'tea-lady extraordinaire', at a dinner party given in her honour when she retired after 17 years with the Division of Animal Genetics, where the range of her duties in-cluded washing laboratory glassware, making tea, 'looking after the laundry' and, unofficially, acting as confidante and friend to the female staff.

the temale staft. The cheerful, gaplitarian and untiring way she carried out these duties was repaid by the great respect and affection with which she was regarded by her colleagues in the Division. Mrs Singleton is holding up the card which was signed by about 120 past and present members of the Division, who attended the dinner to wish her well on her retirement.





Since its formation in March, 1971, the Division of Mineral Chemistry (Garden City) Social Club has enjoyed considerable activity in both social and sporting circles. A highlight in the club's history was the victory of its soccer team last week in the grand final of the airlines cup. The team, which consisted mainly of players from different sections of the Division, was unbeaten in the earlier rounds of the competition defeating more professional sides from Ansett, ABV-2, Qantas and TAA. The final was played at Port Melbourne in front of about 200

The final was played at Port Melbourne in front of about 200 spectators including the Director (Ivan Newnham) and Chief (David Koch) to whom they are grateful for much enthusiastic and

(David Koch) to whom they are graterial for much entropies in an evolution of the part of the Minchem Captain, Bill Wilson, by a senior official of TAA.

--- D. A. J. Rand.



ABOVE: Our indefatigable collector of confusing signs, John Corbett from Animal Physiology, has come up with another one.

BELOW: Speaking of collectors, Jeff Foley, of the Division of Animal Health, who has just celebrated his 45th anniversary in the Organization, is seen here with his alternative to curtains. Photo by Eric Smith.



CAA

In the eighteen months since it was first formed, the Com-munity Aid Abroad group at the National Standards Laboratory has raised nearly \$1,500

Pictured: Last month's lunch guest of the NSL CAA group, the Abbé Pierre with Ms Ingrid Sondberg of the Swallows of India, and Mr Jack Wright, the President of the Group.

to aid overseas projects. The money has been raised pri-marily from donations and pro-

fits from theatre parties. The group's main activity has been its monthly lunch-time meeting. The speaker at the October meeting was Abbé Pierre, a former leader of the French Resistance and life-long crustader analist powerby. The crusader against poverty. The Abbé is in Australia to sup-port the work of the Swallows

of India. Funds raised by the group in 1972 are being used to assist a family planning project and construction of a hospital kit-

chen in India. The group at National Standards has nearly seventy mem-bers and is one of eight CAA groups operating in CSIRO establishments throughout Australia.

E) Harman Harman Harman



Nominations for the Riveft Nominations for the Rivett Medal close on 31st December. The medal in 1973 will be awarded for outstanding re-search in the field of biological science carried out over the past ten years, and is based on published work.

Research staff under the age of 41 years on 1st January 1973 may be nominated.

Nominations should be submitted to the General Secre-tary, CSIRO Officer's Associa-tion, 314 Albert Street, East Melbourne, Vic. 3002.

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SAFETY NOTES

A code of many colours

What are usually red, black and green, may be brown, blue, and striped green and yellow, or can be almost any other combination of hues? Answer — the insulation colours of three-core flexible electric cords.

That just about sums up the rules for these cords. Green, or striped green and yellow insulation must be used for the earth conductor but the current carrying conductors can be

until recently the most commonly used colour code was red, black and green to identify active, neutral and earth

red, black and green to identify active, neutral and earth respectively. The International code is now recognised as an acceptable alternative to the common code. It uses brown for active, blue for neutral, and green and yellow stripes for earth. Confused? Then this is another good reason for getting your equipment wired and extension cords made up by a qualified electrician.

-Gil Barnes, Safety Officer.

MONEY, MONEY, MONEY **1. Housing Finance**

The A.M.P. Society has a special housing finance scheme for CSIRO officers. This has been in operation for 16 years and during that time a total sum of \$1,064,260 has been loaned to 124 members of CSIRO's staff for domestic housing. The main features of the scheme are:

Amount of Loan

Loans are granted for the purchase or erection of suit-able homes in approved locali-ties. In the case of CSIRO officers, the A.M.P. Society will approve loans up to 80% of the Society's valuation of the property. Although there is a formal limit of \$15,000 on housing loans, there have been several instances where adseveral instances where ad-vances in excess of this amount have been approved for CSIRO personnel.

Duration

The usual period of the loan is for 15, 20 or 25 years, ac-cording to the age of the appli-cant. Repayment is made by fixed monthly instalments for the duration of the loan.

Interest

Current interest rates are Current interest reads are 1^{10} per annum for loans up to \$8,000; over \$8,000 and not exceeding \$16,000, the rate is 8% on the total loan; over \$16,000, the rate is $8\frac{1}{2}\%$ on the total loan;

Locality

Loans are generally restricted to properties located in capital cities and in large provincial towns where the Society has its own branch offices.

Life Assurance Protection

All participants in the A.M.P. Society's home finance scheme are required to take out full life assurance cover for at least the amount of the loan. Exist-ing life policies with the A.M.P. Society are acceptable collateral but the 'mortgage' or 'reducing cover' type policy is not regarded as adequate for this nurrose. In short, the asthis purpose. In short, the as-surance policy must be a per-manent one based on the life of the officer.

Valuations

A charge is made for valua-tions of properties offered as security under the scheme. For existing homes, the fee is \$20 and for new building loans it is \$30. It has been the experi-ence of CSIRO officers that the Society's valuations are realistic and follow closely the market conditions operating at the time of the valuation.

Confidential Aspect

Enquiries should be addres-sed to Mr R, W. Viney, Finance Manager, Head Office, P.O. Box 225, Dickson, A.C.T. 2602. All transactions are kept strictly confidential transactions confidential.





2. Benevolent Fund

Since its inception four years ago, the CSIRO Benevolent Fund, functioning in South Australia, Western Australia, Tasmania and Victoria, has been able to assist many members and ex-members of staff (whether superannuated, temporary, or part-time) in over-coming a wide variety of financial difficulties.

Until now most of the fami-Until now most of the fami-lies helped have been in des-perate need. Now that there is an appreciable reserve fund, the Management Committee en-visages giving help to people who might be faced with severe financial difficulties in educat-ing their children.

The Management Committee would be particularly sym-pathetic towards assisting with provision of special education for a child who suffers any type of handicap.

Help might also be granted in instances where a family is

forced to consider withdrawing a child from school of tertiary education to boost the family resources.

resources. This is the time of year when families are making decisions about education for next year and costs are being considered. Anyone with problems in this field is urged to discuss them with their Divisional represen-tative; as always, the strictest confidence is observed about such discussions. such discussions.

The Management Committee The Management Committee has always been concerned that the Fund's activities might not be known to some people who could be in need of help. De-pendents of employees who re-tired many years ago are typical of those who might not have heard of the Benevolent Fund or recollined that here evolution

heard of the Benevolent Fund or realized that help could be given to them. Members of staff are asked to be on the lookout for such people and to suggest that they get in touch with a Divisional rearresentitive representative.

3. Credit Society

During 1971-72 the CSIRO Co-operative Credit Society made loans totalling more than \$1,000,000 to members.

The total amount of loans outstanding at the end of the financial year was almost \$2,580,000.

The total capital of the Society (money on deposit plus share capital) stood at near \$2,730,000. This represents a

net increase of \$506,000 as compared with approximately \$340,000 for the previous financial year.

The total membership of the The total membership of the Society at the end of the finan-cial year was 2,172, a net in-crease of 199 over the previous financial year. Every Division and Section of the Organiza-tion is now represented amongst the membership of the Society. 'Although it is currently fashionable to talk about de-centralization and regard it as a panacea for the ills of the city, detailed pianning in the rural sector is very urgent', said Dr Ross Downes (of the Divi-sion of Plant Industry) when he convened the recent symposium on 'People and Production: the Rural Scene in 1990'. The symposium was or-

Rural Scene in 1990. The symposium was or-ganized by the ACT Branch of the Australian Institute of Agricultural Science, of which Ross is President. Speakers from CSIRO, other government agencies and politicians all con-tributed.

the Academy of Science.



Printed by CSIRO, Melbourne

You never know what you'll You never know what you'll find on the library shelves these days, but you won't find any-thing nicer than Helen Ryan. Helen is one reason for the growing popularity of the Library at the Parkville Labora-tory of the Animal Health Division. Photo by Eric Smith.

PRESIDENT

Dr W. H. Steel of the Divi-sion of Physics was elected President of the International Commission for Optics at its meeting at Santa Monica, Cali-ferencience and Monica, Cali-

Commission for Optics at its meeting at Santa Monica, Cali-fornia, recently. The International Commis-sion for Optics, which was founded in 1947 and has now 19 member countries, is an 'affiliated commission' of the International Union of Pure and Applied Physics, in fact, the only such commission. The Commission has its own bureau and national commit-tees and is effectively an inter-national union, organizing in-ternational conferences and schools on optics. Australia adheres to the Commission through the Australian Aca-demy of Science. Dr Steel has been Convener (later called Chairman) of the Australian National Commit-tee for Optics since its forma-tion in 1958 and was one of the four Vice-Presidents of the In-ternational Commission during 1969-72.

Camels in the Backyard!

Backyard! Napier Mitchell, from the Division of Entomology, re-turned recently from an east-west crossing of the Simpson Desert with two camels in tow. For a start, driving across the desert the 'wrong' way was a feat in itself, as it is usually crossed the other way to avoid the more steeply sloping eastern side of the sand dunes. But having reached Oodna-datta, and conveniently having sent a trailer there by train, Napier bought two camels from Nilpinna Station. Then followed the long tow back to Canberra with two camels behind the Landrover. Napier at present has them in his backyard in suburban Canberra, where they are be-jng spoilt by neighbourhood under the the teaching

Napier thinks that teaching the cance. Napier thinks that teaching the cancels to carry humans should not be difficult but teaching them to kneel for mounting is another matter.

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165##1972

ORESEARCH FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF ---NUMBER 165 DECEMBER

NEW LAB, NEW DIVIS

With the opening of the new Minerals Research Laboratory at Ryde, it was announced that a new Division had been created.

Dr Ken McCracken, who was formerly Officer-in-Charge, now becomes Chief of the Division of Mineral Physics.

At present the Division has thirty-three on the staff.

The Minerals Research Labo-ratories comprise the Divisions of Chemical Engineering, Mine-ralogy, Mineral Chemistry and Mineral Physics.

Research activities currently under way in these Divisions were on display.

The displays included many projects of immediate importance to the chemicals and minerals industries, including prediction of the location of gas- and oil-bearing sites through mineralization studies and sophisticated exploration for minerals using satellite tech-

for minerals using satellite tech-nology. The site at North Ryde was acquired by CSIRO in 1950 and had grown to its present size of about 9 hectares by 1959. Nearly half this area is now occupied by the Minerals Research Laboratories and the rest by the CSIRO Division of Food Research and the Bread Research Institute of Australia Research Institute of Australia.

Construction of the new laboratory and administration block began in 1970. The contract price of \$2,161,000 brings the total investment in land, buildings, and fixed services for the Minerals Research Labora-tories at North Ryde to \$2.75 million.



TOP RIGHT:

TOP RIGHT: The new laboratory and ad-ministrative building of the Minerals Research Laboratory. Built at a cost of \$2,161,000, the new building has five floors of laboratories with the ground floor containing the adminis-trative centre, a library, a con-ference room and a canteen. ABOVE:

Mr Paul Goard is watched Mr Paul Goard is watched by Dr Ed Potter, of the Minerals Research Laboratories, as he prepares a working model of equipment used to study the minimization of dust in chim-ney smoke. An inspection of the Laboratories followed the opening. opening.

Definition

One part per million (p.p.m.) is equivalent to making a mar-tini with 1 ounce of Vermouth in 7,800 gallons of gin.



Malaysian Project -or MARDI meets CSIRO

A new project is proposed that will involve CSIRO in a long-term co-operative project in Malaysia. The partner in the project will be MARDI, the Malaysian Agricultural Research and Development Institute.

As part of the foreign aid programme, Australia is offer-ing to provide two scientists for five years, along with some materials and equipment, to work on tropical pasture estab-lishment and management.

The first scientist to go to Malaysia will be Dr P. C. Kerridge, from the Division of Tropical Pastures.

He plans to go to Malaysia early in 1973.

early in 1973. The Malaysians have well-trained scientists but very little experience with tropical pas-tures and the object of this project is to provide them with experienced leaders until they can take over that role.

Initially the work will be carried out at Serdang, near Kuala Lumpur, but as soon as possible field experiments will be concentrated at the Sungei

Baging and Kluang research stations.

The first phase of the project will involve the establishment of the fertilizer requirements of sown pastures on the major soil types available for develop-ment. ment.

ment. This will be followed by a phase involving the testing of a wide range of tropical pas-ture plants, especially legumes, for use in sown pastures. The other major research objective is to measure the levels of animal production from grazed pastures, and their profitability. Dr Kertidee will work in col-

Dr Kerridge will work in col-laboration with Research Offi-cers in MARDI'S Pasture and Fodder Crops Section, which at present comprises four graduates.

Later next year another officer of the Division will also move to Malaysia.

Research Ships Approval has been

given in principle for a new research vessel for the Division of Fisheries and Oceanography.

At this stage it is thought that the ship will be approxi-mately 220 feet in length. It will be operated by the Depart-ment of Shipping and Transport for CSUPO for CSIRO.

An equally important deci-sion for the Division has been the approval to go ahead with the chartering of research ships in the interim.

The vessels will be used for a balanced programme of fisheries and ocean research.

Immediate attention would be directed to Western Rock Lobster Research initially on the continental shelf and sub-sequently in a large oceanic area extending some 400 miles off-shore.

MARINE BIOCHEM

Ms Joan Samuel receives the keys to the Marine Bio-chemistry Unit's new culture complex from Mr J. Coles of NSL.

The Unit is housed in the Botany Building, Sydney Uni-versity, and its culture complex consists of three illuminated constant temperature rooms, an inoculation room and an auto-clave/media preparation room.



Contributions to the January issue of Coresearch should reach the Editor, P.O. Box 225, Dickson, 2602, by Monday, 11th December.



The Gas Man Flyeth

Every few months the Sunday papers can be relied on to run a story with a headline which screams something like 'POLES MELTING, CITIES FLOODED - SCIENTIST'.

This faithful standby story is usually exhumed each time someone mentions the possible 'glasshouse' effect that increasing atmospheric carbon dioxide concentration may have on the earth.

project being undertaken by two young research workers at the Division of Atmospheric Physics at Aspendale in Vic-toria, could at least give the prophets of doom some data to work on work on.

Drs Graeme Pearman and John Garratt have established an atmospheric monitoring pro-gramme for CO_2 .

gramme for CO_2 . This station will now mean that there are four centres in the world carrying out accur-ate and regular CO_2 measure-ments, the others being in Sweden, Hawaii and Antarctica.

Sweden, Hawaii and Antarctica. The project commenced seven months ago and has involved a great deal of co-operation between the Division and various bodies. In fact, the samplings would not be pos-sible without the assistance of the Department of Civil Avia-tion, Qantas and TAA. Each of these organisations has under-taken to take regular air taken to take regular air samples over the many years that the project is likely to run.

This research project fol-lowed a major literature survey lowed a major interature survey undertaken by the two workers from which it became obvious that although CO_2 is a rela-tively minor constituent of the atmosphere, there appeared to be good evidence for a steady increase in its concentration.

Pollution

There are several possible causes for this increase but the was that it was due to the in-creasing burning of fossil fuels.

creasing burning of fossil fuels. Although Pearman and Gar-ratt agree that that is a pos-sibility they also point out that there may be other causes. For instance, if the temperature of the earth is increasing naturally (as some groups believe) then as the oceans become warmer they give off CO₂. The oceans are a major 'sink' for the gas and more is dissolved at lower temperatures.

This project at Atmospheric Physics was commenced to collect information on changes in CO_2 in the Southern Hemisphere.

Tasmania

"Gentleme

Every Tuesday the Depart-ment of Civil Aviation runs a training flight from Melbourne to northern Tasmania, and

every Tuesday someone from the Division of Atmospheric Physics goes along to collect the air sample.

A box containing a number of glass flasks is attached to one of the air inlets in the cabin of the plane and the sample is collected under pressure, at about 12-15 thousand feet during cruise

Once a fortnight Oantas takes a sample over the middle of the Tasman Sea at about 35-40,000 feet. To do this the box of colfeet, To do this the box of col-lecting flasks is carried on the navigator's table in the cockpit of a Boeing 707 and at the half-way mark the flight engineer fills the flasks from the pres-surised air inlet. This is done during a normal commercial flight flight.

Blue box

To complete the picture and give samples right around sou-thern Australia, a 'blue box' for automatic sampling has been developed.

developed. After final testing, and with DCA approval, blue boxes will be installed in the tails of two TAA Boeing 727 jets. These will then be used to take re-gular samples over the Great Australian Bight during Mel-bourne-Perth flights. The blue box took quite a deal of development, for not only must it sample the air accurately, but it must also be capable of withstanding stress up to 9g's which is a safety requirement. Samples have also been col-

Samples have also been collected using light aircraft.

After the sample flasks are collected they are emptied us-ing a technique called mercury displacement. Essentially a re-servoir of mercury is used to push the CO_2 into an infra-red gas analyser.

The air samples are com-pared with a set of standard reference gases.

As the changes that are be-ing looked for are as small as one part per million per year, the measuring apparatus has to be accurate to one-tenth of a part per million.

Since the project commenced in March this year there has been an increase in the con-centration of CO_2 similar to that observed annually in the Northern Hemisphere.

One of the interesting re-sults so far concerns the variasulls so far concerns the varia-tion in the concentration of CO_2 with height. This could be explained by the seasonal cooling of the ocean. As winter progressed it was noticed that the CO_2 concentration in the lower layers relative to the upper layers of the atmosphere was less. This is possibly due to the cooling of the ocean. If this is correct. Pearman

If this is correct, Pearman and Garratt expect to start see-ing a reversal over the next few months as the ocean warms again.

At this stage, so early in the project, these observations are purely speculative because it will be many years before de-finite theories have any scienti-fic weight fic weight.

Cont'd P.3

The sampling apparatus, in the CO₂ monitoring project, being attached to the air inlets of a D.C.A. Fokker Friendship. Photo by David Whillas

Locally it's referred to as 're-

Locally it's referred to as 're-juvenessence' an awful sounding word, the dictionary definition of which is: '... a renewal of youth with emphasis on lost or fading strength, vigour, alert-ness or resilience of the body and mind....'

and mind....' The members of the group are largely from the Materials Sections of the Division and they are preparing to pool their collective knowledge to see what sort of assistance can be given to those engaged on re-habilitation. They are con-cerned not only with century old terraces but also more re-cent homes, say of the twenties and thirties period, which sim-ply want changing to fit the life

ply want changing to fit the life style of today rather than the design for which they were

old houses.



EJUVENESSENCE

Trendy couples doing up that "cute little, but slightly rundown terrace", in Paddington, South Melbourne, Battery Point or North Adelaide may be cheered to know that science has not forgotten them.

A discussion group has been conceived. A discussion group has been formed at the Division of Building Research at Highett, to consider some of the tech-nical problems of rehabilitating

conceived. Dr Lex Blakey, who is As-sistant Chief of the Division, has convened the group. On a recent overseas trip he studied at first hand some of the large scale rehabilitation programmes being undertaken by various bousing suthorities. housing authorities.

In countries like Sweden and England quite large scale pro-grammes are under way for the restoration and improvement of old areas of the city.

These projects are not motivated by purely altruistic rea-sons, but in some cases it is simply cheaper to restore and improve than it is to bulldoze and rebuild.

and rebuild. Dr. Blakey was very im-pressed with some of the efforts by various British housing authorities to make the more squalid areas of industrial cities like Leeds more habitable. In some of these areas many of the homes were not rehabili-tated for historical reasons, but because they were without such

"Willing hands make . . ."

luxuries as bathrooms or laundries.

The Building Research group is interested in some of the mechanical problems that occur when changes are made to old structures.

structures. Dr Blakey says: 'Probably one of the most common prob-lems faced by people doing up old homes is damp. For in-stance they decide to lay vinyl tiles on an old wooden floor. In many cases the floor may be only inches above the surface of the ground. 'Damp from the have floor

"Damp from the bare floor was lost by evaporation from the wood but once an im-pervious surface like the vinyl tiles is placed on top the wood quickly becomes saturated and in a matter of months may rot through? through.

through.' The Highett group is chiefly concerned with restoration problems on a large scale. At present housing authorities in Australia have not committed themselves to any large scale projects of this nature. In Aus-tralia the housing authorities concern themselves with build-ing new homes, leaving it up to individuals to restore their own. Usually this means that noth-Usually this means that noth-ing is done until the area be-Cont'd P.4

"Gentlemen's residence . . . one for the handyman . . . old world charm well-established gardens . . . quaint colonial verandahs . . ." Photo by Peu Photo by Peter Lee





Photo by Peter Lee.

COMMUNICATION OF INFORMATION - SOME RECENT DEVELOPMENTS

In many countries around the world there is concern about obtaining access to the rapidly expanding scientific and tech-nical information, and trans-ferring it to users. The current investigation by the Scientific terning it to users. The current investigation by the Scientific and Technical Information Ser-vices Enquiry Committee (STISEC) set up by the National Library is clear evi-dence that Australia is no ex-cention. ception.

For many years the profes-sional scientific organisations have been developing systems designed to assist scientists and technologists to search the literature for specialist informa-tion using the techniques of abstracting and indexing.

Chemical Abstracts produced by the American Chemical Society and Physics Abstracts produced by the Institute of Electrical Engineers are two of the oldest and best known of these services.

With the advent of computer technology, a dramatic change in information handling occurred

The computer can store vas quantities of information and

Messrs. Jim Gilmore, Clyde Garrow and Graham Jackson, of the Central Library Informa-tion Service, discussing the printout of a "current profile".

can rapidly provide multiple access to a randomly ordered file of information.

So we are now in a position to develop national and inter-national I.S. & R. Systems.

This depends on the scientific This depends on the scientum literature being classified by accurate bibliographic descrip-tion, abstracted and indexed with appropriate descriptors or keywords which describe the contents of the paper, and agreement on some form of standardization. standardization.

Whether it will be used de-pends upon persuading a spe-cialist scientist that someone other than himself can supply him with relevant information in his field.

SDI

SDI Systems for retrieving in-formation are generally de-scribed by the acronym SDI for Selective Dissemination of Information. One of the most commonly used SDI techniques is the cur-rent awareness service. In a current awareness sy-stem, the user is regularly pro-vided with a list of references to match his interests which have been translated into a search profile using a specia-lized set of logically connected search terms or keywords which

- Clyde Garrow It will be obvious that SDI 0

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When it is appreciated that the cost of searching the addi-tions to the literature on each tape might be \$2-\$4 per user, it becomes quite obvious that the systems must be used in-telligently.

telligently. A number of overseas SDI

systems have been discontinued because they were not econo-mically viable.

Pilot Trial Recently the Central Library and Information Services of CSIRO has been conducting a pilot scale trial of the Chemical Abstracts current awareness magnetic tape service CA-CON-DENSATES, developed by the American Chemical Society. Most scientists have used Chemical Abstracts which now adds the abstracts of some 330,000 scientific books, patents, dissertations, technical reports and conference proceedings each year from over 13,000 journals and publications. It is the most advanced and

It is the most advanced and largest SDI system yet de-veloped.

veloped. Other large systems are BA-PREVIEWS produced by Bio-logical Abstracts, COMPEN-DEX based on Engineering Index and INSPEC which covers computer and Control Abstracts, Electrical and Elec-tronic Abstracts and Physics Abstracts published by the In-stitute of Electrical Engineers, London.

CA-CONDENSATES pro-vides the following information

from the corresponding issues of Chemical Abstracts.

Titles of papers, patents and reports; Names and affiliations authors and assignees; Bibliographic citation;

of

London.

Keywords.

Pilot Trial

It will be obvious that SDI systems are no substitute for browsing or reading. They can only really help if the user knows what he is looking for. In short, they keep him up to date by providing bibliographic details at weekly, fortnightly or monthly intervals, of the infor-mation that is height of the details mation that is being added to the file. Further, SDI systems demand

Further, SDI systems demand that the user should obtain and assess the original papers re-trieved and, since the file will contain a considerable quan-tity of exotic material, these systems tend to place heavy demands on library resources.

Costly

While SDI systems are a major breakthrough in har-nessing the vast and ever-in-creasing scientific literature, creasing scientific they are not cheap. literature,

They stand or fall on the quality of the input, i.e. the level of intellectual analysis of the subject content of the litera-ture on the one hand and the collaboration and interest of the user on the other, particonaboration and interest of the user on the other, parti-cularly in the maintenance of his profile. The well-worn com-puter joke about GIGO (gar-bage in garbage out) is very appropriate in the information field.



Cont'd from P.2.

GAS MAN . . .

Backgrounds

John Garratt and Graeme Pearman have widely different backgrounds, but work closely on this project. John is an English physicist and Graeme West Australian biologist.

And their views on 'polar and their views on point cap melt controversy? At this stage they say it is very diffi-cult to tell whether the increase in CO_2 over the last 50 years is causing or is due to the increase in the earth's tempera-ture. But one of the dangers that they point out is that there are many textbooks currently being produced which unequi-vocally state that the build-up is causing the increase in tem-perature and both these re-searchers feel that it is far too early to be dogmatic about this.

Letter to the Editor

Dear Sir, Having been away, I have just seen the October issue, in which the construction of 'a 48" Newtonian Telescope" is men-tioned as worthy of note.

Since the resolution of a telescope is roughly $4.5^{\prime\prime}$ per inch of aperture, such a telescope would have $\frac{1}{10}$ in, aperture; rather an insignificant instrument.

Yours faithfully, W. H. Steel,

National Standards Laboratory. P.S.—I am aware that the public often uses " for inch, instead of the correct abbrevia-tion, in. But I am sure that this mistake would not occur in a CSIRO publication.

Did I say that? Editor. who prepared and monitored field. Contra P.4 Contra P.4 Contra P.4 Contra P.4 Contra P.4 Contra P.4 Contra P.4

"You look ridiculous with long hair."

CURRENT PROFILE ----- USER CODE - CVTRI2 EDITION 3 *R83CVTR12 C2 I1P *N DR J J JONES CSIRO DIVISION OF TRIBOPHYBICS UNIVERSITY OF MELBOURNE *O PRESBURE DIE CASTING OF ALLOYS - SURFACE TENSION VISCOSITY AND DENSITY OF MOLTEN METALS AND ALLOYS *1 8 *T 8 *P X NOT *3 *M *P X *P T K *3 DIE CAST* BURFACE TENDION* INTERFACIAL TENSION* VIBCOD* DIBGOU* DIBGOU* NUBCOT* AMALGAM* SWETIC* REVIEW* OWNAWIC CONTACT ANGLE* BUUBL* BUUBL* STATE* NOT *: *P T #26# #26# #27# 9999 *P T *E *Z NOT STATE

> example of a current profile.

> After 18 months' operation the trial has been judged to be successful.

> Briefly, out of 31 users, 27 replied to a questionnaire. Eleven users considered the ser-vice very useful, 8 said it was useful, and 8 said they were better served by other services.

External Service

The Executive has decided to make the service available throughout CSIRO and to in-vite the RACI to participate in an external service to assist the chemical profession in industry and academic institutions and academic institutions.

and academic institutions. An external service will in-volve CSIRO entering into a licence agreement with Chemi-cal Abstracts. The present lease agreement provides for an internal service only. It is hoped that the new agreement will become effective on 1st January, 1973. The CSIRO trial highlighted the need for active user parti-cipation.

cipation.

To facilitate this in the next To facilitate this in the next phase it is hoped to set up a decentralized monitoring sy-stem where there will be some-one in the Divisions — re-search scientist, information scientist or librarian — who will act as a consultant for users in the construction and maintenance of their profiles. Backing up the monitors there will be a small nucleus of sub-ject specialist information ject specialist information scientists at CLIS.

Pilot scale trials are being planned for INSPEC and it is hoped that this service and other services such as BA-PRE-VIEWS will be made available to CSIRO staff in the not-too-distant future. distant future. Hopefully it will be possible

About 30 scientists partici-pated in the trial. Their in-terests ranged over the whole field covered by Chemical Ab-stracts. Users collaborated with information scientists in CLIS These developments, along with others, are ensuring that Australia does not lag in this field. who prepared and monitored the search profiles. field

Cont'd P.4

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Courtesy Saturday Review

SAFETY NOTES

Is Your Resistance Low?

Is Your Resistance Low? If you were an electrical plug, and had to spend your life in the corrosive atmosphere of a laboratory, your resistance would probably be very high. Just the opposite of what it should be. Corroded pins on a plug cannot make good contact with the power outlet, so the temperature in the socket rises. This causes contact results with higher temperatures. If the plug and socket are made of plastic, the plastic deteriorates, resulting in loss of insulation and mechanical failure. Electrical contacts should be kept clean, preferably with steel wool or mild abrasive. Coarse sandpaper should not be used, as it causes scratching, which gives electrical contact on the high spots only and scores the spring contacts in the power outlet. Particular care should be taken with the earth pin. A badly cor-roded earth connection can be as useless as none at all. Dead or Alive

Dead or Alive

Many folk these days prefer the metallic Christmas tree to the old dead branch of a pine. But be wary of coloured lights on the metallic trees, many types are dangerous. It is better to have a dead tree and you alive than vice versa.

Checked or Checked Out

Checked or Checked Out In the June 1972 issue of Coresearch, mention was made in the Safety Notes of an electrical test box for checking the safety of electrical equipment, particularly portable tools and extension leads. Response to this item has been poor, very few enquiries have been received from laboratories. We are still having trouble with incorrectly wired leads and equipment, many potentially fatal. Why not check your electrical equipment regularly? The choice is yours, but the use of this small test box could postpone the personal use of a larger more ornate one. ornate one

The Budget

Has not varied greatly from last year, except the cost of living has gone up a couple of cents a bottle. Other relevant facts to be considered before that rather wet Christmas or New Year party:----

- Taxi home about \$2. Fine and suspension of licence for driving under the in-fluence minimum \$50. Hospital about \$20 per day. Funeral at least \$300.

J. W. Hallam, Safety Officer,

asian aid

Australian aid to underdeveloped countries should be geared to the capacity of the people concerned to absorb it and should aim at a gradual, steady improvement for the masses rather than at achieving rapid, spectacular results for a few.

This point is made in an article in the current issue of the Journal of the Australian Institute of Agricultural Science, by Dr L. R. Humphreys.

by Dr L. R. Humphreys. Dr Humphreys, who is on the staff of the Department of Agriculture in the University of Queensland, where he is in-volved in training overseas stu-dents in pasture science, and is also associated with pasture research projects in Thailand, Laos and Indonesia, says Aus-tralian participation in agri-cultural development overseas may be justified on humani-tarian grounds and in the national interest. The claims of the latter, he says, are "quite overwhelming". In this, he points to our de-

In this, he points to our de-sire to live in a peaceful area and to the fact that expansion of trade, like the maintenance

Cont'd from P.3

COMMUNICATIONS

Some of the other important developments include the intro-duction of MEDLARS into Australia by the National Lib-rary, and the contribution of the Atomic Energy Commission to INIS (International Nuclear Information Service).

Information Service). Finally, it is interesting to speculate about the future of SDI services. Well handled, they could be a very powerful tool in many fields outside scientific research, e.g. techno-logy transfer, and it is note-worthy that the mainspring for their development has been the needs of research scientists.

of peace, depends, at least in part, on living standards. Many people, observing the poverty of some farmers in Asia, assume that adequate technology is available to trans-form the productivity of these lands and that the highly de-veloped, scientifically-based agricultural systems of some Western countries may be trans-ported to the East. However, there are differ-

However, there are differ-ences in climate and improve-ments have to be feasible not only biologically but in terms of the local farm system.

Dr Lex Blakey In some cases in England Dr

tenant.

1.

ganisers.

Ms Jean Conochie, Editor of that indispensable library tool, 'Scientific Serials in Australian Libraries', is limbering up in preparation for the annual 26-mile 'Walk Against Want' in support of Community Aid, World Christian Action and Australian Catholic Relief. Last vear Jean raised \$396 and re-

year Jean raised \$396 and re-ceived a well-deserved letter of commendation from the or-

This year, with the support

of colleagues throughout the Organisation, she hopes to exceed her previous record.

If you would like to sponsor her, and have not already been approached, please contact your divisional librarian or Jean her-self at the Central Library.

Ms Judith Stump, C.A.A. re-presentative in the Central Library, was recently elected to the State Council for a period of two years.

REJUVENESSENCE

comes fashionable by which

comes fashionable by which time the original tenants have been forced out. If work on a large scale is undertaken other problems will also arise which the Highett group is interested in, including the sociological cum mechanical problem of the quickest way to do these jobs with the least dis-turbance to the home owner or tenant.

Cont'd from P.2

In some cases in England Dr Blakey noted an interesting ap-proach to the problem where various sized grants are made available for people to rehabi-litate their own homes.

Photo by Peter Lee.

In the future the Highett group and 'rejuvenessence' may play an important role in this new approach to urban re-habilitation.

2.

This is eight-year-old Do Thi Phuong who lives with her family in a small shack in

Charity begins in the...

Vietnam. A group at the Dairy Re-search Laboratory at Highett, Victoria, have 'adopted' Phuong and her family. It will mean that for the first time she and her brothers and sisters will be able to attend school. Also the family is now provided with a monthly cash grant, medical and dental care, food and cloth-ing, vocational guidance and the personal care and super-vision of a trained social worker. worker.



Do Thi Phuong

The group keeps in touch with Phuong by a monthly ex-change of letters and a yearly progress report from the social worker.

Why not start a group in your Division or Section? For more information on the scheme contact: Foster Parent Plan of Australia, 36 Park Street, South Melbourne, Vic. 3205.

-Hank van Leeuwen.

Doctorate

I. D. Boyd of the Forest Pro-ducts Laboratory, Division of Building Research, has been awarded the Degree of Doctor of Applied Science by the Mel-bourne University, on the basis of an integrated series of his papers entitled 'Aspects of Wood Science and Applications in Building Construction and Engineering'.

Recently also, he was re-elected by the International Academy of Wood Science as Chairman of its Asia-Pacific Section.



The Papua and New Guinea Institute of Technology, situ-ated five miles from Lae, is one of that country's most im-portant centres for tertiary education.

education. Unlike a traditional univer-sity, the Institute is developing along lines that are suggested by what is needed and what can be afforded in Papua New Guinea, not by what is done in other more affluent parts of the world.

At present the Institute offers Degree and Diploma courses in Civil, Electrical and Mechanical Engineering, Surveying, Archi-tecture, Building, Accounting and Business Studies.

and Business Studies. People trained in these skills are essential to a developing country and the graduates pro-duced so far have been eagerly received in the professional community. There is, however, an urgent need for a large assembly hall for the Institute. At present there is nowhere

for the Institute. At present there is nowhere to hold major conventions, conferences, graduation or cere-monial occasions. The Government of P/NGhas offered \$100,000 to build a hall, but an amount of \$350,000 is required. Plans have been drawn up for

Plans have been drawn up for a fine hall on a beautiful loca-tion and an appeal to obtain the rest of the money is under way

If any member of staff would like to help this cause he can make a donation directly to:

[•]P.N.G. Institute of Techno-logy Great Hall Appeal[•], Box 793,

Lae, New Guinea.

Gifts, which may be spread over two years, are tax de-ductible.

VISITORS

Mr G. A. Corby, Assistant Director (Dynamical Climato-logical Office, recently spent a month with the Commonwealth Meteorological Research Centre in Melbourne.

Mr Takashi Nakai arrived at MI fakasni ivaka artved at the beginning of September to spend one year at the Forest Products Laboratory, Division of Building Research, under a Fellowship granted by the Japanese Government.



Mr Takashi Nakai

Mr Nakai, a graduate of Kyushu University, is an officer of the Government Forest Ex-periment Station, Meguro, Tokwa ushara ha har hara an Tokyo, where he has been en-gaged in the study of mechani-cal properties of wood for the past eight years.

His project during his stay at South Melbourne is an in-vestigation into the effect of various patterns of interrupted loading on the long-term deflec-tion of wood beams.

Mr Nakai's wife and two young children have come to Australia with him. Printed by CSIRO, Melbourne

"I'm so glad you like it. Actually it's just sodium acid pyrophosphite, crythorbate, and glucose delta lactose with some meat flavouring." Courtesy 'Punch'.