CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 106, MELBOURNE, JANUARY 1968

Cheaper With Dough

General anaesthetics like ether make dough tougher while stimulants like caffeine make it crumbly, Mr. M. V. Tracey, Chief of the Division of Food Preservation, told delegates to a CSIRO conference on the structure and function of water in physical and biological systems.

The conference, which was held at Smiggin Holes, New South Wales, last November, was attended by 66 scientists from 28 Divisions.

Some 39 papers were presented during the two days of the conference.

Mr. Tracey said that his findings on the effects of anaesthetics in dough supported a recent theory of how general anaesthetics worked.

This theory had an appropriately odd history, for it was probably the only important contribution to the science of anaesthetics ever made by an astronomer.

Some years ago, an American named Miller, who was studying the gases of interplanetary space, drew up a list of gases which formed hydrates (compounds with water) and those which did not.

To his astonishment, his list of hydrate-formers was also a list of gases with general anaesthetic properties.

This coincidence led Miller to the idea that an affinity for water might be the property which all general anaesthetics had in common — local anaesthetics like cocaine worked in an entirely different way.

In the brain, he suggested, the anaesthetic would compete for the available water with the brain cells, thus impeding their activity.

Mr. Tracey pointed out that dough was a mixture whose properties depended on the amount of water it contained.

If anaesthetics competed for water in the brain, they might compete for it in dough, too.

Mr. Tracey said that he had now tested the effect of 30 or 40 general anaesthetics on ordinary dough, and without exception they all had the same effect; they made the dough tougher, just as though it contained less water. These results were in complete agreement with Miller's theory.

The next step was to see what stimulants like caffeine and strychnine, which had the opposite effect from anaesthetics on the central nervous system, did to dough.

These substances, too, turned out to have a marked effect, making the dough crumbly instead of tougher.

Significantly a substance called theobromine, chemically very similar to caffeine but without its stimulant properties, did not have this effect.

Mr. Tracey said that the discovery of new anaesthetics and stimulants, as with most drugs, was rather a hit-or-miss affair, and depended on the screening of huge numbers of chemicals in the hope that some might prove useful.

At present, animals were used for screening anaesthetics and stimulants, but it now looked as though it might be possible to carry out initial screening tests with a lump of dough.

This would be a lot cheaper than even the humblest laboratory mouse.

OBITUARY

Mr. A. R. Riddle, one of the pioneers of meat research in CSIRO, died in Brisbane last November.

A graduate of the University of Adelaide, he joined the CSIR Food Preservation Section in 1934.

When the headquarters of the Section were transferred to Sydney in 1938, Mr. Riddle remained at Cannon Hill as Officer-in-Charge and held this position till 1949. He retired from CSIRO in 1953.

MEDALS FOR TWO CSIRO MEN

The 1967 Britannica Australia award for science has been won by two radioastronomers, Mr. J. G. Bolton of the Division of Radiophysics, and Professor B. Y. Mills of the Physics Department, University of Sydney.

Professor Mills was a member of the Division of Radiophysics from 1942 to 1960.

The award consists of a gold medal, a citation, and $10,000.

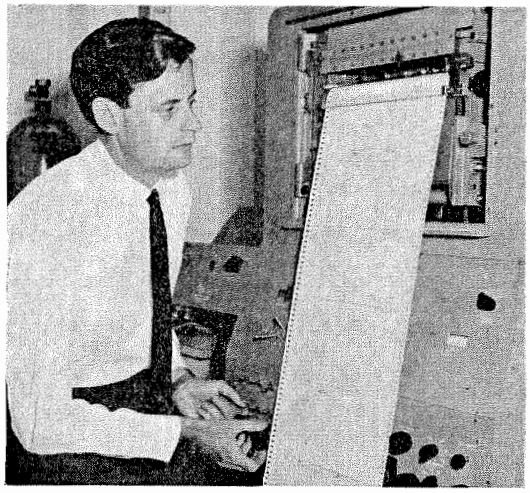
Mr. Bolton graduated with honours from the University of Cambridge in 1942 and was commissioned in the Royal Navy where he worked on radar.

In 1946 he joined the Division of Radiophysics to work on the peace-time applications of radar techniques and in the same year he became the first person to identify "radio stars".

Mr. J. G. BOLTON

He left Australia for the California Institute of Technology in 1955, to work on the design and construction of a modern radio observatory and was appointed Director of the observatory and Professor of Radio Astronomy at the Institute.

Early in 1961, he returned to Australia and the Division of Radiophysics to work with the 210-foot radiotelescope which was commissioned later that year.



Dr. N. K. Boardman with a spectrophotometer used to analyse cytochromes in isolated chloroplasts.

Mr. Bolton is now Director of the Australian National Radioastronomy Observatory at Parkes. He was elected a Fellow of the Australian Academy of Science in 1965.

Dr. N. K. Boardman of the Division of Plant Industry has been awarded the 1967 David Syme Research Prize in recognition of his work on the structure and function of mature chloroplasts in plants.

He shares the prize with Dr. C. F. Henderson of the Department of Mechanical Engineering, University of Sydney.

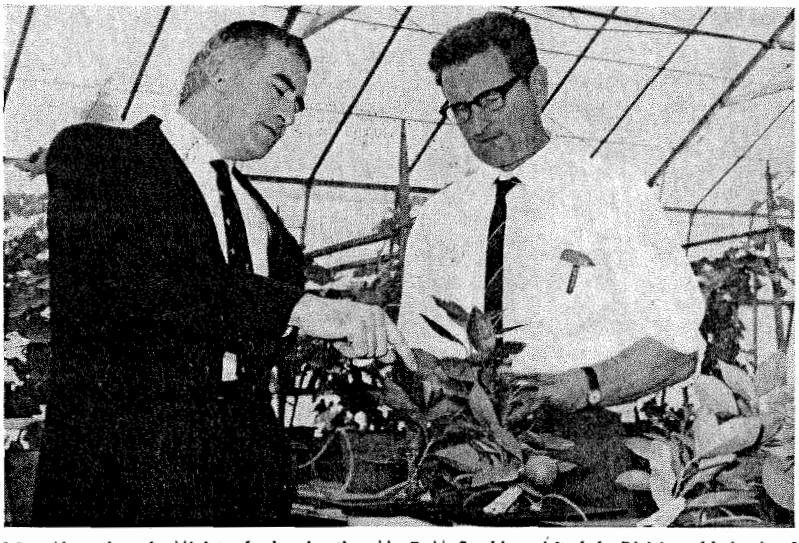
The Syme prize is awarded annually by the University of Melbourne for the most distinguished scientific research in biology, physics, chemistry, or geology carried out in Australia during the preceding two years.

The award provides a medal for each recipient and the prize money of $250 will be shared.

In the past two years, the most significant result from Dr. Boardman's research team has been the development of a method to fractionate the photochemical systems of photosynthesis.

In the green plant, photosynthesis is a two quantum process; the two quanta are absorbed by different groups of pigments which then co-operate in the primary photochemistry.

The physical separation of the two photochemical systems has provided convincing evidence in favour of the concept of two pigment assemblies.



Last November, the Minister for Immigration, Mr. B. M. Snedden, visited the Division of Irrigation Research at Griffith during a tour of the Murrumbidgee Irrigation Area. On his first evening in Griffith he was entertained at a barbecue dinner held in the grounds of the Division by the local Good Neighbour Council. The following day he was shown some of the Division's research activities. Our picture shows the Chief of the Division, Mr. E. R. Hoare (right), explaining a citrus nutrition experiment to Mr. Snedden.

Assistant Secretaries

Mr. P. A. Grant has been appointed Assistant Secretary (Industrial and Physical Sciences).

Mr. P. A. GRANT

He will be concerned with the development, formulation and implementation of policy associated with the use by CSIRO of patents and licences as aids to the industrial application of research results.

Mr. Grant came to CSIRO in 1965 after two years as internal patent attorney with Philips Industries.

Mr. G. R. Williams returned to Australia last month to take up the position of Assistant Secretary in the Administrative Branch of Head Office.

He will be located in Canberra where he will assist the Chairman. He will also have a general responsibility for the Organization's public relations activities and for the Film Unit.

Mr. G. R. WILLIAMS

Mr. Williams was formerly Divisional Secretary of the Division of Fisheries and Oceanography, and has spent the last two years on an F.A.O. assignment in Rome.

THE BLASTED BUSHFLY

At this time of the year when all of us enjoy at least a taste of outdoor life during the holidays we invariably find that one of our fellow-Australians, the bushfly, pushes togetherness just a little too far.

The bushfly, *Musca vetustissima*, is apparently a native of Australia, at least in the sense that it was here when the early European explorers first touched on our shores.

It probably came to Australia with the ancestors of our aborigines when they migrated from south-east Asia twenty thousand years or so ago.

Over the years information has been accumulating about the bushfly, but it was only recently that funds became available for the Division of Entomology to embark upon a full-scale study of this problem.

Dr. R. D. Hughes and a band of helpers are undertaking this investigation.

Bushflies are adapted to outdoor life. They shun darkened places and, should they cling to their human transport long enough to be carried indoors, they are generally found in a very short while imprisoned on the inside of a screen door or window, frantically trying to get out into the sunlight again.

In this respect their behaviour contrasts markedly with that of their cousins the houseflies which are tolerant of low light intensities and are quite at home in dwellings.

Why does the bushfly worry humans out-of-doors?

This is partly a reflection of thirst, which is satisfied by the flies drinking up perspiration or the moisture of eyes, lips, nostrils or any skin abrasions.

These fluids also provide some nutriment to the flies, though doubtless they obtain food from numerous sources.

Like many other flies they probably drink dew, the nectar of flowers, honeydew, and the juices of dung and carcasses.

With such habits it is not surprising to find, more particularly in the north, that the bushfly may transmit digestive tract and eye diseases and carry infections to open wounds.

Fortunately, in southern Australia, the bushfly is not known as an important disease carrier although this is an aspect that should always be borne in mind.

Where do the swarms of bushflies come from?

Bushflies breed throughout the year in much of the northern half of Australia and for the few mid-summer months in southern Australia.

They breed in human excreta and in the dung of cattle.

More than three hundred flies have been known to emerge from one dung pad, and cattle dung must be regarded as the most important source of bushflies in most areas.

This article is based on a talk given last month by Dr. D. F. Waterhouse, Chief of the Division of Entomology, on the A.B.C. radio programme "Insight".

The dung of horses, sheep, pigs and dogs may also produce some bushflies.

Observations have enabled us to piece together the life history of the bushfly.

The female lays batches of up to 50 eggs deep into fresh, moist dung.

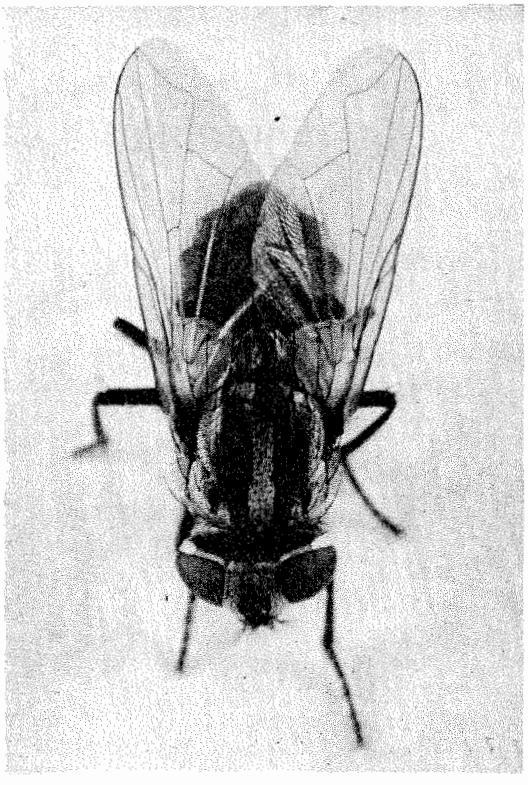
These eggs soon hatch and, in warm weather, the maggots quickly reach maturity. They then leave the dung and pupate.

In hot weather flies are produced from eggs in about ten days.

Given the necessary protein-rich food, the female fly takes four or five days to mature her first batch of eggs; she then mates and is ready to lay.

The full life cycle of the fly from egg to adult thus occupies about a fortnight under warm conditions.

Below. The bushfly Musca vetustissima.



We do not yet know how long the flies live in nature, although evidence obtained from dissecting wild flies indicates that some are probably several months old.

How far will they travel?

On the back of a man or animal they can hitch-hike considerable distances, but they are also excellent travellers under their own power.

By catching all the bushflies arriving on a person standing at one spot we can show that the supply of flies is apparently inexhaustible.

This means that the flies are able to "home in" from what must be considerable distances.

This sort of behaviour accounts for the build up of fly numbers on us as we walk or sunbathe and for aggregations of flies where many people or animals congregate.

Recent evidence suggests that flies may travel several hundred miles in a few weeks when aided by warm strong winds.

This may account for their sudden appearance in late spring in southern Australia, and for their occurrence in areas where no obvious breeding sites occur.

Mr. K. R. Norris of the Division trapped a number of bushflies, marked them with dyes, and released them again.

Within 48 hours, marked flies were collected in traps four miles away from where they were released, and knowledge of the country over which they had travelled to reach the traps suggested they had flown rather than hitch-hiked.

However, there are a number of puzzling features about the abundance of the bushfly.

In the Canberra area we have estimated that there are sometimes populations of the order of 9,000 to the acre.

This was done by a technique of liberating into the population a known number of marked flies and comparing the numbers of marked and unmarked ones trapped.

Yet, at the time people in the area were not unduly troubled by bushflies.

Obviously the vast majority of the flies are not interested in humans — or at least they are not all interested at once.

Bushflies are most troublesome in dry inland areas but we do not yet know whether they are really more abundant there than elsewhere.

Perhaps the populations are not really greater — they may even be very much lower — but the flies are thirstier and hungrier than in the moister areas.

So, perhaps, a far higher proportion is attracted to people.

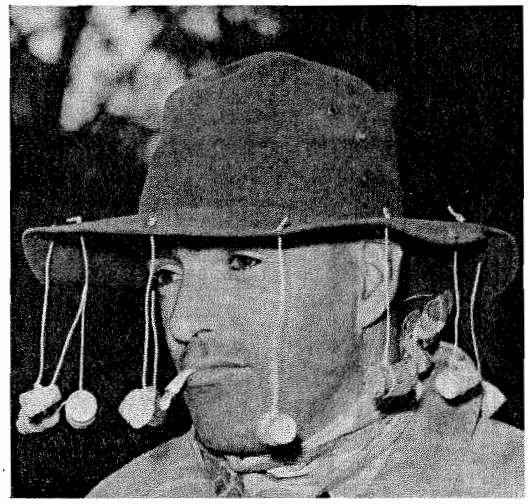
What can be done to reduce the numbers of bushflies?

Trapping catches only a small fraction of the population and is ineffective in making an important reduction in numbers.

Fogging or spraying with an insecticide from the ground was ineffective, at least when areas up to 40 acres were treated.

Flies presumably moved in rapidly from surrounding areas.

Aerial spraying over much greater areas might be more effective but this is an expensive measure and it wouldn't kill the immature stages of the fly which would continue to emerge and would commence building up the population again right away.



Above. Mr. John Green of the Division of Entomology demonstrates one well tried method of repelling bushflies.

Then, too, one must watch for undesirable side effects which can occur with large scale spraying.

One possibility being looked at is biological control — the use of parasites and predators to control a pest.

In Australia we have a number of dung-beetles which dispose of the small pellets of marsupials.

Unfortunately they are not adapted to dealing with the large dung pads of cattle and so we are seeking to supplement our dung-beetle fauna from countries where the beetles go about their work in more robust fashion.

In parts of Africa, for instance, it is reported that dung pads are entirely removed and buried underground by beetles in the course of about an hour.

Some of the beetles make round balls of dung and roll them away to a spot where the digging of other beetles will not interfere with them.

Here they bury the balls and the female lays an egg in each.

Dung broken up in this fashion affords little opportunity for flies to breed.

It is noteworthy that, although the bushfly occurs in Africa, it seldom becomes abundant enough there to cause any real worry.

Thus, we are not without hope that we can influence the population in Australia in the future, but it will be some years before our current programme of introducing dung-dispersing beetles can be expected to exert any appreciable effect on the flies.

The beetles will have plenty of work to do, for a cow can produce up to a dozen pads a day.

There is, also, some hope that carnivorous beetles which attack bushfly maggots in cattle dung pads might exert a useful effect.

We have already introduced and liberated one such beetle and are looking into the problems involved in introducing others.

If we cannot do much yet to reduce the numbers of bushflies, we do at least have a better means of keeping them from our faces than our forebears had.

For them the alternatives were corks on strings, fly veils or the familiar waving of the hand across the face, known as the Barcoo salute, because of its extensive use in the Barcoo area where bushflies abound.

A few years ago we found two highly effective repellents which are now widely available on the market, generally as aerosol sprays, but also in liquid form.

Although a few people are sensitive to the chemicals used, most are not.

With their protection it's possible to derive considerable comfort for an hour or so even when bushflies are abundant.

Our research programme will certainly lead to a great increase in our knowledge of the bushfly.

When we know the weaknesses of this troublesome pest we confidently expect to be able to devise further methods for reducing the irritation that it causes.

SAFETY NOTES

Ups and Downs or Spring Fever

A very popular amusement these days is the Trampoline. Children love them, and it looks so easy that Dad needs little encouragement to have a go.

If Dad is not as agile as he likes to think — beware.

As a friend of mind found out at a beach resort last summer, it's very embarrassing to be stuck with your head between the springs — painful, too.

He was lucky. A man was killed recently when he bounced off a trampoline and struck his head.

Back to the children — tell them to stay in the centre of the net and do not allow more than one person on a trampoline at a time.

Brightening up the Kitchen

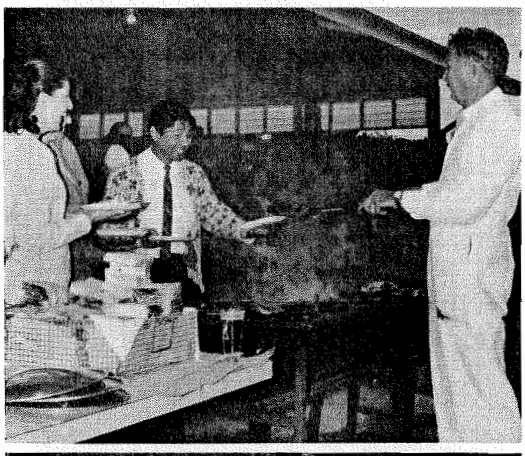
A recent press report states that three people were seriously burnt when cleaning a kitchen floor with petrol while the stove was alight.

If you have to remove excess wax or polish from a floor, use a good strong detergent. It is not inflammable, and will probably do a better job.

More important, you will still be around to enjoy it.

J. W. Hallam, Safety Officer.

CHRISTMAS FESTIVITIES



Top left. Cook Alf Rees obliges with a tasty hamburger for Miss Nola Gunn at the Building Research Barbecue.

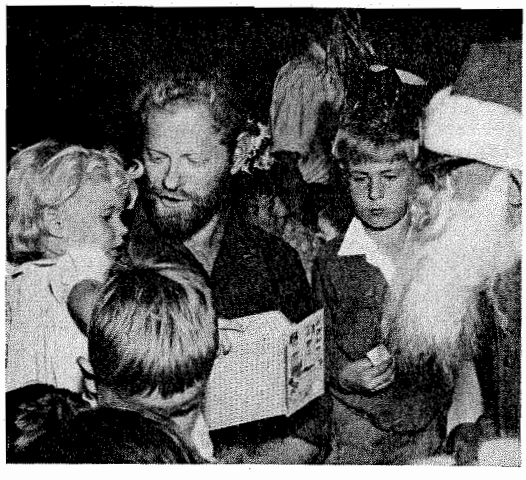
Top right. The "Maharishi of Highett", hippy barman Dick Lewis, with two former and one present Divisional photographers. They are, from left to right, Eric Smith (now at Animal Health), Neil Hamilton (now at Mechanical Engineering), and Peter Lee.

Left, second from top. The Division of Animal Health's Christmas barbecue was held at the Maribyrnong Field Station. Mr. Jim Whitten, Officer-in-Charge of the Parkville Laboratory, dispenses Siroburgers to Mr. Hugo Samame, a visiting FAO Fellow from Peru.

Left, second from bottom. The Animal Health barbecue was followed by a barn dance in the hayloft, but the exercise proved too much for this group, which had to take time off in the corner to recover its strength.

Bottom left. "What can a fella do when his name's called?" Three-year-old Charles Howick gets a helping hand from Dad at the Forest Products children's party.

Bottom right. "Why can't you grow a beard like that Dad?" Mr. David Henshaw and daughter with Father Christmas at the Textile Industry children's party.



News In Brief

Chief For GARP

Dr. C. H. B. Priestley, Chief of the Division of Meteorological Physics, has been invited to join an international planning committee to organise the coming Global Atmospheric Research Programme (GARP).

Dr. Priestley was also appointed Chairman of the Advisory Committee to WMO last year and is the only member from a southern hemisphere country on these two committees.

GARP is a joint enterprise by the WMO and the International Council of Scientific Unions.

It will be a co-ordinated international effort to carry out intensive observations of the total world atmosphere for about one year.

It will start in the mid-1970's and is expected to be much more ambitious than previous world scientific efforts such as the IGY because of its intensity, its new techniques and its global coverage.

Doctorate

Mr. C. W. Wrigley of the Wheat Research Unit has been awarded the degree of Doctor of Philosophy by the University of Sydney. His thesis was entitled "Protein composition of wheat leaves with relation to rust infection."

ANZAAS Congress

The 41st Congress of ANZAAS will be held in Adelaide from 18th to 22nd August, 1969.

Export Awards

Varian Techtron Pty. Ltd. which manufactures atomic absorption apparatus under licence to CSIRO has been awarded an export pennant by the Associated Chambers of Manufactures for its achievements in the export field.

The company has also won an award from Industrial Research (U.S.) of Indiana. Each year this organisation announces awards to 100 new technical products selected on the basis of their uniqueness and importance.

Practically all of these awards go to American firms, but Techtron won a similar award in 1966.

The 1966 and 1967 awards are the only ones which have been granted in the world for atomic absorption spectrophotometers and the only two awarded to an Australian company.

Thoughts on Brains

"Brain: the apparatus with which we think we think."

Ambrose Bierce (1842-1914).

"I have finally come to the conclusion that a good reliable set of bowels is worth more to a man than any quantity of brains."

Josh Billings (1818-1885).

"The brain is a wonderful organ; it starts working the moment you get up in the morning, and does not stop until you get into the office."

Robert Frost (1875-1966).

"When God endowed human beings with brains, He did not intend to guarantee them."

Baron de Montesquieu (1689-1755).

Super-secret Top-level You-beaut Discovery Wacko for the CSIRO

The CSIRO has done it again. It has made a top-level scientific discovery.

A scientist says the discovery is a "major breakthrough."

Details are being kept secret.

It is understood they are being kept secret for security reasons.

Details of the reasons are being kept secret.

It is understood the discovery will have important and far-reaching effects.

It will open the door to further major developments.

Details of the developments are being kept secret, for security reasons, it is understood.

Used Scientists

The discovery came after years of painstaking research.

It is believed the CSIRO employed scientists for the research.

It can now be told that the scientists had to overcome many almost insurmountable obstacles and heart-breaking setbacks before they found the vital answers.

The obstacles, setbacks and the vital answers are being kept secret, probably for security reasons.

King's Cross Whisper 6/12/67.

APPOINTMENTS TO STAFF

Miss Josephine Cardale has joined the Division of Entomology where she will carry out research on the taxonomy of Hymenoptera. Miss Cardale

Miss Josephine CARDALE

graduated B.Sc. with honours from the University of Queensland in 1964 and since then has been studying for her M.Sc. at the same university.

Mr. R. Michael has been appointed to the Division of Physics where he will study physical optics and work on the development of new methods of measurement. After graduating B.Sc. from the University of Sydney in 1959 and B.E. from the same university in 1961 Mr. Michael spent two years in the University's Department of Electrical Engineering followed by one year at the University of Bologna. Since 1965 he has been with the European Space Technology Centre, Holland.

Miss Jane Sharpe has been appointed to the Central Library where she will work on the mechanization of bibliographic procedures. Since

Miss Jane SHARPE

graduating B.Sc. from the University of Sheffield in 1961, Miss Sharpe has worked with Unilever Ltd., firstly in Britain and more recently in Australia.

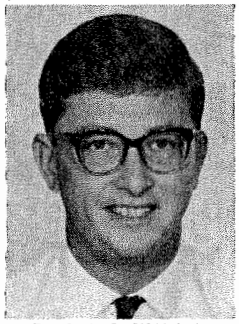
Dr. N. Taylor has joined the Division of Protein Chemistry where he will study the application of polymers to fibrous proteins and the *in situ* polymerisation of monomers on and within fibres. Dr.

Dr. N. TAYLOR

Taylor graduated B.Sc. with honours from the University of Birmingham in 1964 and recently obtained his Ph.D. from the same university.

Mr. L. W. Welch has joined the Electronics Group of the Division of Mechanical Engineering where he will work on the remote operation of digital computers and on automatic design and control. After obtaining his Higher National Certificate in Britain in 1960, Mr. Welch worked as a developmental and experimental engineer in industry. In 1965 he came to Australia and joined Australian Computers Ltd. as a computer engineer.

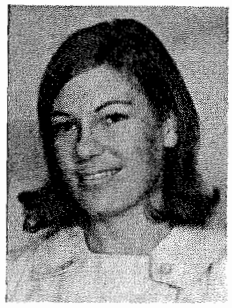
Dr. J. A. L. Watson has been appointed to the Division of Entomology where he will carry out ecological and physiological investigations on termites. After graduating B.Sc. with honours from the University of Western Australia in 1957 and Ph.D. from the University of Cambridge in 1962 he spent three years at the Western Reserve University, Cleveland, Ohio. Since then he has been with the Division of Entomology as a Queen Elizabeth II Fellow.



Dr. J. A. L. WATSON

Dr. G. W. Paltridge has joined the Division of Meteorological Physics where he will study energy balance and water exchange at the earth's surface. Dr. Paltridge graduated B.Sc. with honours from the University of Queensland in 1961 and Ph.D. from the University of Melbourne in 1965. He spent from 1965 to 1966 at the New Mexico Institute of Mining and Technology and since then has been at the British Radio and Space Research Station, Slough.

Mrs. Judith LeClaire has been appointed to the Division of Fisheries and Oceanography where she will be responsible for maintaining a collection of marine algae in culture. Mrs. LeClaire was a technical assistant with the Division of Food Preservation from 1962 to 1966 and graduated B.Sc. from the University of New South Wales in 1966. She has spent the last year as a scientific officer at the Prince Henry Hospital, Sydney.



Mrs. Judith Le CLAIRE

Miss Peggy Sprague, who retired last year after twenty-six years with the Australian Scientific Liaison Office, London, has been awarded the Imperial Service Medal in recognition of her long public service. She is seen here with the High Commissioner for Australia, Sir Alexander Downer, following the presentation of the award last November. Miss Sprague will be visiting Australia shortly to renew her many CSIRO acquaintances.

Beauty Beats Brains

Psychologists at the Universities of Minnesota and Nebraska have found, by a somewhat sneaky technique, that male students like to date physically attractive women.

They wanted to test the hypothesis that an individual tends to expect a partner of about the same social desirability as himself, in other words that his level of aspiration would be related to his choice of social goals.

To check this they advertised a Computer Dance as part of the University of Minnesota's Welcome Week for freshmen, and 376 unsuspecting males and 376 females applied for tickets.

These were told that they would be assigned partners by a computer and to this end were asked to fill in various forms with personal details, and to undergo several tests of intelligence, scholastic aptitudes and so on.

Unknown to the freshmen, four students concerned in taking down some of these details quietly rated them on an eight point scale from extremely unattractive to extremely attractive.

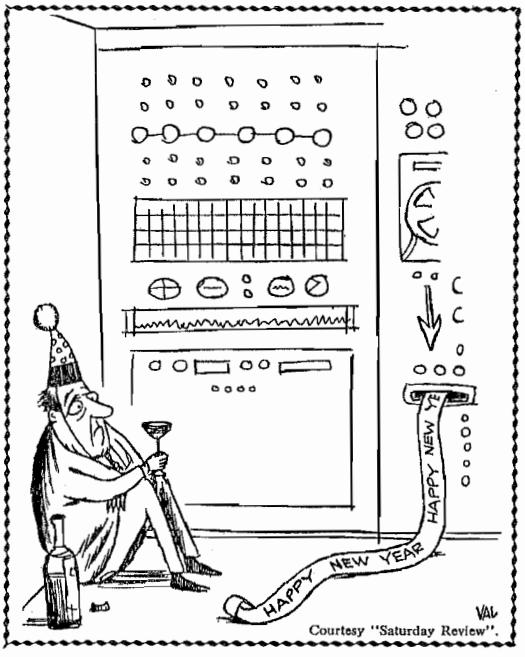
For the dance, the freshmen were not, as they had been led to believe, paired off by a computer, but were allocated at random.

The relative importance of the various factors was later checked by a rating of their particular date given by the students during an intermission in the dance, and a follow-up four to six months later to see which pseudo-computerised friendships had lasted.

The result was that, regardless of the student's own physical attractiveness, the most important factor deciding how much he liked his partner, how much he wanted to date her again, and how often he did in fact ask her out again, was, quite simply, her degree of physical attraction.

Her scholastic aptitudes, and her high school percentages, had no significant effects.

New Society.



Courtesy "Saturday Review".

OVERSEAS VISITS

Mr. J. S. Cook of the Division of Applied Physics left last month for the United States where he will spend six months as Visiting Professor at the University of Southern Illinois. Mr. Cook will visit laboratories in North America, Britain, Europe and Japan before returning to Australia at the end of the year.

Dr. T. R. A. Davey of the Division of Chemical Engineering leaves later this month on a four month visit of metallurgical plant and research establishments in North America, Britain, and Europe.

Dr. A. J. Dyer of the Division of Meteorological Physics leaves this month for the United States where he will spend six months at the Department of Atmospheric Sciences of the University of Washington. Dr. Dyer will visit meteorological research centres in North America and Britain before returning to Australia at the end of the year.

Dr. L. H. P. Jones of the Division of Soils left last month for Britain where he will spend two years as Head of the Soil Chemistry Section of the Grasslands Research Institute at Hurley.

Mr. I. Langlands, Chief of the Division of Building Research, left last November for Thailand where he has been attending a meeting of the ECAFE Advisory Council for Industrial Research. Mr. Langlands will also attend a seminar in Bangkok on the development of building materials in the ECAFE region before returning to Australia later this month.

Dr. C. H. B. Priestley, Chief of the Division of Meteorological Physics, leaves next month for Switzerland where he will attend a meeting of the W.M.O. Advisory Committee. Dr. Priestley will also visit meteorological research centres in Britain and the United States. He will be away for six weeks.

Dr. R. H. Wharton of the Division of Entomology returned recently from Geneva where he attended a W.H.O. seminar on ticks.

POSITIONS VACANT

The following vacancies for professional appointments are current:—

SCIENCE WRITER (SSO2/3) — Head Office — Agricultural and Biological Sciences Branch — 110/1029 (26/1/68).
SCIENTIFIC SERVICES OFFICER (SSO2/3) — PATENTS AND LICENCES — Head Office — Industrial and Physical Sciences Branch — 111/20 (12/1/68).
CHEMICAL ENGINEER (RS/SRS) — Division of Food Preservation — 300/463 (12/1/68).
PLANT PHYSIOLOGIST (RS/SRS/PRS) — Division of Plant Industry — Riverina Laboratory — 132/169 (12/1/68).
FOOD TECHNOLOGY LIAISON OFFICER (SSO1/2/3) — Division of Food Preservation — 300/465 (19/1/68).

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CO RESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 107, MELBOURNE, FEBRUARY 1968

Death of Mr. A. F. B. Nickson

Mr. A. F. B. Nickson of the Architectural Acoustics Section of the Division of Building Research died last month after a period of illness.

After graduating B.Sc. from the University of Melbourne in 1935, Mr. Nickson spent six years with the Radio Research Board of the C.S.I.R.
He obtained his M.Sc. from the University of Melbourne in 1938.

In 1941 Mr. Nickson joined Rola Co. (Aust.) Pty. Ltd. where he worked on magnetic circuit design and the development of magnetic alloys.

He joined the Division of Building Research in 1949 and began his research on various aspects of room acoustics and on noise problems, particularly as they affect the community.

Mr. A. F. B. NICKSON

Mr. Nickson was a foundation member of the Victorian Division of the Australian Acoustical Society and a Fellow of the Institute of Physics.

HIGH PRAISE

The following comments on CSIRO and its latest Annual Report are taken from a recent letter to the Chairman, Sir Frederick White, from Sir Harold Hartley, F.R.S.

"I have now had the pleasure of reading your golden book.

"I have no hesitation in saying that, of all the many research reports I have read in fifty years, yours is head and shoulders the best, not only in the wide variety of successful contributions to matters of vital significance to Australia, and many of them to the world also, but in the splendid, lucid and graphical way of presentation.

"This could not fail to win the admiration and attention of the least scientifically minded reader. This is a wonderful story of achievement and, of course, so much of it relates to problems in which I have personally taken a lively interest.

"And your illustrations are admirable; colour does help so much to bring things to life. You must be very proud of your staff and their record.

"They seem to have a keen sense of what is significant and to go after it so successfully. There can be no waste of energy and a fine imaginative construction afforded to each person.

"This is no exaggeration. I can only tell you it cheered me up to read it."

Triple Honour

Mr. I. Langlands, Chief of the Division of Building Research, has been elected a Fellow of the Australian Institute of Building, President-Elect of the Institution of Engineers, Australia, and a member of the Council of the Papua and New Guinea Institute for Higher Technical Education.

Mr. I. LANGLANDS

VISIT BY RUSSIAN BOTANISTS

Two Leningrad botanists of the All Union Scientific Research Institute of Plants are on a six week visit of Australian agricultural research centres.

They are Professor D. V. Ter-Avanesyan, a specialist in cotton and certain other field crops, and Dr. R. A. Udachin, a wheat breeder.

While in Australia they will visit CSIRO Divisions, State Departments of Agriculture, and Universities, to see something of the organization and conduct of plant breeding work and to collect seeds of cultivated and uncultivated plants.

In particular they hope to collect seeds of disease resistant strains of wild tobacco for cross breeding with Russian varieties.

They are also interested in Australian cotton and citrus fruit that might be more resistant to water shortage than their own varieties, and in cereals, soybeans, potatoes, and vegetables.

Professor Ter-Avanesyan said that Soviet flora could be of considerable interest to Australian botanists as Russia had many protospecies, particularly cereals.

Our picture shows, from left to right, Dr. Udachin and Professor Ter-Avanesyan examining herbarium specimens of Australian plants with Miss Dorothy Johns and Dr. Nancy Burbridge of the Division of Plant Industry.

SAFETY NOTES

Irritating Smell

Whether the health-giving properties of sea-air are due to ozone or to some other cause could be a matter for debate.

But don't start looking for ozone freshness elsewhere.

Ozone is a highly injurious gas and can be lethal at concentrations of a few parts per million for exposure times of only a few hours.

Even the recommended maximum allowable concentration of 0.1 parts per million can cause physical damage if exposure is prolonged over a period of years.

Ozone is generated in many operations. Xenon lamps such as those used for photographic illumination or in photocopying machines produce ozone; so do inert gas shielded arc welders.

The hydrogen and mercury lamps used in instruments such as spectrometers often generate ozone.

Inhalation of ozone at concentrations not acutely injurious in themselves can trigger off, accelerate or aggravate respiratory tract infections of bacterial or viral origin.

If the smell of ozone in the laboratory or work room is more than the faintest whiff, do something about having the ventilation improved.

Leave the "clean, fresh" smell of ozone where it belongs — at the seaside.

Hands off the Grim Reaper

Accident statistics for 1966/67 show that two CSIRO gardeners suffered lacerated hands as a result of encounters with motor mowers. Need we say more?

J. W. Hallam, Safety Officer.

Mr. J. Fridrichsons retired from the Organization recently after ten years as a member of the crystallography section of the Division of Chemical Physics. Many of his friends and colleagues gathered together last month to wish him well in his retirement. Our picture shows Mr. Fridrichsons (second from right) together with, from left to right, Dr. A. D. Wadsley of the Division of Mineral Chemistry and Dr. A. McL. Mathieson and Dr. B. Dawson of the Division of Chemical Physics.

POSITIONS VACANT

The following vacancies for professional appointments are current:

MICROBIOLOGICAL OR BIOCHEMICAL ENGINEER (EO1/2) — Division of Dairy Research — 410/179 (23/2/68).

EXPERIMENTAL OFFICER — SOCIAL BEHAVIOUR OF GREY KANGAROOS (EO1/2) — Division of Wildlife Research — 560/236 (23/2/68).

RESEARCH APPOINTMENTS IN STEROID BIOCHEMISTRY OR PHYSIOLOGY, AND ANIMAL NUTRITION (RS/SRS) — Division of Animal Physiology — 245/406 (23/2/68).

COAL PETROLOGIST/CHEMIST (RS/SRS) — Division of Mineral Chemistry — 480/558 (29/2/68).

DEVELOPMENT ENGINEER (Engineer 1/2/3) — Division of Mineral Chemistry — 601/67 (1/3/68).

DEVELOPMENT CHEMIST (EO1/2) — Division of Mineral Chemistry — 601/66 (1/3/68).

EXPERIMENTAL OFFICER — DEVELOPMENTAL AND PHYSIOLOGICAL GENETICS (EO1/2) — Division of Plant Industry — 130/898 (1/3/68).

SOIL SCIENTIST (RS/SRS) — Division of Land Research — 618/234 (1/3/68).

VETERINARY SCIENTIST (EO1/2) — Division of Animal Health — 201/299 (8/3/68).

AGRICULTURE IN AN AGE OF COMPUTERS

Dr. F. H. W. Morley, an Assistant Chief of the Division of Plant Industry, predicted last month that the computer age would bring about drastic changes in agriculture.

The traditional way of life would be replaced by the "agribusiness", which resembled a modern factory rather than the family farm, he said.

Dr. Morley was delivering his Presidential address to Section K, Agriculture, Horticulture, and Forestry, at the 40th ANZAAS Congress in New Zealand.

He cited the broiler industry as an indication of the shape of things to come.

The broiler grower was in the grip of the feed producers and the marketers; he was no longer free to decide what birds to raise, where to buy them, what to feed them or where to sell them, although he was still free to decide whether to continue as a producer, or sell out and seek other ways of earning a living.

He said that on the farm of tomorrow experience and commonsense would no longer be enough.

Indeed much of the experience gained from today's systems of agriculture would be useless.

For example, the spraying of hundreds or thousands of acres a day with herbicides could render plough-lore irrelevant.

Dr. Morley said that the human brain was a poor tool for simultaneously appreciating the many different and complex relationships involved in decision making.

Electronic computers would, to an increasing extent, be used to aid agricultural decisions by exploring the possible consequences of various decisions in terms of such objectives as making money.

He pointed out that as yet there was little appreciation of the likely impact of computers on agricultural practice or on the planning, design and application of agricultural research.

Nor was there any appreciation of the speed with which many of today's techniques of production and research might become obsolete.

Dr. Morley illustrated his point by comparing a conventional cereal variety trial, in which several cereal varieties were grown at a number of different sites in a district, with the sort of investigation which was likely to be found in the computer-oriented society of tomorrow.

With the conventional variety trial, general recommendations were made on the basis of a limited amount of data obtained at each site on such things as rainfall, temperature, grain quality and yield.

In the near future, however, such trials might be replaced by an intensive study of each variety at one centre covering a number of regions.

Dates of planting, fertilizer levels, and sowing rates could be varied.

Supplementary watering, and perhaps heating, might be used, while measurements of radiation, temperatures (soil and ambient), wind velocity, water budgets, nutrient supplies in soil water, dates of flower initiation, anthesis, tiller number, leaf area index and duration, and the harvest would contribute to the study.

Analysis of this experimental data involved a growth study of each variety, including a description of response to the experimentally controlled treatments.

Simulation studies with a computer would then be undertaken.

The varieties would be grown, in theory, by the computer at each of a number of simulated localities, chosen to represent specific portions of regions, over a long run of seasons using actual meteorological data from given sites.

The results, in terms of money or other units of production, of a particular choice of variety, or varieties, could thus be estimated, to enable a choice to be made between different recommendations.

Such extrapolations would probably be highly inaccurate at first, but they would almost certainly be better than many of our present "guesstimates".

Prediction, however, should improve as more was learnt about the different responses of each variety and as calibration for particular localities was sharpened by comparisons of prediction with performance.

If computer simulation was to be effective for analysis and prediction in agriculture, we had to be able to describe quantitatively responses to such things as plant nutrition, genetic variation, and management in an array of seasons, from an array of sites characterised by differences, such as those actually encountered, in soil, aspect, topography, and previous treatment.

Although we did not have even rough estimates of such relationships at present, we still had to make decisions.

Experimental designs in much of our agricultural research should therefore be geared to supply data which were basic to simulation analysis.

This meant increased emphasis on estimation of parameters of the equations to be used in simulation.

It also meant that greater attention had to be paid to the consequences of variations in management, such as time of planting, and especially in those variables which were not controlled by man, such as weather, rainfall, aspect, and soil.

This would demand more complex designs, much more instrumentation, and very much more penetrating analyses.

"Regional" experiments would decline in importance, except in confirming or refuting conclusions which were based on simulation programmes.

Many useful contributions could come from simulation studies before performing an experiment.

"Mock-up" situations could be explored in order to help decide which data were the most important.

Dr. Morley went on to say that computers would be an essential ingredient in the agricultural practice of the future.

If computers lived up to expectations as aids to decision making, they would enable us to choose procedures which approached optima more closely as our input data became more precise and should point to techniques which maximised profits.

As farms became larger, employing greater capital resources, they might become more profitable than the farms of today, but the risks would probably be greater.

Profits would be bigger for the best managed farms; losses for those which were badly managed would become more crippling.

Take-over, already a common phenomenon in agriculture, would bring the control of production into fewer hands.

Fewer farmers would be self-employed. More land would be owned by investment companies, or perhaps by governments.

The decision-maker would be a highly trained executive who could understand, or at least use, biology and engineering, as well as business management, and perhaps computer simulation.

The best manager would be one who was at home both in the biology and in the business of agricultural production.

While he could not be expert in all aspects of both, he would be able to use specialists.

Dr. Morley visualized the agricultural experiment station of the future as being staffed largely by people with specialist training in such fields as soil physics, chemistry, meteorology, mathematics, and physiology.

It would include perhaps an occasional agronomist whose value would be inversely proportioned to his occasionalness.

The group as a whole would run few experiments, but these few would be at a level of sophistication quite unknown today.

The group would use computers constantly.

The central experiment station would be supported by a limited number of outstations.

These would be used mainly to collect such data as were necessary to sharpen the models constructed at the central station, in order to increase their predictive power.

This might seem an unrealistic picture, but failure to appreciate this future and to plan for it could have serious consequences, Dr. Morley warned.

Firstly, our brighter scientists would refuse to work at our experiment stations, because they would be inadequately equipped, encouraged, or served.

Secondly, the larger agribusinesses would be forced to look after their own research, but their results would not be available to the country as a whole.

Dr. Morley said that computers were extraordinarily efficient in doing what they were told.

They did not ask questions about the motives underlying criteria for decisions.

These motives had to be determined by the person who made the decisions; the computer could only help him understand the consequences of his decisions.

Our main motive in agriculture was to make a lot of money.

Australia's agricultural produce gave us a nice return, and enabled us to develop the potential of our country.

It did not contribute appreciably to freedom from hunger, nor was it likely to unless we changed from predominantly animal production to the production of plants for direct consumption by humans.

If we considered feeding the world our moral responsibility, we could possibly produce enough food to feed 200 million people, perhaps even two or three times that number.

However, we would probably make less money and we would probably have to invest more than we now spend on defence to reach such productivity before 2,000 A.D.

Nor would we have sufficient agricultural scientists, or other human or material resources; but we could, by using plenty of money, go a long way towards our goal, at great risk to our natural resources.

The same argument applied with greater force to the countries in which the needy were found.

But should our goal be to produce the maximum amount of money, calories, and people, asked Dr. Morley.

If *Homo sapiens* was irresponsible enough to overpopulate the world, should we rape the world to feed him?

Should every underdeveloped resource challenge us to develop it?

Humanity surely needed more than food and reproduction. It needed solitude, time and place for reflection, and opportunities for the mind to rise above biological needs.

As agriculturists we had to look to improving the efficiency of production of agricultural products; as humans we had to make certain that, in so doing, we did not overlook the other needs of man, even when these competed with agricultural production.

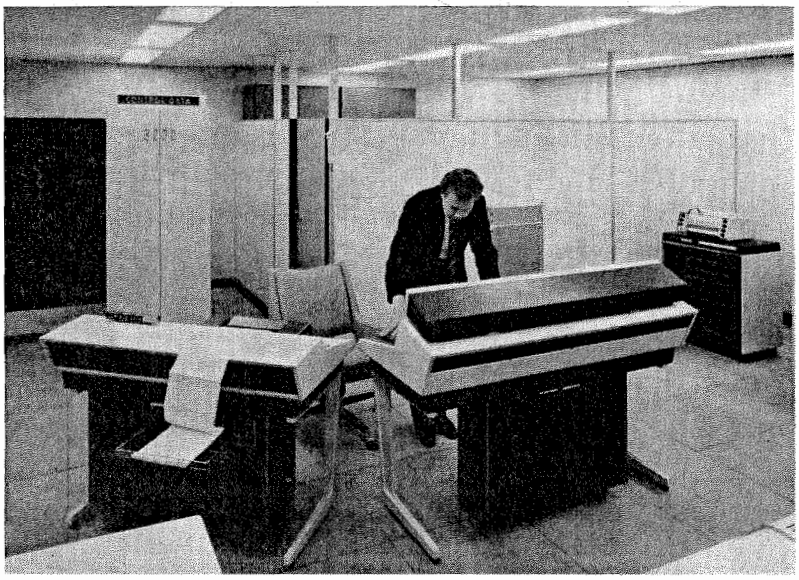
Computers would provide an important link between our objectives and their achievement.

If our objective was wealth computers would help us become rich.

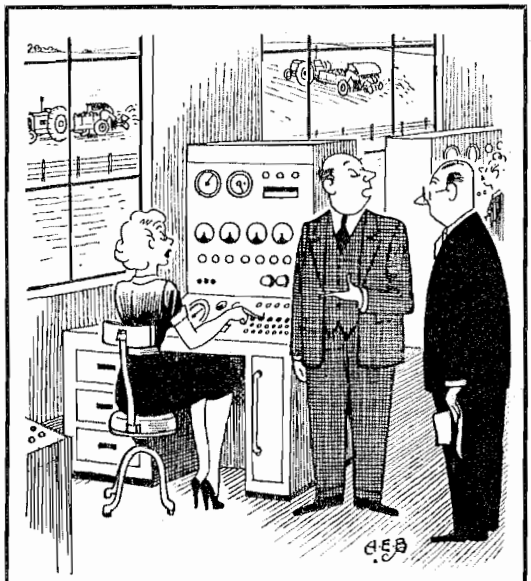
If our objective was to help provide essentials for the needy computers would help us.

If these objectives conflicted computers would help us achieve a compromise.

What, asked Dr. Morley, were our objectives?



"Let me see now! Will I program for frost, flood, fire or drought?"



"Miss Merridew here is dung spreading."

News In Brief

Assistant Minister

Following **Senator Gorton's** recent appointment as Prime Minister, the Minister for the Army, **Mr. M. Fraser,** has been appointed Minister assisting the Minister for Education and Science.

Doctorates

Mr. F. N. Ratcliffe, an Assistant Chief of the Division of Entomology, has been awarded an honorary degree of Doctor of Science by the Australian National University.

Dr. L. B. Bull, Chief of the Division of Animal Health and Production from 1935 until 1954, was awarded an honorary degree of Doctor of Laws last December by the University of Melbourne for his distinguished contributions to veterinary science in Australia. The degree was awarded on the occasion of the conferring of degrees on the first graduates from the University's veterinary school for forty years.

Council Member

Dr. H. J. Frith, Chief of the Division of Wildlife Research, has been appointed to the recently established National Parks and Wildlife Advisory Council of New South Wales.

ANZAAS Congress

The Chairman, **Sir Frederick White, Mr. C. S. Christian** of the Executive, and fifty-five officers of the Organization attended the 40th Congress of ANZAAS in Christchurch, New Zealand, last month. Some 42 officers presented papers.

Blockbuster

"Concrete Technology and Practice" by **Mr. W. H. Taylor** of the Division of Building Research looks like becoming a best seller.

Now in its second printing, nearly 10,000 copies have been sold in Australia and overseas.

According to Mr. Taylor's calculations, the 700 page book took 70,000 hours to produce.

Screen News

The Food Preservation Film Society will screen "Train 349 from Berlin", an exciting drama that dispassionately examines international tensions in divided Berlin, at 8.00 p.m. on Tuesday, February 13, at North Ryde. For further details contact Mr. R. Burns (88 0233).

Thoughts for the Month

"Do not praise the ants' ready exsuscitation, but pity rather that entomological barrenness of invention which has never furnished this hard-worked insect with a really comfortable bed."

Rose Macaulay.

"When you smoke cigarettes you're likely to burn yourself to death; with chewing tobacco the worst thing you can do is drown a midget."

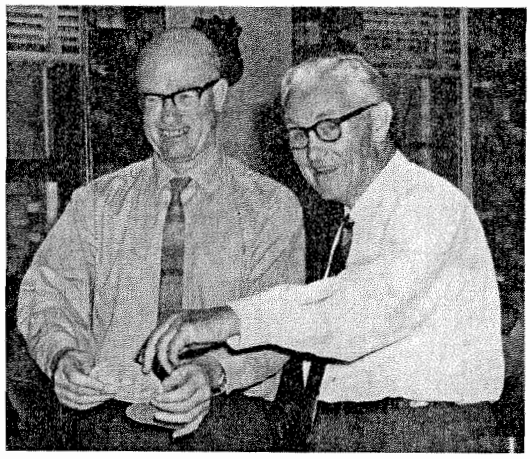
Fred Allen.

"Many public speakers are good extemporaneous listeners."

Edgar Wilson Nye.

Retirement

Mr. R. A. Partridge retired from the Organization last month after 22 years with the National Standards Laboratory. For the last ten years he has been chief draftsman with the Division of Physics. Before leaving, he was presented with a set of lawn bowls, a bowling bag and a wallet.



Above: Mr. Partridge (right) at the presentation ceremony with Dr. R. G. Giovanelli, Chief of the Division of Physics.

Tom Thumb

The Division of Fisheries and Oceanography has acquired a 17½ ft. aluminium boat for oceanographical work off Port Hacking.

It has been named the "Tom Thumb" after the boat in which Matthew Flinders discovered and explored Port Hacking.

Address Unknown

Several officers who sent CSIRO Christmas cards overseas last year received Christmas cards addressed to them care of the courtyard of the F. C. Pye Field Environment Laboratory, Division of Plant Industry.

Visitor

Dr. Margaret K. Seikel of the Forest Products Laboratory of the United States Department of Agriculture, Madison, Wisconsin, is spending a year with the Division of Forest Products.

She will study certain commercially important eucalypts which contain extractives similar to those found in North American oaks which are being affected by a serious staining problem.

Below: Dr. Margaret K. Seikel.

Overseas Visits

Mr. C. D. Howick of the Division of Forest Products has been awarded a Winston Churchill Fellowship and will leave next month on a nine month visit to Britain, Europe, East Africa and South Africa. Mr. Howick will study the habits, distribution, and economic significance of several important insect pests of wood which have the potential ability to establish themselves in Australia.

Dr. A. L. G. Rees, Chief of the Division of Chemical Physics, leaves later this month for London where he will attend a meeting of the Executive of the International Union of Pure and Applied Chemistry. He will return at the beginning of March.

Dr. T. R. Scott of the Division of Mineral Chemistry will leave later this month on a four week visit to the United States and Canada. Dr. Scott will attend the annual meeting of the American Institute of Mining and Metallurgical Engineers in New York. The theme of the meeting will be pressure hydrometallurgy.

Above: This group of youngsters with man-sized appetites made short work of their cakes and soft drink at the Building Research children's party last December.

Below: One of the sixty children who received a gift from Santa Claus at the combined Animal Health and Entomology children's party at Yeerongpilly, Queensland.

HOW TO KEEP YOUR SECRETARY HAPPY

- Don't dictate everything at once — dole it out a little at a time, say, every hour or so. Keep her on the run.
- Every so often, give her a little dictation at five to five, just to show her who's boss.
- Make a few long-winded telephone calls while she's sitting there.
- Never make yourself understood when you can avoid it. Swallowing every other word helps, as does chewing on a pencil, holding your hand over your mouth, talking to your belt buckle.
- Another thing — just because you've already said something one way, doesn't mean you can't change it. Make full use of inserts, crossouts, deletions. And, when her notes look as if they've been through the wars, ask her to read them back . . . just for laughs.
- If you feel grouchy, why hide it? Give her a piece of your mind regularly, just on general principle. A good way to get rid of pent-up emotions is to revise all those nicely finished letters on your desk. Ink in all the corrections you want to.
- Never spell out unusual names. And every once in a while throw in a foreign phrase or two without blinking an eyelash.
- When she asks questions beat around the bush, and make it quite clear that you don't encourage that sort of nonsense.
- And, when you're in a suitable mood to play a really funny joke, dictate a long, long report . . . and don't tell her you want an extra carbon until after it's finished.

ODE TO IODIDE

The Division of Radiophysics will begin a series of cloud seeding experiments in South Australia next April. Announcement of this inspired the following contribution to Streaky Bay's "West Coast Sentinel".

Hurrah! for C.S.I.R.O.
They'll show us how to make things grow
No more droughts when they've applied
A dose of silver iodide.

Pitter Patter, raindrops falling
Softly soothing, gently calling
Shoots and roots and seeds to grow
Streams and rivulets to flow.

Pastures growing all year round
Record-breaking crops abound
Everywhere the rural scene
Changes hue to dollar green.

City gardens bright and gay.
Steady rain from June to May
River Torrens bursting banks
No more Murray water, thanks.

Still that steady pitter patter
First Wilpena Pound Regatta.
Water skiing at Warooka
Ibis nests at Andamooka.

Hydroplanes on Lake Kulpara
Tuna boats of Tintinara
People clutching bits of timber
Floating through the streets of Kimba.

Sudden panic through the nation
Frantic science consultation
Still that steady drip and drop
They don't know how to make it stop!

Upon a modern Noah's ark
They'll probably erect a plaque
So all who sail this way will know
Who did it? C.S.I.R.O.!

New Appointees

Dr. C. Harris has joined the Division of Applied Chemistry where he will carry out research on the influence of complexing on the structure and reactivity of free radical species. Dr. Harris graduated from the Royal Institute of

Dr. C. HARRIS

Chemistry at the Royal College of Advanced Technology in 1959 and obtained his Ph.D. from the University of Manchester in 1963. After a year at the Texas Technological College he came to Australia and spent two and a half years with the Division of Applied Chemistry as a Queen Elizabeth Research Fellow.

Dr. R. W. Hemingway has been appointed to the Division of Forest Products where he will investigate the extractives or non-structural components in wood. Dr. Hemingway

Dr. R. W. HEMINGWAY

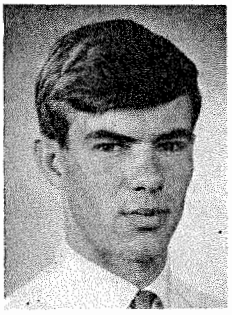
graduated B.Sc. from the University of Oregon in 1962 and Ph.D. from the University of Michigan in 1967.

Dr. H. Greaves has been appointed to the Division of Forest Products where he will study fungal deterioration of wood and timber preservation. Dr. Greaves graduated Bachelor of Technology from the University of Bradford in 1964 and Ph.D. from the Imperial College in 1966. For the last year he has been working in the Plant Pathology Department of North Carolina State University.

Dr. M. P. Austin has been appointed to the Division of Land Research where he will carry out research on expressing plant communities in mathematical terms. Dr. Austin graduated B.Sc. from the University in London in 1960 and Ph.D. from the same university in 1966.

Mr. E. P. Furnival has joined the Division of Animal Physiology and will work at the Pastoral Research Laboratory, Armidale, on wool growth by ewes, lamb nutrition, and energy metabolism in grazing sheep. After graduating B.Sc. from the University of Reading in 1962, Mr. Furnival spent three years working on British farms. He came to Australia in 1965 and for the last two years has been with the South Australian Department of Agriculture.

Mr. G. R. Nicholls has been appointed to the Division of Building Research where he will carry out research on



Mr. G. R. NICHOLLS

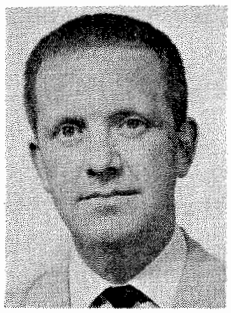
structure and communications of the building industry. Mr. Nicholls recently obtained his Diploma in Communications Engineering from the Royal Melbourne Institute of Technology.

Mr. P. R. A. Rutter has been appointed to the Division of Computing Research and will act as a consultant to computer users from the Adelaide Divisions. Mr. Rutter graduated B.Sc. from the University of London in 1963 and after a year with the Standard Telephone Company, London, came to Australia. He has worked with E.M.I. Electronics (Aust.) Pty. Ltd. since 1964.

Dr. I. M. Seligman has joined the Division of Entomology where he will study the biosynthesis of pheromones. Dr. Seligman graduated B.Sc. from the University of Witwatersrand, South Africa, in 1961 and Ph.D. from the University of Illinois in 1967.

Mr. M. J. Wooldridge has been appointed to the Division of Mechanical Engineering where he will study heat and mass transfer and radiation exchange. Mr. Wooldridge graduated B.Sc. with honours from the University of Leeds in 1954 and for the last eleven years has been with Hawker Siddeley Dynamics Ltd., Coventry.

Dr. H. J. Whitfield has been appointed to the Division of Chemical Physics where he will carry out research on molecular spectroscopy. After graduating M.Sc. from the University of Melbourne in



Dr. H. J. WHITFIELD

1954, Dr. Whitfield spent three years at the Gadjah Mada University, Jogjakarta, Indonesia, three years in Melbourne with ICIANZ, and four years with the Australian Atomic Energy Commission at Lucas Heights. He obtained his Ph.D. from the University of Wellington in 1966 and spent last year at the University of Newcastle upon Tyne.

Mr. R. Oborn has joined the Division of Chemical Engineering where he will work on the production of edible protein from whey. Mr. Oborn obtained his Diploma of Applied

Mr. R. OBORN

Chemistry from the Royal Melbourne Institute of Technology in 1962 and for the last six years has been working for David G. Bull Pty. Ltd.

Mr. R. I. Willing, who graduated B.Sc. recently from the University of Melbourne, has joined the Division of Applied

Mr. R. I. WILLING

Chemistry where he will operate the Division's nuclear magnetic resonance spectrometer.

Melissa Jane comes from a long line of aristocrats. She has received a third prize at the Royal Melbourne Show and was Champion at the Yarra Glen Show, where the Judge said that she had "very good Show potential". With her is Judy Yelland of the Animal Health Laboratory, Parkville.

Deposits Wanted

The CSIRO Co-operative Credit Society is now in a position to accept money on deposit.

Interest rate is 6% a year for money deposited for 12 months or more, and 4% for periods of less than 12 months.

Application forms may be obtained from your local Credit Society Director.

The completed forms should be sent to Mr. J. Belkin, Manager, CSIRO Co-operative Credit Society, 314 Albert Street, East Melbourne.

DEADLINE

Contributions for the March issue of Coresearch should reach the Editor at 314 Albert Street, East Melbourne, by Wednesday, 14th February.

PURE RESEARCH OR APPLIED?

"Why don't you invent something useful like a dinosaur trap?"

Courtesy "Saturday Review".

OBITUARY

Mr. H. Burnett, caretaker at Head Office, died suddenly last December.

Mr. Burnett, who served in two world wars, was with Head Office for some twenty years.

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 108, MELBOURNE, MARCH 1968

FLEAS JOIN THE FIGHT

The European rabbit flea, which has been the main agent responsible for the spread of myxomatosis in Britain and Europe, is being enlisted to help in the fight against rabbits in Australia.

Approval to release the fleas in Australia for field tests was given by quarantine authorities of the Commonwealth Department of Health late last January.

It is hoped that the fleas will supplement mosquitoes as carriers of the myxoma virus. They should prove particularly useful in introducing virulent strains of myxoma virus into rabbit populations.

When myxomatosis was first released by the Division of Wildlife Research in 1950, it spread spectacularly, killing hundreds of millions of rabbits and boosting Australia's pastoral production in the years that followed by hundreds of millions of dollars.

Over the years, however, less lethal strains of the virus have developed.

Once a rabbit has recovered from an infection with one of these weaker strains it is immune to further infection.

The chances of a mosquito biting a rabbit infected with a non-lethal strain are several times that of biting a rabbit infected with a lethal strain because lethal strains kill rabbits quickly.

Because of this there will always be a percentage of the rabbit population which is immune to myxomatosis as a result of earlier infection with non-lethal strains.

The present situation, therefore, is that while myxomatosis still kills a lot of rabbits, the level of kill is much lower than when the disease was first released in 1950.

The rabbit flea could offer an opportunity for raising this level of kill by favouring the spread of more virulent strains of myxoma virus.

Since the flea, unlike the mosquito, moves infrequently from one rabbit to another unless its host dies, there should be less chance of its transmitting weaker strains of myxoma virus.

It may be significant that weaker strains emerged more slowly in Britain, where transmission was by the rabbit flea, than in Australia, where transmission has been by the mosquito.

The Division of Animal Genetics has been selecting more virulent strains of myxoma virus and hopes to use the flea to introduce these strains into isolated rabbit communities.

Last year the Division of Animal Genetics imported pupae of the flea from a disease-free quarantine station of the Ministry of Agriculture and Fisheries in England and for the last twelve months the fleas have been bred in quarantine by the Division.

Extensive tests have confirmed that they are harmless to wild life, domestic animals, and man; they will not breed on any animal but the rabbit.

In experiments with native fauna, large numbers of fleas were introduced to four species of Australian marsupial.

The fleas rapidly deserted their hosts and died of starvation.

Laboratory technicians handling rabbits covered with fleas are never bitten, and fleas refuse to stay on the technicians or their clothing when placed there.

The breeding cycle of the rabbit flea is completely dependent on the breeding cycle of the female rabbit.

Ten days before the litter is due the fleas become aware of the doe's state and flock to her.

They are so sensitive to pregnancy in rabbits that they can detect coming pregnancy failure and on such occasions promptly leave for another host.

Hormones in the blood sucked from the rabbit rapidly induce sexual maturity in the female fleas.

The fleas then lay their eggs in the rabbit's nest after the litter is born.

Several years ago the Division of Wildlife Research tried breeding large numbers of the European rabbit flea for release in Australia.

However, the attempt was unsuccessful as it was not known at the time that the flea would breed only on pregnant rabbits.

Officer-In-Charge

Mr. K. S. Blaskett of the Ore-Dressing Investigations Section has been appointed Officer-in-Charge of the Section.

This follows the resignation of Professor H. H. Dunkin who first became Officer-in-Charge in 1940.

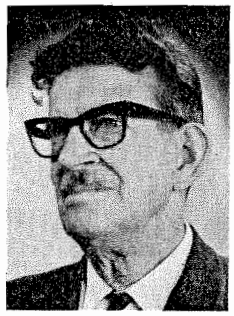
Professor Dunkin will continue his association with the Section in a consultant capacity.

Senior Retirements

Dr. J. S. Hosking retired last month from the Division of Building Research after 38 years with CSIRO.

Dr. Hosking graduated B.Sc. from the University of Western Australia in 1925 and after five years with the State Railways Chemical Laboratories joined the Division of Soils in 1930.

He obtained his M.Sc. from the University of Western Australia in 1934 and his Ph.D. from the University of California in 1942.



Dr. J. S. HOSKING

From 1942 until 1947 he served in the Information Branch at Head Office. He then transferred to the Division of Building Research to take charge of research on masonry and ceramics.

Dr. Hosking's work has greatly helped the clay industry in Australia. It also led to an invitation to work as Associate Geologist at the Illinois Geological Survey in 1959-1960.

In 1952 and again in 1966 he advised the Government of Ceylon under the Colombo Plan on its ceramics industry.

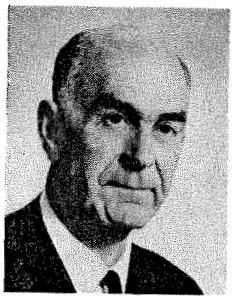
Dr. Hosking was elected a Fellow of the Royal Australian Chemical Institute in 1956 and President of the Australian Clay Minerals Society in 1966.

One of the pioneers of trace element research in Australia, **Dr. D. S. Riceman,** retired recently from the Division of Nutritional Biochemistry.

After graduating B.Ag.Sc. from the University of Adelaide in 1934, Dr. Riceman joined what was then the CSIR Division of Animal Nutrition.

His research has been in the area of trace element nutrition and transport in plants.

Dr. Riceman was closely associated with the work on copper deficiency in the coastal areas of south-east South Australia.



Dr. D. S. RICEMAN

His discovery of copper and zinc deficiencies in the so-called 90-Mile Desert of South Australia helped lay the foundations for the remarkable agricultural developments which have converted the desert to the highly productive Coonalpyn Downs.

He obtained his M.Sc. from the University of Adelaide in 1947 and his D.Sc. from the same university in 1959.

In 1953 he was awarded the Australian Medal of Agricultural Science by the Australian Institute of Agricultural Science.

SAFETY NOTES

Keep It Clean

A lot of people still use light-fraction petroleum products around the home for dry cleaning.

The other day a friend of mine asked whether brand "X-lite" would be as good as brand "Y-lite" for removing grease spots from a suit.

He had bought some the day before and had it stored in a plastic container.

I warned him first of all about storing petroleum products in plastic as they can make the plastic brittle.

I also cautioned him about using inflammable solvents for dry cleaning. They are particularly dangerous when used on synthetic fabrics in hot dry weather because of the accumulation of static electricity in the fabric.

It's best to use a non-inflammable dry-cleaning fluid of low toxicity such as methyl chloroform (trichloro-ethane).

Dry-cleaning must be done in a well ventilated area, preferably out of doors.

Incidentally, if you're removing a grease-spot, the following procedure reduces the risk of a "water-mark" ring being left around the original spot.

Place a pad of clean cloth under the grease spot, then a clean cloth on top of the spotted fabric.

Gently rub over the site of the spot with a small wad soaked in cleaning fluid.

The grease will be washed through the fabric into the pad below or partly absorbed on the upper cloth.

Safety In Action

We have recently purchased a copy of four short films as one reel. Total filming time is about eight minutes.

The subjects covered are falls, machinery, lifting and falling objects.

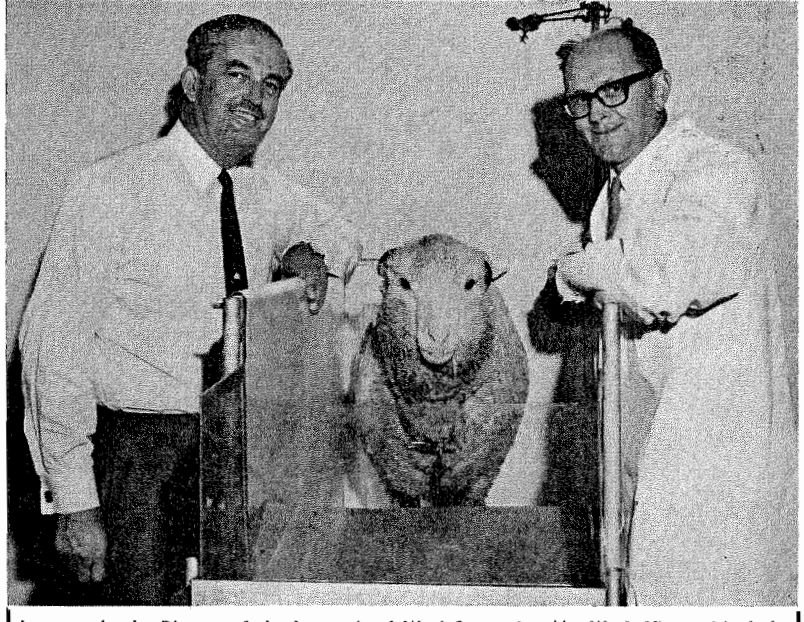
The film is available from the Film Unit at Head Office. Why not arrange a screening for your laboratory?

Open To Suggestions

Safety notes are often written around incidents (or accidents) involving friends and acquaintances. Apparently they have all become safety conscious. This is a good thing, but it's making it harder for me to choose interesting subjects to write about.

If you would like to see some particular topic dealt with in "Safety Notes", please drop me a line or ring me at Head Office.

J. W. Hallam, Safety Officer.



Last month, the Director of the International Wool Secretariat, Mr. W. J. Vines, visited the Ian Clunies Ross Animal Research Laboratory of the Division of Animal Physiology at Prospect. Our picture shows Mr. Vines (left) discussing the application of radio isotopes in the study of wool growth with Mr. A. M. Downes.

MAN AND HIS ENVIRONMENT

As a result of the development of technology, man's impact on his environment has increased enormously in scope, scale and speed.

For example, in the 100 years or so of wheat growing and pasture development in New South Wales and Victoria, virtually all of of the 100 million acres of woodland vegetation (about half the area of central Europe), has been effectively destroyed.

In Queensland, where land is still supposedly plentiful, only one extensive stand of tropical rainforest on rich parent materials remains and within the next 10 years the 5 million acres of wallum and the 23 million acres of brigalow country in Northern New South Wales and Queensland, and 30 million acres of heath and eucalypt vegetation in the southwest of Western Australia will probably have been cleared and developed for crops and pastures.

It is clear then, that with the passage of time, the man-environment relation has changed from one where the environment is dominant to one where the initiative is now absolutely with man.

This man-environment relationship has also undergone other changes.

Initially, with man's requirements small and simple in relation to the size and complexity of the environment, he lived in what seemed to be an "open" system.

He took what he needed, when he needed it, without much effect on the environment as a whole.

As man's demands on the environment have increased and become more complex, the resources of the environment have become finite and they are increasingly influenced by the by-products of his activities.

Although man has the initiative, the environment has suddenly become uncomfortably small and effectively closed, with no inputs except the energy of the sun and no possibility of permanently disposing of waste materials except by regrading and using them again.

In short, man is now the navigator, but he is confined to a spaceship which is fast becoming too monotonous, dirty and crowded for his liking.

* * * * *

Many Australian plant and animal species are fast disappearing in the face of land development.

In Victoria, 12 species of plants are presumed extinct, another 36 have not been seen for many years and if not extinct must be extremely rare, while a further 201 species are restricted to very few colonies or individual specimens.

Another 14 are threatened with extinction by land development projects, 8 by bushfires, and 6 by the projected construction of Chowilla Dam.

In New South Wales, of some 52 species of marsupials of open grazing land, 22 are either extinct or rare.

This article is based on a talk given on the A.B.C. programme "Insight" earlier this year by Dr. A. B. Costin, an Assistant Chief of the Division of Plant Industry. The talk was one of a series on the International Biological Programme (IBP).

Similar detailed statistics on changes in flora and fauna are not available for most of the other States.

In many places, communities are disappearing before it is known what species are there.

In North Queensland, where rainforest is still being cleared despite a ready supply of misdeveloped, semi-abandoned land, a recent study on a small area of rainforest revealed that 3 of the 25 commonest tree species were undescribed.

In the South-west Province of Western Australia, approximately 30 million acres will soon have been converted to agriculture before an adequate botanical survey of this biologically important area has been undertaken.

And despite years of talking, the flora of Australia project has not yet begun.

But reduction in biological diversity is by no means confined to the areas actually utilized.

Compared with natural and semi-natural communities, most of our agricultural crops are extraordinarily simple systems and are wide open to invasion by all kinds of pests.

An increasing part of agricultural technology is therefore devoted to reducing these invasions, as through the development and application of broad-spectrum chemicals.

For example, the tobacco soils of Mareeba, which occur in the midst of native forest and woodland vegetation, receive annual applications equivalent to 12 gallons of insecticides and fungicides and 20 gallons of soil sterilants to the acre (20-30% concentration).

Due to pollution of drainage water and transmission through food chains, the effects of such chemical treatments extend well beyond the target area and species into natural and semi-natural communities.

Even the Adelie penguin, which never leaves the Antarctic, is now reputed to lay eggs containing DDT.

* * * * *

Of course, many people have the attitude that Australian flora is not worth preserving on economic grounds.

This attitude has been encouraged by the fact that most of the useful crop and pasture plants which are grown in this country have been introduced from overseas.

It therefore comes as a surprise to many that the most widely planted forest trees in the world are eucalypts and some 100 species are now commonly grown in more than 50 countries, including species not of much commercial value here.

The seed used to establish these plantations was almost certainly not from the best genetic material available nor have the most suitable species of the 500 available always been grown.

Aware of Australia's responsibility to other countries in this regard, the Forestry and Timber Bureau, in conjunction with FAO and with stimulation through IBP has commenced a eucalypt provenance testing programme, and has established a seed bank from which seed can be made available to other parts of the world.

* * * * *

In the Middle East, the progenitors of present-day cereals are threatened with extinction, as the semi-wasteland habitats in which they occur are developed for more intensive use.

In Australia, plant introduction workers are faced with similar problems in the many thousands of lines which have been brought into this country from subtropical as well as from temperate regions.

Of some 45,000 introductions to date, only about 0.3 percent have proved commercially valuable or useful in breeding programmes.

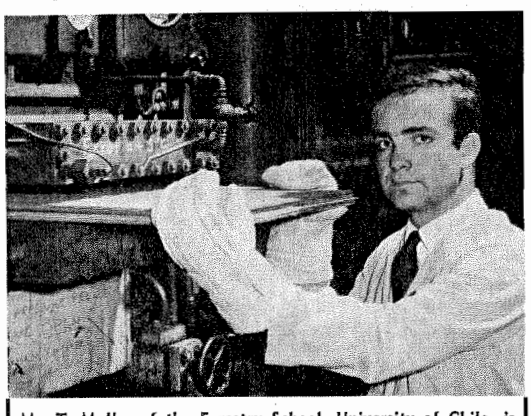
But many of the others may have potential value, and the problem is to know what to keep and what to throw away, especially as some of the original habitats from which these lines were obtained no longer exist.

For instance, CSIRO's subterranean clover collection contains roughly 400 lines, mostly from the Mediterranean region.

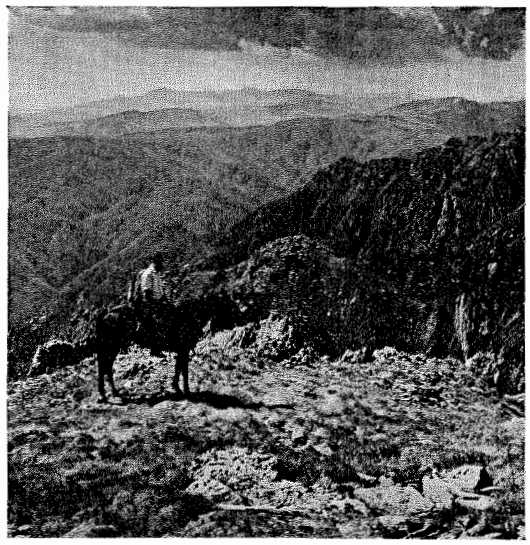
Sir Otto Frankel has urged an FAO-sponsored inventory of all available collections of primitive and wild plants and a world programme of plant exploration of priority areas.

If maximum productivity is to be the main objective of our agriculture, it is fairly clear that agricultural crops will largely replace pastures in the humid to subhumid potentially arable areas, leaving the steeper country to be developed for pastures or retained as forests, especially in the south.

Forest areas retained for timber production will be converted from their present heterogeneous conditions to managed forests of fewer species and only in the semi-arid and arid zones will the grazing industry continue to be based on native species.



Mr. T. Muller of the Forestry School, University of Chile, is spending two months at the Division of Forest Products with Mr. J. W. Gottstein studying the technology and practice of radiata pine plywood production. He will also spend some time in industry before returning to Chile next July. Our picture shows Mr. Muller withdrawing a plywood sheet from an experimental hot press.



Above: The Kosciusko Wilderness Area in the Kosciusko National Park includes a wide range of alpine, sub-alpine and montane environments. Such areas are vast biological reservoirs and provide opportunities for a wide range of outdoor recreation.

Our irrigation water will be used for crops rather than for pastures and, at least in the south, an increasing proportion of our irrigation water will be reallocated for industrial and domestic use.

More and more water will be taken out of rivers into canals and pipelines, and the rivers will be used as drains.

Dr. F. Morley of the Division of Plant Industry, and others have examined the magnitude of the increased production which could be obtained in Australia by the application of known agricultural knowledge.

Dr. Morley estimates that reasonably intensive development of the 360 million-odd acres suitable for higher production, at a probable cost of some $100 per acre, could produce enough food for another 200 million people by the year 2000 — less than 5 percent of the people living in Asia at that time. However, he queries whether the effort would be worth while.

This increase in production could only be achieved at considerable cost, and at the expense of biological diversity and degrees of freedom for future generations in the utilization of their resources. No world food or population problems would have been solved.

* * * * *

The preservation of biological diversity is necessary in agricultural development but it is also a vital consideration in planning facilities for the recreation of man.

The main form of recreation in the near future will simply be driving and walking for pleasure, of which a biologically diverse landscape is a principal component.

By the year 2000 U.S. demands for land for agriculture, forestry, water catchments, urban development and recreation will exceed available supply by some 50 million acres, even assuming every acre including so-called wasteland is utilized.

More realistically, the deficit will be nearer 110 million acres since at least 60 million acres will not be useful for any of the projected purposes.

In the absence of a nuclear catastrophe which would decimate population, this impasse can be solved only by retaining utmost flexibility in land use, combined with multiple purpose use crop, pasture and forest land for recreation, in addition to much greater recreational use of parks and reserves themselves.

However, there is a further value of environmental diversity—the stimulation of human endeavour and the enrichment it brings to man's achievements in all walks of life.

I can do no better here than quote from Dubos of the Rockefeller University of New York — "Man has been highly successful as a biological species because he is adaptable; he can hunt or farm, be a meat-eater or a vegetarian, live in the mountains or by the seashore, be a loner or engage in teamwork, function in a free democracy or a totalitarian state."

Adaptability is essential for continued biological success.

We should shun uniformity of surroundings as much as conformity in behaviour and make instead a deliberate effort to create as many diversified environments as possible.

This may result in some loss of efficiency but the more important goal is to provide the many kinds of soil that will permit the germination of the seeds now dormant in man's nature.

We shape our environments and afterwards our environments shape us.

News In Brief

Secretary

Mr. J. H. Whittem, Officer-in-Charge of the Animal Health Research Laboratory, Parkville, has been appointed Secretary of a new Commonwealth and States Veterinary Committee.

The new committee, which will be responsible to the Australian Agricultural Council through its Standing Committee on Agriculture, will report on the incidence and economic importance of livestock diseases including those not yet in Australia and review the training, diagnostic and research facilities available.

It will make recommendations on any legislative, financial, administrative and technical action required for eradication or control.

Mr. J. H. WHITTEM

These responsibilities have been borne since 1941 by the Biennial Conference of Commonwealth and State Principal Veterinary Officers.

Responsibility for quarantine matters will remain with the Commonwealth Health Department.

The first meeting of the new committee is expected to take place in Melbourne next month.

Existing technical sub-committees concerned with livestock diseases such as bovine pleuropneumonia, tuberculosis, brucellosis, bovine infertility, pullorum, and with contingency planning for introduced disease will report to the new committee.

Swimming Sports

At the CSIRO Swimming Sports in Melbourne last month, the Division of Forest Products won the trophy for the third year in succession after a very narrow last event victory over the Division of Protein Chemistry.

Events included the plunge, an egg and spoon race, an obstacle race and a cork scramble.

Below. The victorious team clutches the championship shield, which, appropriately enough, was donated by the Division of Forest Products.

FAO Post

Dr. G. L. Kesteven, Assistant Chief of the Division of Fisheries and Oceanography, left last January for Mexico to take up an appointment with FAO as Project Manager of a UN Development Programme.

The Programme will be concerned with research into and development of three important Mexican fisheries — the tuna fisheries of Baja California, the trawl fisheries of the southern states of the west coast of Mexico, and the shrimp fisheries in the Gulf of Mexico.

Dr. Kesteven is a former Chief of the Biology Branch of FAO's Fisheries Division.

He will be in Mexico for two years in a project aimed at doubling Mexican fisheries output. At present, Mexico lands about 256,000 metric tons of fish a year.

From Germs to Gems

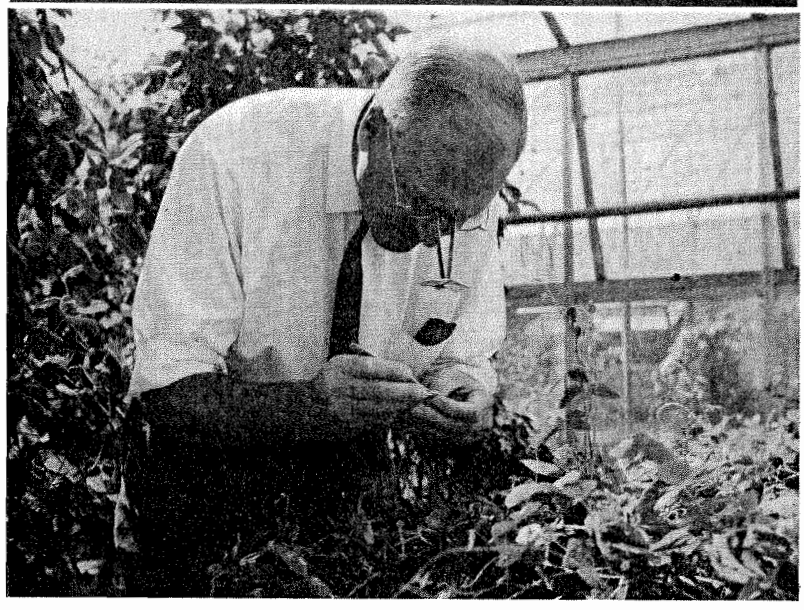
Dr. D. O. Norris of the Division of Tropical Pastures has just obtained the Diploma of the Gemmological Association of Australia with distinction and is now a fully qualified gemmologist.

A legume bacteriologist by profession, Dr. Norris took up lapidary work as a hobby and became a rock hound some two years ago.

This led to his enrolment in the two-year Diploma course conducted by the Gemmological Association which consists of a preliminary year to sort out those who are really earnest about it, and a second year of hard theoretical and practical work.

Dr. Norris has warned those of his colleagues who have been wondering about the "diamond" they inherited from Grandma that some stones are best left unturned.

PASTURES FOR THE NORTH



The Film Unit has just completed a 37 minute, 16 mm. colour film which tells of the work of the Division of Tropical Pastures and the Queensland Department of Primary Industries in developing highly productive pastures based on legumes and grasses introduced from Africa and South America. The film is entitled "Tropical Pastures for Australia". Our picture shows Dr. E. M. Hutton, Assistant Chief of the Division of Tropical Pastures, crossing selected strains of the sub-tropical legume Siratro.

BESIDE THE SEASIDE

In last month's Safety Notes we referred, though not too seriously, to the popularly held belief that the health-giving properties of sea-air are due to ozone.

This has prompted the following comments from Dr. A. B. Pittock and Mr. J. E. Galbally of the Division of Meteorological Physics.

"At the Division of Meteorological Physics we have been responsible for daily measurements of ozone concentration near the earth's surface both at Aspendale and at Macquarie Island over the past three years.

"The Macquarie Island site is only a few yards from the sea and is always in maritime air.

"The Aspendale site is about two hundred yards from Port Phillip Bay and is under the influence of maritime air only for particular wind directions.

"Ozone can be detected by a 'trained human nose' down to concentrations of about 0.1 parts per million. This is slightly greater than the highest concentrations ever detected at either Aspendale or Macquarie Island.

"There is no clear correlation between ozone concentration at Aspendale and winds from the sea. On the contrary, our results tend to confirm the well-established theory that ozone is primarily created by photochemical processes in the stratosphere and brought down to the earth's surface by meteorological processes which are equally active over land surfaces.

"The average ozone concentration at Macquarie Island is about 0.02 parts per million, while at Aspendale it is about 0.03 parts per million. Measurements made on oceanographic cruises in the Pacific Ocean and the Baltic Sea have shown similar low mean concentrations.

"Most people cannot differentiate between the odours of ozone and the oxides of nitrogen unless trained to do so.

"It seems likely that the ozone-by-the-sea myth arose from a confusion between the odour of ozone and that of some other gas formed perhaps by the rotting of seaweed.

"The health-giving properties of sea air would seem much more likely to be due to the absence of urban pollution, the more even climate by the sea, and the additional exercise indulged in by visitors to the seashore, rather than to the toxic properties of ozone."

Nocturnal Invasion

Canberra's still a bush-town apparently. A member of the staff of the Division of Computing Research arrived at work early one morning recently and found the following note on her desk.

Pat,

Please let Bill Smith know that a possum found his/her way into the building last night and swung on his rubber plant near the library and broke it.

Harry.

P.S. When we put it out I followed it around the corner and frightened a young red kangaroo away from outside Kris Kaldma's office window.

Deadline

Contributions for the April issue of Coresearch should reach the Editor at 314 Albert Street, East Melbourne, by Thursday, 14th March.

Screen News

On March 12, the Food Preservation Film Society will screen the Lerner and Loewe musical "Gigi" at 8.00 p.m., at North Ryde. To join the Society ring Mr. R. Burns (88 0233) and see thirteen screenings for only $2.

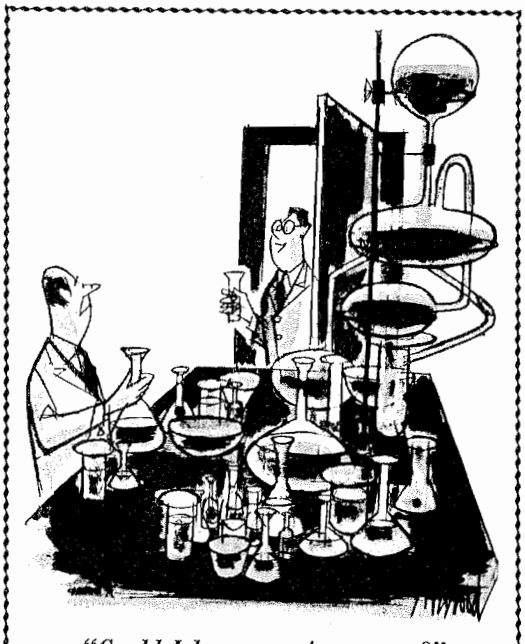
Thoughts for the Month

"I love fools' experiments; I am always making them."
Charles Darwin 1809-1882

"Drink wine and have the gout; drink none and have the gout."
Thomas Cogan 1545-1607

"Nothing is so fallacious as facts, except figures."
George Canning 1770-1827

"Cockroaches think that kitchens were created to afford a convenient home for cockroaches."
Grant Allen 1848-1899



"Could I borrow a few germs?"

APPOINTMENTS TO STAFF

Mr. M. O'Callaghan has been appointed to the Division of Mathematical Statistics and will assist in statistical aspects of research carried out by the Divisions of Animal Genetics, Animal Health and Animal Physiology. Since graduating B.Sc. with honours from the University of Sydney in 1965, Mr. O'Callaghan has been studying for his M.Sc. at the same university.

Mr. L. K. Corbett has been appointed to the Division of Wildlife Research where he will carry out research on the ecology of kangaroos and study the effect of harvesting for

Mr. L. K. CORBETT

meat and hides on wild populations of animals. After graduating B.Sc. from Monash University in 1965, Mr. Corbett spent twelve months with the Victorian Lands Department. Last year he taught biology at a Melbourne high school.

Dr. J. E. O'Hagan has joined the Division of Entomology to study the biochemistry of the cattle tick. Dr. O'Hagan graduated M.Sc. from the University of Queensland in 1950 and Ph.D. from the same university in 1960. From 1948 to 1961 Dr. O'Hagan worked as a biochemist with the Red Cross Blood Transfusion Service and from 1961 to 1966 was head of the Biochemistry Division, Department of Pathology, Princess Alexandra Hospital, Brisbane. Dr. O'Hagan spent last year as a Research Fellow in the Department of Biochemistry, University of Queensland.

Mrs. Margaret Davis has been appointed to the Leather Research Unit of the Division of Protein Chemistry where she will work on the chemical

Mrs. Margaret DAVIS

nature of the tanning process and the utilization of waste collagen. Mrs. Davis graduated B.Sc. from Monash University in 1963 and M.Sc. from the same University in 1967.

Mr. D. A. Saunders has been appointed to the Division of Wildlife Research where he will study the biology of the white-tailed black cockatoo in Western Australia. Mr. Saunders graduated B.Sc. with honours last year from the Australian National University.

Dr. S. C. Sharma has been appointed to a research fellowship with the Division of Applied Chemistry where he will work on the synthesis of alicyclic and heterocyclic compounds likely to exhibit biological effects in plants or insects. Dr. Sharma graduated M.Sc. from Banaras Hindu University in 1961 and Ph.D. from the same University in 1964. He also obtained a Ph.D. from the University of Sydney last year.

Dr. H. Weigold has been appointed to the Division of Applied Chemistry where he will work on the chemistry of zirconium and titanium. Dr. Weigold graduated B.Sc. with honours from the University of Adelaide in 1960 and Ph.D. from the same university in 1965. He was a research fellow at the University of Manchester in 1965 and 1966 and since then has been working at Case Western Reserve University in the United States.

Mr. C. M. Gerrard has joined the Division of Soil Mechanics where he will investigate the stress-deformation characteristics of clay soils under repeated loading with

Mr. C. M. GERRARD

particular reference to road pavement design. Mr. Gerrard graduated in civil engineering from the University of Melbourne in 1961 and obtained his Master of Engineering Science (Highway Engineering) from the same university in 1964. Since then he has been studying at the University for his Ph.D.

Dr. B. P. Springett has joined the Division of Entomology where he will study the ecology of orchard pests, particularly scales and mites. Dr. Springett graduated B.Sc. with honours from the University of Dunelm in 1962 and Ph.D. from the University of Durham in 1967.

Miss Marion Vickery has been appointed to the Division of Animal Physiology where she will work on biochemical and hormonal aspects of metabolism in sheep. Miss Vickery graduated B.Sc. from the University of Sydney in 1961 and M.Sc. from the same university

Miss Marion VICKERY

in 1963. After eighteen months as a biochemist at the Royal Prince Alfred Hospital she went overseas, working firstly at the Royal Veterinary and Agricultural College, Copenhagen, and then as a food chemist at Lyons Laboratories, London. Miss Vickery is a daughter of Dr. J. R. Vickery, former Chief of the Division of Food Preservation.

Dr. R. T. Williams has joined the Division of Wildlife Research where he will carry out an assessment of the present status of myxomatosis in

Dr. R. T. WILLIAMS

various parts of eastern Australia. Dr. Williams graduated B.Sc. with honours from the University of Durham in 1964 and obtained his Ph.D. recently from the University of Nottingham.

Janet Ward, of the Division of Forest Products, had more than one reason for smiling on her wedding day last month. Janet was unable to sit for her examination in organic chemistry last December and was given a special paper two days before her marriage to Neil Hamilton of the Division of Mechanical Engineering. Among the congratulatory messages on her wedding day was the news that she had passed with credit.

Overseas Visits

Mr. H. R. Brown, Consultant to the Executive, leaves later this month for Mexico, North America, Britain, Europe, Russia and Japan where he will visit coal and steel research centres. Mr. Brown will return at the end of November.

Dr. R. H. Hackman of the Division of Entomology leaves shortly on a nine month visit of research centres in Hawaii, North America, Britain, Europe and Russia. In Britain, Dr. Hackman will spend three months at the Institute of Cancer Research working on mucopolysaccharides, glycoproteins, and chitin. He will also attend international conferences in London and Moscow.

Dr. M. Lipson, Chief of the Division of Textile Industry, and **Mr. J. P. Shelton,** Secretary (Industrial and Physical Sciences), leave shortly on a two week visit to Washington to negotiate arrangements for the industrial application of a new spinning technique developed by the Division of Textile Industry.

Dr. F. H. W. Morley, an Assistant Chief of the Division of Plant Industry, leaves later this month for overseas on a Wool Board travelling fellowship. He will visit FAO, Rome, and grazing research institutes in South Africa, East Africa, Britain and the United States. In America he will deliver a paper at the World Conference on Animal Production. Dr. Morley is due back in late July.

Dr. C. H. B. Priestley, Chief of the Division of Meteorological Physics left recently on a two-month visit of meteorological institutions in the United States and Britain. In April he will fly to Geneva to attend meetings of the Joint Global Atmospheric Research Programme Organising Committee and the WMO Advisory Committee. Dr. Priestley is Chairman of the Advisory Committee.

Mr. E. F. Riek of the Division of Entomology left early in February on an eleven month visit of taxonomic research centres in Britain, Europe, Russia, and North America. He will examine Australian insect species collected during early exploration trips and deposited in overseas institutions. He will also attend conferences in Lapland and Moscow.

Dr. D. F. Stewart, Associate Chief of the Division of Animal Health, leaves shortly for the United Kingdom, Europe and North America where he will study the progress of campaigns for eradicating bovine brucellosis and tuberculosis and the methods employed. He will also visit veterinary research institutes in Japan before returning to Australia in mid-June.

Dr. R. J. Swaby of the Division of Soils leaves later this month on a four month visit to India, the Middle East, Europe, Britain and the United States. Dr. Swaby will visit research centres concerned with soil microbiology and soil organic matter and will take part in a symposium on organic matter and soil fertility organized by the Pontifical Academy of Sciences, Rome.

"Simpson — I think you ought to run through your calculations again."

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 109, MELBOURNE, APRIL 1968

NEW MINISTER

The appointment of Mr. M. Fraser as Minister for Education and Science and his elevation to Cabinet rank were announced last February by the Prime Minister.

Mr. Fraser has come to Education and Science after two years as Minister for the Army.

He was born in Melbourne in 1930 and educated at Melbourne Grammar and Oxford

Mr. M. FRASER

University where he obtained a Master's degree in Philosophy, Politics and Economics.

Shortly after his return to Australia from Oxford he gained pre-selection for the electorate of Wannon in south-west Victoria but was initially unsuccessful in winning the seat. However, he won the seat in 1955 and has retained it ever since.

As a backbencher he was extremely active in Parliament and until his promotion to the Ministry in January 1966, he served on many Parliamentary Committees.

He was a member of the Joint Parliamentary Committee on Foreign Affairs from 1962 to January 1966, and was Chairman of the Government Members' Defence Committee and Secretary of the Government Members' Wool Committee. He was also a member of the Government Members' Committees on Housing, Food and Agriculture, Industrial Relations, Research and Science, and Communications.

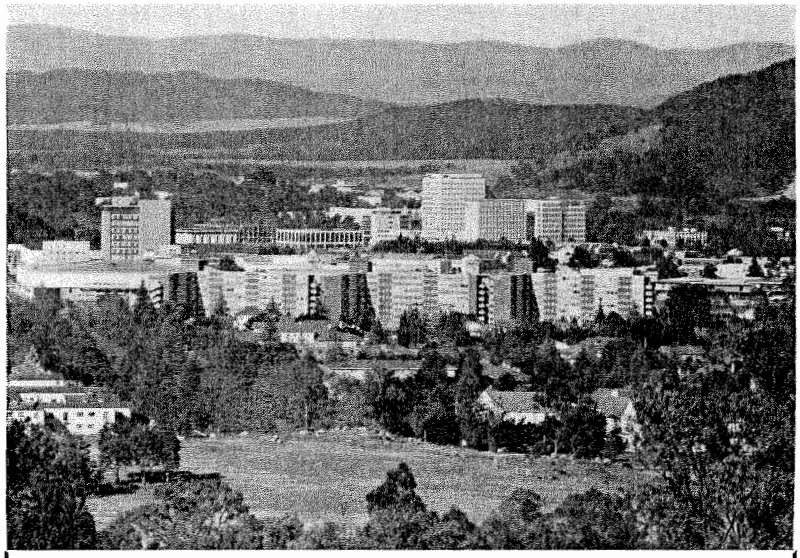
In 1964 he was appointed a member of the Council of the Australian National University on which he served until January 1966.

In 1964 the United States Government invited Mr. Fraser, as a representative of the Government party, and Mr. Whitlam as a member of the Opposition party, to visit America for two months, the purpose of the visit being to gain an understanding of the United States and to study the particular aspects of the United States' Administration in which they had a special interest.

These travel grants are made available by the United States Government to people in many walks of life but this was the first time they had been awarded to Australian Parliamentarians. On his return to Australia from America Mr. Fraser toured South-East Asia, including Vietnam.

In 1965 Mr. Fraser also visited Indonesia as a private member and studied many aspects of that country's Government and of Australia's relations with Indonesia.

Mr. Fraser is married with two sons and two daughters, and his recreations include fishing and photography.



The Government recently approved the building of a new Head Office for CSIRO in Canberra The building will be constructed by the National Capital Development Commission using funds under its control and should be ready for occupancy by December, 1970. Our picture is taken looking south-west across the proposed Head Office site. The site occupies an area of 10.8 acres and is bordered by Quick Street, Limestone Avenue, and Campbell High School.

Among the landmarks in the picture are the Hotel Ainslie Rex (bottom right), Black Mountain (the near hill, upper right) and the A.M.P. building (the tallest building near the centre). Part of Head Office is housed at present in the A.M.P. building, together with the Canberra Regional Office. Not shown in the picture is the Australian War Memorial, which is a few hundred yards south-east of the site.

Tribute to Mr. Gorton

The Chairman, Sir Frederick White, paid tribute recently to Mr. J. G. Gorton who was Minister for Education and Science before his appointment as Prime Minister.

Sir Frederick recalled that Mr. Gorton was first appointed Minister-in-Charge of CSIRO in February 1962. At that time he was also Minister for the Navy.

In December 1963, he was appointed Minister for Works and, under the Prime Minister, Minister-in-Charge, Commonwealth Activities in Education and Research.

Three years later, in December 1966, he became the first Minister to take up the new portfolio of Education and Science.

Sir Frederick said that Mr. Gorton had shown an enthusiastic interest in CSIRO and that in spite of his many other Ministerial commitments he had found time to visit a number of CSIRO laboratories and field stations, talk to CSIRO staff associations, and visit industrial firms which were collaborating with CSIRO.

As a result, he had gained a deep and sympathetic understanding of the Organization and its problems.

Sir Frederick said that the help and advice given by Mr. Gorton during his term as Minister had been very much appreciated by the Executive and that the Organization had benefited greatly from his assistance.

The Division of Horticultural Research is becoming quite a stamping ground for visiting experts from the United States. Three of them are seen here with the Chief of the Division, Dr. J. V. Possingham, tasting some new varieties of grapes that have been developed at Merbein. Our picture shows from left to right: Dr. L. Bernstein of the U.S.D.A. Salinity Laboratory, an expert on salinity problems in horticultural crops; Dr. Possingham; Dr. C. D. Fisher, Technical Director of Henrietta Rancho Products, California, an authority on the processing of dried fruits; and Professor N. Thaulis of Cornell University who is working with the Division on new vine training systems.

MEDALLISTS

Edgeworth David Medal

Mr. W. J. Peacock of the Division of Plant Industry has been awarded the Edgeworth David Medal of the Royal Society of New South Wales for his contributions to botany. Mr. Peacock's most recent work has been concerned with the cytological basis of meiotic drive.

H. G. Smith Medal

Dr. J. S. Shannon of the Division of Entomology has been awarded the H. G. Smith Memorial Medal of the Royal Australian Chemical Institute for his contributions to organic and physical chemistry. He will share the award with Mr. R. A. Dewar of ICIANZ.

News In Brief

Doctorates

Dr. A. J. Dyer of the Division of Meteorological Physics has been awarded the degree of Doctor of Science by the University of Melbourne for his published work in meteorology.

Dr. E. W. Radoslovich of the Division of Soils has been awarded the degree of Doctor of Science by the University of Adelaide for his work on the crystal structure of layer silicate minerals.

Fellow

Professor M. E. Hargreaves, Officer-in-Charge of the Physical Metallurgy Section, has been elected a Fellow of Queen's College, University of Melbourne.

Fiery Match

In a display of brilliant cricket that left the spectators gasping Chemical Research Laboratories finally defeated Tribophysics in a hard fought match at Monash University oval last month.

C.R.L. lost 7 wickets for 135 to snatch victory from Tribophysics who were all out for 91.

The fall of wickets by Tribophysics catches something of the drama which characterized the game: 0, 0, 5, 69, 72, 87, 87, 91, 91.

SAFETY NOTES

A Busy Day at the Office

The office or library can be full of traps for the unwary. The following is a list of common mishaps and the hazards which have produced them.

Mishap	Hazard
Torn stockings, barked shins	Filing cabinet and desk drawers left open.
Bruised back or worse	Standing on swivel chair or soft chair to reach a high shelf.
Tripping and falling	Electric cord from typewriter or radiator, loose mat on polished floor.
Fire	Cigarette butt in waste paper basket, radiator too close to wooden desk or fittings, paper from desk falling on to radiator bar.
Broken or cut finger	Electric fan.
Long hair entangled	Hair drawn into back of electric fan.
Ricked neck (males only)	Mini-skirts.

How many more can you add to the list?

J. W. Hallam, Safety Officer.

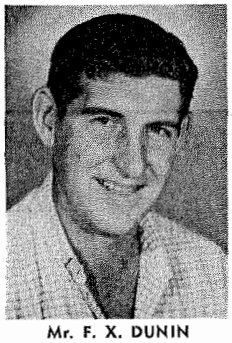
APPOINTMENTS TO STAFF

Mr. A. W. Brown has joined the Industrial and Physical Sciences Branch at Head Office where he will carry out an economic assessment of the benefits of some of CSIRO's research. Mr. Brown obtained his Diploma of Applied Chemistry from the Royal

Mr. A. W. BROWN

Melbourne Institute of Technology in 1952 and his Master of Business Administration from the University of Melbourne in 1967. He worked as a chemist with Monsanto Chemicals from 1949 to 1954 and with Nicholas Pty. Ltd. from 1954 to 1959. Mr. Brown then had four years with Albright and Wilson before joining A.P.M. in 1963.

Mr. F. X. Dunin has been appointed to the Division of Plant Industry where he will study the hydrological significance of different types of vegetation and the hydrological consequences of major



Mr. F. X. DUNIN

changes in land use. Mr. Dunin has been a hydrologist with the Soil Conservation Authority of Victoria since 1956 when he graduated B.Agr.Sc. from the University of Melbourne.

Mr. G. P. Gillman has joined the Division of Soils. He will be stationed in Townsville and will work on the chemical fertility and characteristics of north Queensland soils. Since graduating B.Sc. with honours from the University of Queensland in 1964, Mr. Gillman has worked with I.C.I.A.N.Z. and with Australian Newsprint Mills.

Mr. C. D. Jordan has joined the Division of Building Research where he will develop programmes for use in civil engineering design processes. Mr. Jordan obtained his Diploma in Mathematics last year from the Royal Melbourne Institute of Technology.

Dr. D. H. Kemp has joined the Division of Animal Health where he will work on the host-parasite relationship between cattle and cattle ticks. Dr. Kemp graduated B.Sc. with honours from the University of Edinburgh in 1963 and obtained his Ph.D. from the same university recently for his research on tick physiology.

Mr. D. M. Keenan has been appointed to the Division of Tropical Pastures where he will work on pasture evaluation and animal nutrition. After graduating B.V.Sc. from the University of Sydney in 1960 Mr. Keenan spent twelve months in Papua and New Guinea with the Department of Territories. He then had a short period in private practice before joining the South Australian Department of Agriculture. Since 1965 Mr. Keenan has been studying for his Ph.D. at the University of New South Wales.

Mrs. Annette Leggo has been appointed to the Division of Applied Mineralogy as an X-ray fluorescence spectroscopist. Since graduating B.Sc. from the Australian National University in 1965, Mrs. Leggo has been a research assistant in the University's Department of Geophysics and Geochemistry.

Dr. R. S. Hogarth-Scott has been appointed to the Division of Animal Health to study helminth infestations of sheep, particularly in Victoria. Dr. Hogarth-Scott graduated B.V.Sc. with honours from the

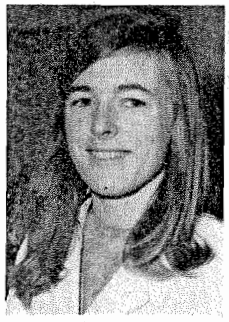
Dr. R. S. HOGARTH-SCOTT

University of Queensland in 1963 and Ph.D. from the University of Cambridge in 1966.

Dr. P. Lesse has been appointed to a two year fellowship in wood physics with the Division of Forest Products. He will study wood-moisture relationships, including the influence of stresses and surface phenomena. Dr. Lesse has been carrying out research at the Institute of Macromolecular Chemistry, Czechoslovakian Academy of Science, since 1958 when he graduated in physics and mathematics from Charles University, Prague. He obtained his Ph.D. from the Institute in 1964.

Mr. R. N. Manchester has been appointed to the Division of Radiophysics and will work at the Australian National Radio Astronomy Observatory at Parkes. Mr. Manchester graduated B.Sc. with honours from the University of Canterbury, New Zealand, in 1963. Since then he has been studying for his Ph.D. at the University of Newcastle.

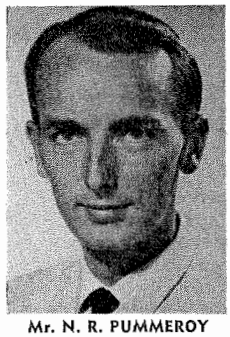
Mrs. Margaret Pont has joined the Division of Protein Chemistry where she will work on the characterization of



Mrs. Margaret PONT

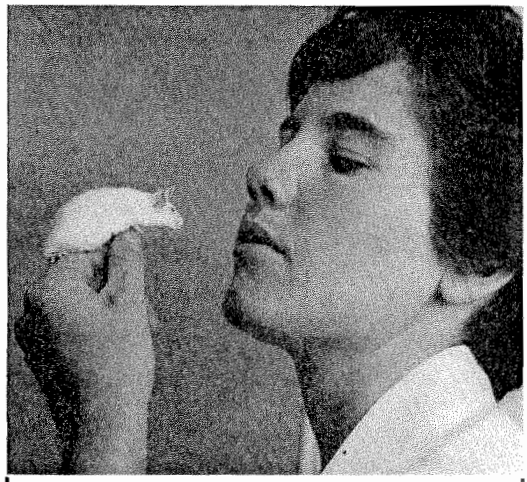
fibrous proteins. Mrs. Pont graduated B.Sc. from the University of Melbourne last year.

Mr. N. R. Pummeroy has been appointed to the Division of Computing Research to give courses in FORTRAN and ALGOL to research staff. He will also edit technical publications. Mr. Pummeroy graduated B.Sc. from the University of Melbourne in 1963 and since then has been teaching with the Victorian Education Department.



Mr. N. R. PUMMEROY

Dr. M. A. Naughton has joined the Division of Animal Genetics where he will carry out research on molecular genetics. Dr. Naughton graduated B.Sc. from the University of St. Andrews, Scotland, in 1952, and Ph.D. from the University of Cambridge in 1959. After three years at the Massachusetts Institute of Technology he became Associate Professor of Biophysics at the John Hopkins University, Baltimore. In 1966 he spent a year with the Division of Animal Genetics as a visiting research fellow before returning to the John Hopkins University as Professor, School of Medicine.

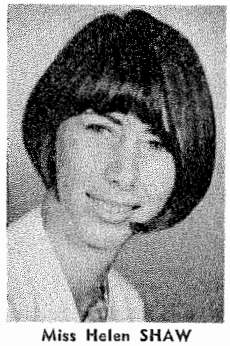


To the majority of womankind mice are a "pernicious race of little odious vermin". But to Nola Thompson, a girl of rare murine empathy, each mouse is a personality. Nola works at the McMaster Laboratory of the Division of Animal Health.

Miss Judith Sykes has joined the Division of Entomology where she will work on insect pheromones and maintain insects in laboratory culture. Miss Sykes graduated B.Sc. with honours from the University of Adelaide last year.

Miss Maureen Wright has been appointed to the Division of Fisheries and Oceanography as a technical editor. Miss Wright graduated B.Sc. from the University of New England last year.

Miss Helen Shaw has joined the Division of Plant Industry where she will work on in-



Miss Helen SHAW

duced mutations in Arabidopsis and yeast. Miss Shaw graduated B.Sc. recently from the University of Queensland.

Overseas Visits

Dr. J. E. Begg of the Division of Land Research leaves shortly for the United States where he will visit plant physiology research centres. Dr. Begg will spend from early May until the end of October working at the Connecticut Agricultural Experiment Station, New Haven.

Mr. J. G. Downes, Assistant Chief of the Division of Textile Physics, will leave later this month on an eight week visit to wool testing laboratories in Britain, Europe, the United States and New Zealand.

Dr. L.'t Mannetje of the Division of Tropical Pastures left recently on a seven month visit to pasture research centres in New Zealand, the United States, the United Kingdom and Europe. He will also collect tropical legumes in Indonesia.

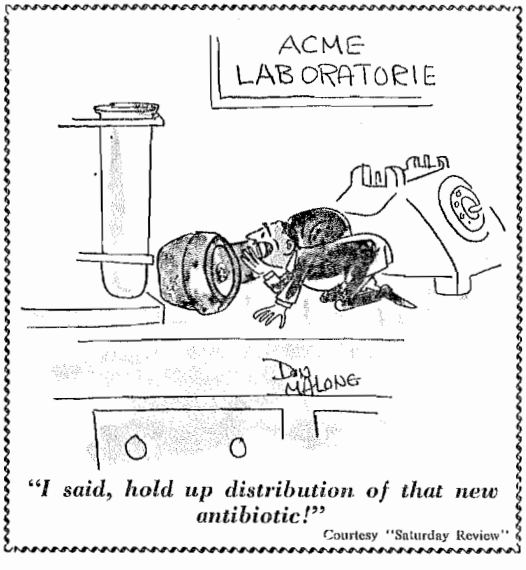
Mr. W. M. McArthur of the Division of Soils left last month on a 15 week visit to soil research centres in Mauritius, South Africa, East Africa, Europe, Britain and Ireland.

Mr. R. W. R. Muncey, Chief of the Division of Forest Products, left recently on a four month visit to New Zealand, North America, Britain, Europe and South Africa. Mr. Muncey will study developments in forestry and forest products research.

Dr. K. E. Murray of the Division of Food Preservation leaves later this month for North America, Britain, Europe and India where he will spend three months visiting laboratories concerned with food flavour research.

Mr. W. R. Read of the Division of Mechanical Engineering left recently for Fiji, North America, Spain, Greece, Pakistan, India and the Philippines where he will spend three and a half months studying the design and performance of solar distillation plants.

Mr. E. R. Watson of the Division of Plant Industry left recently on a visit to agricultural research centres in New Zealand, North America, Britain, Europe, Israel and South Africa. He will return in mid-August.



"I said, hold up distribution of that new antibiotic!"

Courtesy "Saturday Review"

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER (EO 1/2/3)—Division of Building Research—390/390 (19/4/68).

RESEARCH SCIENTIST (RS/SRS)—Division of Fisheries and Oceanography—320/374 (19/4/68).

PHYSIOLOGIST (RS/SRS)—Division of Fisheries and Oceanography—320/376 (26/4/68).

RHEOLOGIST, PHYSICIST, PHYSICAL CHEMIST, BIOPHYSICIST OR BIOCHEMIST (RS/SRS)—Division of Food Preservation—Meat Research Laboratory 305/108 (26/4/68).

PLANT ECOLOGIST—RANGELANDS RESEARCH PROGRAMME (RS/SRS/PRS)—Division of Land Research—618/239 (26/4/68).

MAMMAL ECOLOGIST—RANGELANDS RESEARCH PROGRAMME (RS/SRS/PRS)—Division of Wildlife Research—560/240 (26/4/68).

ENGINEERS AND SCIENTISTS—RESEARCH FELLOWSHIPS (RS/SRS/PRS/SPRS)—Division of Forest Products—290/833 (19/4/68).

RESEARCH SCIENTIST—ARCHITECTURAL ACOUSTICS (RS/SRS)—Division of Building Research—390/388 (19/5/68).

RESEARCH SCIENTIST—CIVIL ENGINEERING SYSTEMS (RS/SRS/PRS/SPRS)—Division of Building Research—390/389 (31/5/68).

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 110, MELBOURNE, MAY 1968

News In Brief

Buchan Prize

Dr. A. J. Dyer and **Mr. W. C. Swinbank** of the Division of Meteorological Physics have been awarded the 1968 Buchan Prize of the Royal Meteorological Society. The award is made in recognition of their original contribution to meteorology.

Medal

Mr. A. F. A. Harper of the Division of Physics has been awarded a Medal of the Royal Society of New South Wales for "Researches in Physics and Service to Science". Mr. Harper is a Past-President of the Society.

Prize

Dr. D. H. Solomon of the Division of Applied Mineralogy has been awarded the Archibald D. Olle Prize of the Royal Australian Chemical Institute for his book on the chemistry of organic film formers.

ASPAC Appointment

Mr. J. R. M. Wolfe of the Division of Land Research has been appointed Director, ASPAC Register of Experts' Services in the Department of External Affairs, Canberra. Member countries of ASPAC (The Asian and Pacific Council) are: South Korea, Japan, Taiwan, Philippines, Thailand, Malaysia, Australia and New Zealand, and Laos as an observer. The main object of the register is to discover and document the scientific and technological groups and individuals in the above countries which may play a role in development.

Lecturer

Mr. D. A. Watson of the Agricultural and Biological Sciences Branch has been appointed Senior Lecturer with the Audio Visual Aids Section of the Faculty of Education at Melbourne University.

Holiday Club

The Anglesea Holiday Club has one share for sale for $220. Shareholders are entitled to rent the Club's flat at Anglesea, Victoria, at moderate tariffs. Further details may be obtained from the Secretary, **Mrs. Phyllis Fricker,** Fisheries Investigations, Camberwell, Melbourne (Phone 82-6757).

Assistant Chiefs

Dr. E. L. French has been appointed Assistant Chief of the Division of Animal Health.

Dr. E. L. FRENCH

Dr. M. J. T. Norman has been appointed Assistant Chief of the Division of Land Research.

Dr. M. J. T. NORMAN

Advisory Council

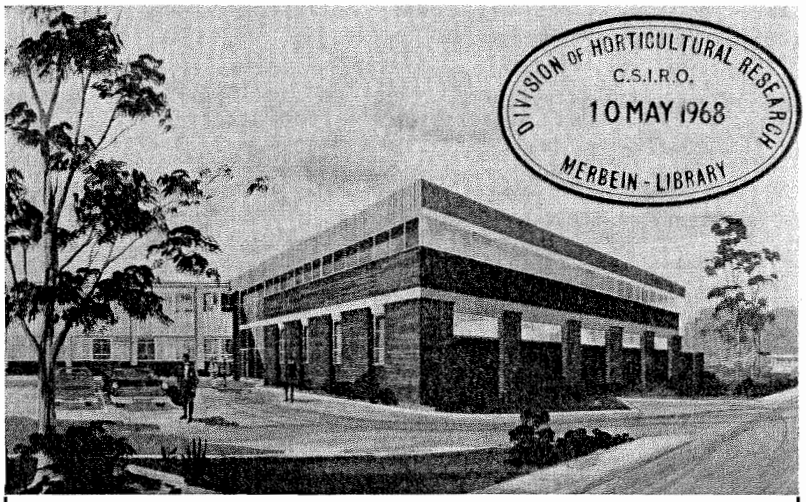
The CSIRO Advisory Council will meet in Canberra on the 7th and 8th May.

Unsung Heroes

"The unsung heroes of Australia's dramatic progress in the scientific world are the men from the CSIRO, the silent miracle workers of our time. These men cast their net wide, plumbing the mysteries of the origin of the universe, applying their talents to the problems of bushfires and drought, extermination of pests and the preservation of our wildlife, developing vaccines to fight disease."

Sunday Sun.

Professor Robert G. Parr, Professor of Chemistry at the Johns Hopkins University, Baltimore, is spending four months working with the Theoretical Chemistry group of the Division of Chemical Physics as a National Science Foundation Senior Postdoctoral Fellow, with the assistance of a travel grant from the Australian-American Education Foundation. Our picture shows Professor Parr (seated) surrounded by (from left to right), Dr. J. K. MacKenzie, Dr. V. W. Maslen and Dr. A. C. Hurley of the Division.



Above is an artist's impression of a new wool testing research and development laboratory to be built with finance from the Australian Wool Board for the Division of Textile Physics at Ryde. The total cost of the project is about $135,000.

The building will be a two-storey reinforced concrete structure featuring brick walls and, above first floor level, steel columns and roof trusses. It will have an area of 7,200 square feet and will house the Division's wool testing development programme including the CSIRO yield and fineness tester. It features a spacious demonstration area and a trials area as well as a climate-controlled room amongst it many laboratories.

The building is expected to be completed and occupied before the end of the year. The architects for the project are Messrs. Winterbottom and Moore and Associates, of Sydney; the contractor is E. H. Donnelley and Sons Pty. Ltd.

But in Leap Year That's the Time . . .

CSIRO staff in the A.M.P. Building, Canberra, all know that this is a leap year. Out of a total of twelve unmarried girls, five have become engaged since the beginning of the year.

Sciences Club

The following have been elected to the first committee of the Sciences Club, which will have its premises in Clunies Ross House — National Science Centre, Melbourne.

President: J. E. Cummins (Royal Australian Chemical Institute).

Vice-Presidents: R. C. Edquist (Royal Australian Chemical Institute), B. Terry (Australian Institute of Refrigeration, Air-Conditioning and Heating, Inc).

Secretary-Treasurer: J. A. Roberts (Australian Institute of Agricultural Science).

Members: W. H. Algar (A.N.Z. Pulp and Paper Industry Technical Association), Prof. D. C. Blood (Australian Veterinary Association, and nominee of the Governors of the Foundation), G. Loftus-Hills (Australian Society of Dairy Technology), I. W. Montgomery (Australian Veterinary Association), S. R. J. Nicholls (Oil and Colour Chemists' Association), Dr. J. C. Nixon (A'sian Institute of Mining and Metallurgy), A. C. Willis (Plastics Institute of Australia), D. Welch (Australian Institute of Food Science and Technology), J. J. Zagorski (Institution of Engineers, Australia).

INSURANCE PLAN

For the last nine years the insurance plan developed by the A.M.P. Society specifically for CSIRO officers has proved a popular form of additional life cover at low cost.

To date just on 500 members of the Organization's staff have taken advantage of the plan, which provides a total cover of about $2¾ million for the subscriber's dependants.

Under the scheme the amount of cover reduces year by year.

Revised brochures and new application forms have been issued by the A.M.P. Society and are now available at all the Organization's Regional Administrative Offices.

The main feature of the revised plan is that the maximum number of permissible insurance units has been increased from 10 to 15.

Membership of the plan is available to all members of CSIRO.

Anyone interested in this life insurance scheme should apply to his local Administrative Officer for inspection of the brochure, which covers the plan in detail.

For the Melbourne area the A.M.P. Society's Servicing Representative is Mr. G. F. Judd. He can be contacted at 62-0201 (Business) or 57-6701 (Private).

Officers in other States requiring further information should contact the nearest branch of the A.M.P. Society.

SAFETY NOTES

Flare-Up

In the May 1967 issue of Coresearch we reported a fire due to the leakage of a bottle of fuming nitric acid.

A more recent incident involved white phosphorus, which was stored in a tinplate container.

Apparently corrosion of the container allowed the water to drain out, and about 1 lb. of white phosphorus ignited.

No damage was done, thanks to the installation of a sprinkler system.

The above incidents highlight the need to inspect the storage of hazardous chemicals regularly and thoroughly.

- Keep non-compatible chemicals well separated.
- Make sure chemicals which react with moisture or air are properly protected. Chemicals such as sodium or lithium hydride can generate dangerous concentrations of hydrogen.
- Be particularly careful with chemicals that react with water. If a fire does break out, secondary hazards due to the fire control methods must be avoided.
- Storing chemicals in alphabetical order is about as intelligent as arranging the periodic table of elements in a similar way. Storage location of chemicals should be under the supervision of a senior suitably qualified person, to prevent sodium cyanide ending up next to sulphuric acid.
- If you store or handle dangerous metals such as sodium or even magnesium, make sure you have a suitable dry chemical fire extinguisher handy for an emergency.

Done to a Crisp

The Australian image is the bronzed outdoor type — suntanned and done to a golden brown or near black.

As a result, we have the highest rate of skin cancer in the world. It accounts for 60 per cent. of all cases of cancer diagnosed in this country.

You northern inhabitants in particular, take care in that delightfully sunny climate. You will probably be just as comfortable wearing a light shirt, and could save yourself a lot of skin trouble later.

J. W. Hallam, Safety Officer.

A SONG FOR TRISTRAM

(Tune: Jerusalem the Golden)

Dedicated to Dr. J. B. Langridge, Assistant Chief, Division of Plant Industry.

'. . . marked males of the silkworm moth have been known to fly upwind seven miles to a fragrant female of their kind . . . the chemical compound with which a female silkworm moth attracts mates is highly specific; no other species seem aware of it. In 1959, the Nobel Laureate, Adolph Butenandt, of the Max Planck Institute for Biochemistry in Munich, succeeded in analysing it. He found it to be an alcohol with sixteen carbon atoms per molecule . . .'

L. and M. Milne: The Senses of Animals and Men.

My darling, have you heard it,
This news I sing to you?
It's true, my lovely bird, it
Is absolutely true!
A Biochemist probing
Has caught without a doubt
The Queen of Love disrobing
And found her secret out.

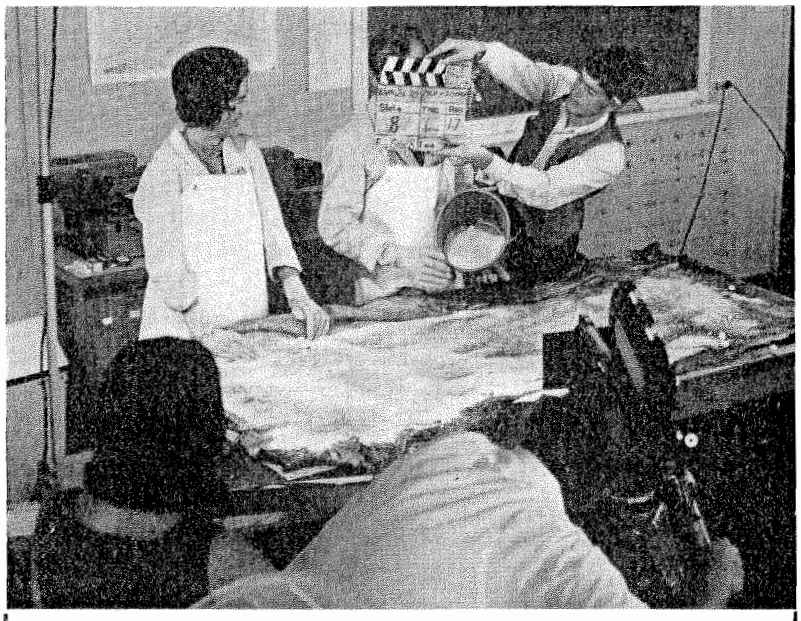
What drives the ***Bombyx mori***
To fly, intrepid male,
Lured by the old, old story
Six miles against the gale?
The formula, my Honey,
Is now in print to prove
What is, and no baloney,
The very stuff of love.

At Munich on the Isar
Those molecules were found
Which everyone agrees are
What makes the world go round;
What draws the male creation
To Love, my darling doll,
Turns out, on trituration,
To be an alcohol.

A Nobel Laureatus
Called Adolph Butenandt
Contrived to isolate us
This strong intoxicant.
The boys are celebrating
And singing at the club:
Here's Bottoms up! to mating,
Since Venus keeps a pub!

My angel, O my angel
What is it you suffuse,
What redolent evangel,
What nosegay of good news?
What draws me like a dragnet
And holds and keeps me tight?
What odds! my fragrant magnet,
I shall be drunk tonight!

A. D. HOPE



The A.B.C. Education Department is producing a series of 14 programmes, "Men and Science", in support of a new science course for secondary schools. The first film deals mainly with CSIRO and includes segments from three of the Organisation's films, "Tropical Pastures", "The Rainmakers" and "Current Research in Entomology". It also includes a segment on tanning research which was filmed at the Leather Research Unit of the Division of Protein Chemistry. Our picture shows Mrs. Catherine Money on camera.

APPOINTMENTS TO STAFF

Mr. G. M. Adam has been appointed to the Division of Computing Research to supervise the installation and operation of a computing station at the Western Australian Laboratories. Since graduating in Electrical Engineering from the University of Western Australia in 1963, Mr. Adam has worked as an electrical engineer with the Post-Master General's Department.

Dr. T. S. Ch'ang has joined the Division of Animal Genetics, where he will work on the application of genetics to livestock improvement. Dr. Ch'ang graduated M.Agr.Sci. with honours from the University of New Zealand in 1956. Since 1958, he has been a lecturer in sheep husbandry at Massey University, and in 1967 he obtained his Ph.D. from this University.

Mr. J. B. F. Field has been appointed to the Division of Mathematical Statistics to assist research staff in an advisory and consultative capacity. Mr. Field graduated B.Sc. with honours recently from the University of Adelaide.

Dr. C. A. Stanley has joined the Division of Fisheries and Oceanography and will carry out research on the population dynamics of Australian salmon and crayfish. Dr. Stanley graduated B.Sc. with honours from the Queen's University, Belfast, in 1964, and Ph.D. from the same university in 1967.

Miss Catherine King, a recent science graduate from the University of New England, has joined the Division of Mathematical Statistics. She will be stationed at the Pastoral Research Laboratory, Armidale, to assist with statistical aspects of the Laboratory's research programme.

Dr. F. W. Jones has joined the Division of Textile Industry, where he will work on wool setting and wrinkling of wool. Dr. Jones graduated B.Sc.

Dr. F. W. JONES

with honours from the University of Canterbury in 1964, and recently obtained his Ph.D. from the same university.

Mr. R. C. Neil has been appointed to the Division of Soil Mechanics where he will work on the stabilization of soils. Since graduating M.Eng.Sc. from the University of Melbourne in 1964, Mr. Neil has worked as a consultant with several firms of consulting engineers.

Miss Heather Pietsch has been appointed to the Editorial and Publications Section where she will work on the editing of biological and chemical papers. Miss Pietsch graduated B.Sc. with honours from the University of Melbourne in 1956 and is at present completing her M.Sc. thesis.

Mr. I. J. Poulter has been appointed to the Editorial and Publications Section. After graduating B.Sc. from the University of New England in 1961, Mr. Poulter spent three years with the Division of Textile Industry. Since 1963, he has been a chemist with Wagga Rural Stock Feeds Pty. Ltd.

POSITIONS VACANT

The following vacancies for professional appointments are current:

SCIENCE WRITER (SSO1/2) — Head Office, Agricultural and Biological Sciences Branch — 110/1041 (17/5/68).

POSTDOCTORAL FELLOWSHIP IN BIOCHEMISTRY — Division of Entomology — 180/453 (17/5/68).

CIVIL ENGINEERING SYSTEMS (EO1/2/3) — Division of Building Research — 390/391 (20/5/68).

RESEARCH IN ATMOSPHERIC RADIATION (RS/SRS) — Division of Meteorological Physics — 420/232 (31/5/68).

CIVIL ENGINEERING SYSTEMS (RS/SRS/PRS) — Division of Building Research — 390/389 (31/5/68).

RESEARCH ENGINEER OR SCIENTIST (RS) — Division of Mechanical Engineering — 430/262 (3/6/68).

GROUP LEADER, COTTON RESEARCH (SRS/PRS) — Division of Textile Industry — 464/440 (3/6/68).

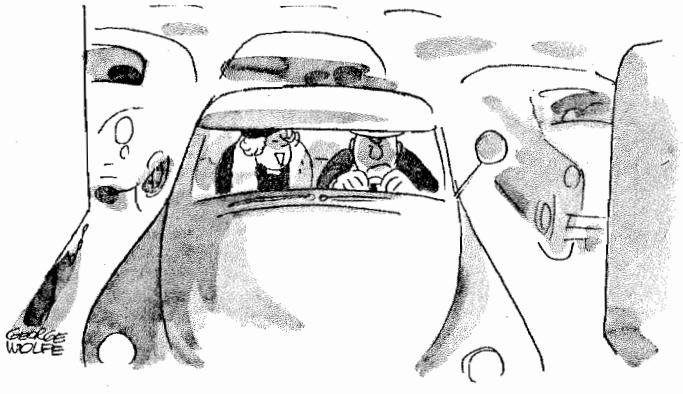
HYDROLOGIST OR WATER SCIENCE ENGINEER (RS/SRS) — Division of Irrigation Research — 500/222 (7/6/68).

ELECTRICAL ENGINEER OR PHYSICIST (RS/SRS/PRS) — Division of Applied Physics — 750/411 (7/6/68).

POSTDOCTORAL FELLOWSHIP IN PROTEIN CHEMISTRY — Division of Protein Chemistry — 462/304 (7/6/68).

VETERINARIAN (EO2/3) — Division of Animal Health, Pastoral Research Laboratory, Townsville — 204/133 (14/6/68).

POSTDOCTORAL FELLOWSHIP IN POLYNER CHEMISTRY — Division of Protein Chemistry — 462/302 (14/6/68).



"Don't mind me — just pretend that I'm a programmer feeding information to a computer when I say 'the light turned red', or 'look out for the bicycle!'"

Courtesy "Saturday Review".

OVERSEAS VISITS

Dr. W. C. T. Dowell of the Division of Chemical Physics leaves shortly on a six-month visit to Britain, Germany and Japan, where he will study electron microscopy techniques.

Dr. S. D. Hamann, Chief of the Division of Applied Chemistry, will deliver a paper at the Second International High Pressure Conference in Bavaria this month.

Mr. S. B. Hudson of Ore Dressing Investigations leaves later this month on a thirteen-week visit to ore dressing centres in Singapore, Thailand, India, Europe, Britain, the United States and Russia. Next June he will present a paper at the 8th International Mineral Processing Congress in Leningrad.

Dr. F. G. Lennox, Chief of the Division of Protein Chemistry, will leave later this month for Johannesburg, where he will be a guest speaker at a meeting of the South African Chemical Institute. Dr. Lennox will also attend a meeting of the International Wool Secretariat in Britain and will visit wool research laboratories in Britain, Europe and the United States, before returning early in July.

Mr. H. R. Jitts and **Mr. D. R. Lockwood** of the Division of Fisheries and Oceanography, left last month to take part in the research cruise of the "Ellen B. Scripps" with SCOR/UNESCO Working Group 15. They will return early in June.

Mr. R. E. Prebble of the Division of Soils, left recently for Britain. He will spend 14 months in the Soil Physics Department at Rothamsted Research Station.

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 111, MELBOURNE, JUNE 1968

RANGELANDS RESEARCH

Australia's rangelands, the arid and semi-arid regions of natural pasture, carried a third of our flocks and herds and earned an export income of more than $400 million, but their future productivity could not be assured, Mr. R. Perry of the Division of Land Research told the Advisory Council in Canberra last month.

He said that many rangelands were beginning to show signs of deterioration, while some had already deteriorated badly. Proper management practices were needed to prevent this decline and to maintain productivity permanently, but before this could be done much more had to be learnt about the climate - land - vegetation - animal system and the processes operating in it.

As a first step towards this, the Executive had established a Rangelands Research Programme to study the maintenance and use of our rangeland resources.

The Programme, which involves scientists from the Divisions of Land Research, Plant Industry and Wildlife Research, is managed by an Interdivisional Committee under the chairmanship of Mr. Perry. Other Divisions are likely to participate later.

Headquarters of the Programme are in Canberra. There is an active field centre at the Riverina Laboratory, Deniliquin, in the winter rainfall semi-arid region, and a developing field centre in the summer rainfall arid region at Alice Springs where scientists from both CSIRO and the Northern Territory Administration are working in collaboration.

Talks were started last month with the Universities to explore the possibility of forming with them an "Australian Arid Lands Research Association" of which the CSIRO programme would be a part.

Mr. Perry said that we still had a chance to learn how to manage our vast rangelands resources which accounted for three-quarters of the area of the Australian continent, but time was fast running out.

Land and vegetation were the long term resource; animals were simply short-term devices for harvesting that resource.

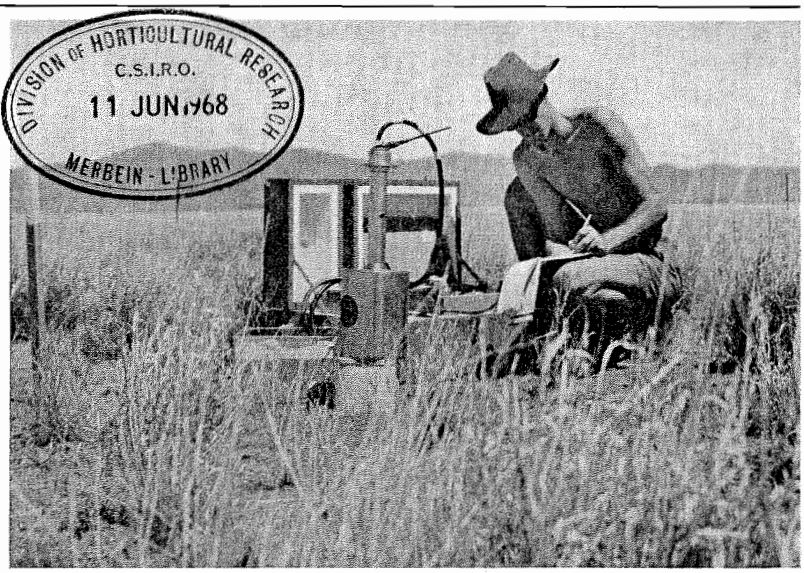
Our alternatives were clear —either we must learn to maintain the condition of our arid lands or watch them deteriorate to unproductive wastelands which could not be restored.

We had only to look at the deserts in other parts of the world and at our oldest settled areas in the arid regions for proof of this.

The return per acre on our rangelands was so low that improved pastures and fertilizers were uneconomic.

The only management practices open to graziers were to provide watering points and fences and to transfer stock as the need arose.

Mr. Perry said that sound grazing management meant striking a balance between the use of the rangelands resources and the maintenance of permanent productivity.



Above: Mr. T. Nicholls, a plant ecologist with the Northern Territory Administration, uses a neutron moisture meter to measure soil water in Mitchell grass country near Alice Springs. This is part of a collaborative study by CSIRO and the Administration.

Science Survey

The Minister for Education and Science, Mr. Fraser, announced last month that the Science Branch of the Department of Education and Science will compile a record of all scientific research being undertaken in Australia.

The Branch will gather information on all expenditure on science and scientific research in both the public and private sectors.

Research in the social sciences and the humanities will also be included.

Dr. R. I. Garrod of the Department of Supply has been appointed Officer-in-Charge of the Science Branch and will take up his new duties in July.

Dr. Garrod's own research has been in the fields of X-ray diffraction, electron diffraction, and electron microscopy.

Since 1966 he has been Defence, Research, and Development Attaché for the Department of Supply in Washington.

Competition

The A.C.T. Group of the Royal Institute of Public Administration is conducting an essay competition to encourage research in public administration in Australia. Essays should be between 3,000 and 8,000 words in length. Entries close on 31st October. Further details may be obtained from the Editor of Coresearch, 314 Albert Street, East Melbourne.

Mr. A. V. Hill retired from the Division of Plant Industry last April after more than thirty-eight years' service with the Organization. A world authority on blue mould in tobacco, Mr. Hill was a member of the research team which in 1935 showed the effectiveness of benzol vapour in controlling blue mould in tobacco seedbeds. More recently he has played a significant role in breeding blue mould resistant varieties of tobacco.

Above: Mr. Hill watches as Miss Annette Muller of the Division of Plant Industry presents a bouquet of flowers to Mrs. Hill at a farewell ceremony arranged by the Division in Mr. Hill's honour.

OBITUARIES

Dr. G. E. Cunningham of the Division of Food Preservation died last April after several years of ill-health.

Dr. Cunningham joined the Division as its Editor in 1963 after wide experience in industrial research, particularly in the leather industry.

Mr. K. J. Heffernan of the Division of Radiophysics was killed by a car in Hobart last month.

Mr. Heffernan joined the Division in 1944 and has worked mainly in the field of cloud seeding and rain physics, particularly those aspects of the work which involved aircraft.

Visitors

Dr. B. C. Nelson of the Division of Parasitology, University of California, is spending a year at the McMaster Laboratory of the Division of Animal Health on a National Institute of Health Post-Doctoral Fellowship. Dr. Nelson will study the feeding and reproductive adaptations of bird lice.

Dr. R. Roth of the Institute of Meteorology, University of Munich, is spending twelve months with the Division of Meteorological Physics working on atmospheric turbulence.

News In Brief

Professor

Dr. S. J. Leach of the Division of Protein Chemistry has been appointed to a Chair of Biochemistry at the University of Melbourne.

Doctorate

Dr. J. S. Shannon of the Division of Entomology has been awarded the degree of Doctor of Science by the University of Adelaide for his work on the application of mass spectrometry to chemical structural problems.

Glider

Mr. C. E. Wallington of the Division of Computing Research left last month for Lezno, Poland, as a member of the 12-man Australian team which will take part in the World Gliding Championships.

Mr. Wallington was a member of the British gliding team from 1954 to 1964 before coming to Australia in 1966.

His book on meteorology for glider pilots has been the standard work for world gliding for the last seven years, and in 1965 he was awarded an international prize for his contributions to the science of gliding flight.

Commonwealth Extension Grant

Dr. R. N. Farquhar of the Head Office Agricultural and Biological Sciences Branch has been appointed to the Extension Services Division of the Department of Primary Industry, where he will be concerned with the administration of Commonwealth Grants for agricultural extension and regional research.

Goldacre Award

Dr. R. Smillie of the Division of Food Preservation has been awarded the P. L. Goldacre Award by the Australian Society of Plant Physiologists for his work on the biochemical events involved in the development and functioning of chloroplasts.

The Award honours the memory of the late Dr. P. L. Goldacre who was an officer of the Division of Plant Industry prior to his death in 1960.

SAFETY NOTES

Bald On Top

What to do? Replace a worn tyre with a new one, or get a retread?

Expert advice has enumerated the following points, which will be of interest to private motorists.

Standard tyres are rated at approximately 80 m.p.h. when new. Tyres whose walls are in good condition and no more than two years old, can be retreaded. The vehicle speed using retreaded standard tyres should not exceed 65 m.p.h.

Retreads cost about half the price of a new tyre, but give only about half the mileage.

Radial ply tyres can be retreaded, but the maximum speed of the retreaded tyre should not exceed 80 m.p.h.

If you like to travel in safety, buy new tyres if you can afford them. Can you afford not to?

Drivers of pool vehicles should note that some vehicles are fitted with retreads.

It is wise to check the tyres of these vehicles, as a retread was "thrown" recently on a vehicle being taken on a field trip.

Safety Record

Congratulations to the Division of Textile Industry, which last month was presented with an Award of Merit by the National Safety Council of Australia. The award was made following the completion of 100,000 working hours without a lost time accident.

J. W. Hallam, Safety Officer.

Overseas Visits

Dr. K. Baird of the Division of Textile Industry left recently on a seven week visit to South Africa, Britain, Europe and the United States to hold discussions on woven and knitted fabrics and the technical promotion programme of the International Wool Secretariat.

Dr. C. F. Bruce of the Division of Applied Physics leaves this month on a three month visit to Russia, Britain, Europe and the United States, to visit national laboratories and discuss interferometry.

Mr. V. D. Burgmann, Chief of the Division of Textile Physics, left recently on a six week visit to Britain, Europe, the United States and Japan. Mr. Burgmann will attend an International Wool Secretariat meeting in London and visit wool research centres.

Dr. B. Dawson of the Division of Chemical Physics leaves later this month to deliver the opening lecture at the International Union of Crystallography meeting at Cambridge and to give an invited lecture at the Summer School on Elastic Neutron Scattering, Harwell. He will visit research institutes in Europe and the United States before returning in early August.

Dr. M. Lipson, Chief of the Division of Textile Industry, left recently to attend a meeting of the International Wool Secretariat in Britain and to visit wool research laboratories in Russia, Poland, Czechoslovakia and the United States. He will return in July.

Dr. A. McL. Mathieson of the Division of Chemical Physics leaves later this month to deliver a lecture at the International Union of Crystallography meeting, Cambridge, and to attend the 5th International Symposium on the Chemistry of Natural Products, London. He will visit laboratories in Europe and the United States before returning in mid August.

Dr. M. F. R. Mulcahy of the Division of Mineral Chemistry leaves this month to attend the 7th International Conference on Coal Science, Prague, to read papers at the International Symposium on Combustion, Poitiers, and the 7th World Power Conference, Moscow, and to visit laboratories in Britain, Europe and the United States. He will return in mid-September.

Dr. J. R. Price of the Executive left recently to attend an IUPAC Symposium on the Chemistry of Natural Products in London. He will visit the United States before returning in mid-July.

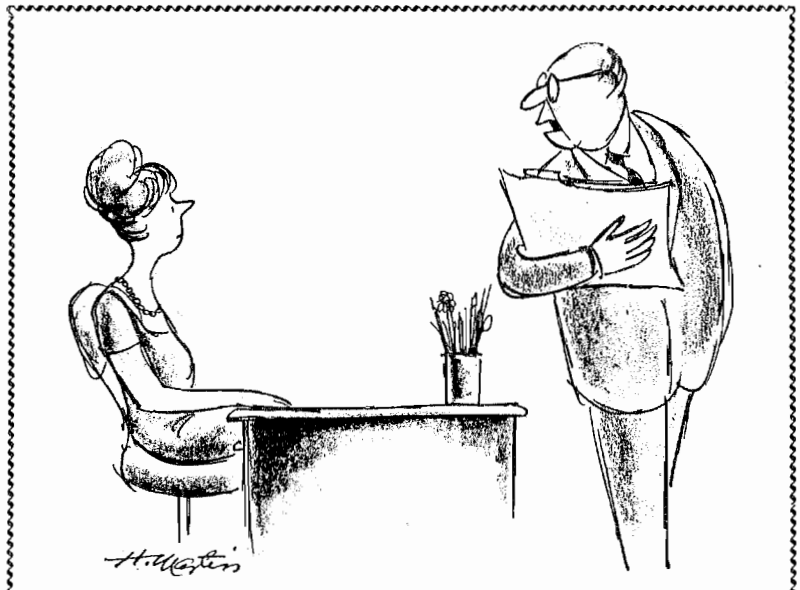
Dr. C. M. Stewart of the Division of Forest Products left recently to attend the IUPAC 5th International Symposium on Chemistry of Natural Products, London, and the IUPAC International Symposium on Macromolecular Chemistry, Toronto. He will visit research laboratories in Britain, Europe and the United States and will return in early November.

Dr. R. W. Taylor of the Division of Entomology left last month to attend the XIIIth International Congress of Entomology, Moscow, and to visit museums in Malaya, Europe, Britain and Africa. He will return in November.

Mr. A. M. Thompson of the Division of Applied Physics will leave later this month to attend a Conference on Precision Electromagnetic Measurements, Boulder, Colorado, and to deliver two lectures to the Technical University in Hanover. He will visit research centres in the United States, Britain, Europe and Russia, Japan and China, before returning in November.

Mr. M. M. H. Wallace of the Division of Entomology leaves shortly to spend six months at the Museum National d'Histoire Naturelle, Paris. He will attend the XIIIth International Congress of Entomology, Moscow, in August and visit research centres in India, Europe and Moscow, returning in May next year.

More than 80 different films made by CSIRO's Film Unit are now available from the Film Library at Head Office. According to Film Librarian, Mrs. Marie Bruce (above), schools, technical colleges, universities and film societies account for nearly three-quarters of all loans. The most popular film last year was "Birth of the Red Kangaroo" which was lent 125 times. Other popular films are "Biological Control of Insects" (400 loans in 7 years) and "Window into Space" (150 loans in 2 years).



"Well, don't just sit there. Xerox something."

Courtesy "New Yorker".

APPOINTMENTS TO STAFF

Mr. J. C. Bowater has been appointed to the Division of Mineral Chemistry where he will be concerned with the fabrication and operation of a small pilot plant for the pressure leaching of metallic sulphides. Mr. Bowater graduated B.Sc. from the University of Melbourne last year.

Mr. R. N. Caffin has been appointed to the Division of Textile Physics where he will work on the development of instrumentation for wool testing. Mr. Caffin graduated B.Sc. from the University of Melbourne in 1965 and M.Sc. from the same University in 1967.

Dr. W. A. Denne has joined the Division of Chemical Physics to carry out research on X-ray diffraction. Dr. Denne graduated B.Sc. from the University of Birmingham in 1963 and Ph.D. from the University of Lancaster in 1966.

Mr. M. Druhala has joined the Division of Textile Physics and will work on the development of new and improved techniques of measuring wool fibres. Mr. Druhala graduated B.Sc. with honours from the University of New South Wales last year.

Dr. P. J. M. Greenslade has joined the Division of Soils where he will carry out research on the role of ants in soil formation. Dr. Greenslade graduated B.A. from the University of Cambridge in 1958 and M.A. from the same University in 1963. He obtained his Ph.D. from the Imperial College in 1961. From 1961 to 1966 Dr. Greenslade worked with the Department of Agriculture in the British Solomon Islands and for the last two years he has been working at the British Museum.

Dr. R. Hamond has been appointed to the Division of Fisheries and Oceanography where he will carry out research on zooplankton. Dr. Hamond graduated B.Sc. with honours from the University of London in 1959 and Ph.D. from the same university in 1968.

Dr. D. A. Ledward has joined the Division of Food Preservation where he will carry out research on the colour of meat and meat products, and the changes in pigments during processing and storage. Dr. Ledward graduated B.Sc. with honours from the University of Leeds in 1964 and Ph.D. from the same university in 1968.

Miss Kay Lehmann has been appointed to the Division of Animal Physiology where she will study the nutrition and reproduction of cattle on tropical pastures. Miss Lehmann graduated B.Agr.Sc. from the University of Queensland last year.

Dr. Mary McClain has joined the Division of Animal Genetics where she will carry out research on RNA virus genetics in the general field of translation of genetic information. Dr. McClain graduated B.A. from the University of California in 1942 and Ph.D. from Columbia University in 1951. From 1961 to 1963 she was a research fellow at the John Curtin School for Medical Research at the Australian National University, and since 1964 she has been with the California State Department of Public Health.

Miss Barbara Nairn has been appointed to the Division of Applied Chemistry and will work at the Microanalytical Laboratory on the development of new techniques and functional methods of microanalysis, particularly in the fields of organo-metallic chemistry. Miss Nairn graduated B.Sc. from Monash University in 1967.

Mrs. Sabita Roy has joined the Division of Entomology where she will be concerned with research on the ecology of orchard insects. Mrs. Roy graduated M.Sc. from Andhra University, India, in 1959. From 1960 to 1967 she was head of the Department of Botany at St. Joseph's College for Women, Walton, India.

Mr. A. Volframs has been appointed to the Division of Mineral Chemistry where he will study minerals and carbonaceous materials by electron microscopy and electron diffraction. Mr. Volframs graduated B.Sc. with honours from the University of Tasmania in 1966 and for the last year has been working as a geophysicist with the Bureau of Mineral Resources.

YOU'RE ALL RIGHT JACK

Writing as one who monthly dotes
On Mr. Hallam's Safety Notes
Which call on all to use their brains
Avoiding falls and burns and strains.

And lists each pitfall, trap and snare
Which lurks to catch the unaware.
Well reading down his ample list,
There's not a lot that he has missed.

It's always easy to acquire
Complacent attitudes to fire.
And there are those who end their days,
If not in glory, in a blaze.

We all have heard of blokes who're sadder
They climbed a badly angled ladder.
And though insured against a fall
Their widows will collect it all.

How many men have bit the dirt
Distracted by a mini-skirt?
If you'd avoid this bitter price
Pay heed to Hallam's sage advice.

That way you'll stay in circulation
To draw your superannuation.
And bless those timely little quotes
In Coresearch's Safety Notes.

Hugh M. Currie, Forest Products.

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 112, MELBOURNE, JULY 1968

NEW BILL PASSED

Last month Parliament passed a Bill to amend the Science and Industry Research Act. The main purpose of the Bill is to provide CSIRO with more appropriate financial provisions than those which have applied in the past.

Ever since the first Science and Industry Research Act was passed in 1926, doubts have existed as to whether CSIRO was subject to all the provisions of the Commonwealth Audit Act and Treasury Regulations. This was because the financial clauses in the Act were inconsistent with the Organization's status as a corporate body with independent legal status.

In earlier years both Treasury and Audit officials were inclined to argue that CSIRO was obliged to apply to its activities all the detailed controls outlined in the Treasury Regulations and Directions.

During an enquiry by the Parliamentary Accounts Committee in 1957 an opportunity occurred to refer to CSIRO's peculiar financial situation.

From that time onward the Chairman and senior members of the Finance Section have campaigned to have the financial sections of the Science and Industry Research Act amended.

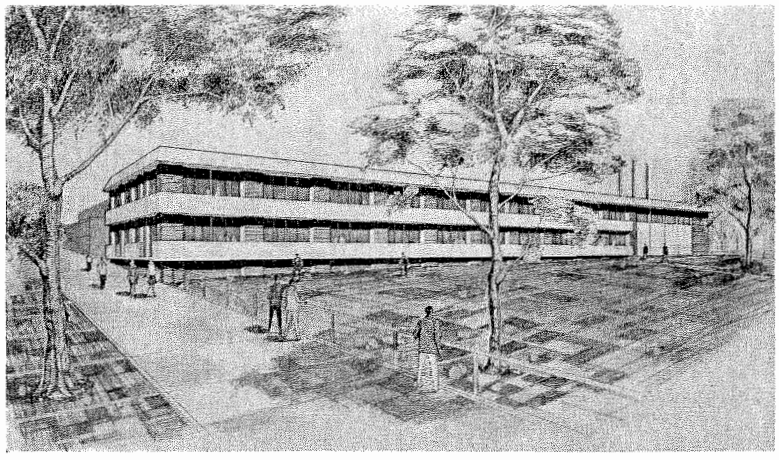
In the new Bill, CSIRO's financial provisions have been completely re-written and the Auditor-General's responsibilities have been explained in greater detail.

The practical effects of these changes are:

- CSIRO now operates its own bank accounts with the Reserve Bank of Australia in Brisbane, Sydney, Canberra and Melbourne.
- CSIRO can issue its own cheques. In the past this work has been undertaken on behalf of the Organization by the Commonwealth Sub-Treasuries in each State.
- The Science and Industry Trust Account established by the 1926 Act has been repealed.
- CSIRO's Estimates will, in future, appear as a one-line entry in the Appropriation Act and supporting details will be shown elsewhere in the budget papers.
- CSIRO will lay down its own financial regulations. These must, of course, be satisfactory to the Auditor-General.

In addition to the above changes, the Bill increases the quorum of the Advisory Council to twelve and allows the Executive to appoint, without Ministerial approval, persons whose salary does not exceed $10,073.

The Bill also permits the Executive, with the approval of the Minister, to appoint in exceptional cases a senior scientist who does not meet the normal requirements of physical fitness.



Above is an architect's impression of a new extension to be built for the Division of Textile Industry at Geelong. The building will cost in the vicinity of $130,000. Finance will be provided by the Australian Wool Board. The two-storey extension will have a total floor area of about 11,000 square feet and will house a boiler room together with pilot plant and laboratories for research on wet and dry finishing processes of wool including continuous dyeing, piece scouring, and flame singeing.

Tenders for the building are expected to be let this month and construction should be completed by early next year. Consultant Architects for the project are Peter T. Goodman and Associates and Consulting Engineer is Harold L. Evans.

OVERSEAS VISITS

Dr. M. Anson of the Division of Building Research left recently for Britain. Dr. Anson will spend nine months at the University of Lancaster working on the evaluation of alternative town planning layouts. He will also visit building research laboratories in Britain, Israel and North America.

Mr. J. G. Bolton of the Division of Radiophysics left last month for the United States to spend four and a half months at the Mt. Palomar and Lick Observatories. Mr. Bolton will attend a symposium in Trieste on contemporary physics and a symposium in Austin, Texas, on relativistic astrophysics.

Dr. E. L. French, Assistant Chief of the Division of Animal Health, leaves this month for South Africa, Europe, Britain, the United States and New Zealand, where he will spend five months visiting veterinary research institutes.

Dr. J. L. Madden of the Division of Entomology left last month for Russia, Poland, Czechoslovakia, Germany, Britain, North America, Italy and India. Dr. Madden will visit entomological research centres and attend the 13th International Congress of Entomology at Moscow before returning to Australia next October.

Miss Helen Newton Turner of the Division of Animal Genetics will attend the 2nd World Conference on Animal Production in Washington this month and the 12th International Congress on Genetics in Tokyo. Miss Turner will also visit laboratories in the United States and Britain before returning in late September.

Mr. J. W. P. Nicholls of the Division of Forest Products leaves shortly on a four-month visit to New Zealand, the United States, Britain, Europe and Japan. Mr. Nicholls will study wood quality assessment in forest tree improvement programmes.

Dr. A. Walsh, Assistant Chief of the Division of Chemical Physics, left last month for the United States to present a paper on physical aspects of atomic absorption at the 71st Annual Meeting of the American Society for Testing Materials. Dr. Walsh will visit laboratories in the United States, Britain, Ireland and South Africa before returning later this month.

Mr. J. Warner of the Division of Radiophysics leaves shortly for North America where he will attend conferences on radar meteorology, cloud physics, and atmospheric turbulence. Mr. Warner will also visit laboratories in the United States, Britain, India and Japan before returning in October.

Courtesy the Melbourne "Sun".

Clunies Ross House, incorporating the National Science Centre, was opened on 30th May by His Royal Highness Prince Philip, Duke of Edinburgh. Prince Philip is Patron of the Clunies Ross Foundation which was established nine years ago to commemorate the late Sir Ian Clunies Ross, Chairman of CSIRO from 1949 to 1959. Our picture shows Prince Philip with the Secretary of the Foundation, Mr. J. Cummins, in front of a mural depicting the life and work of Sir Ian. The mural, which stands in the foyer of the building, was commissioned by the Australian Veterinary Association and was painted by Robert Ingpen of Head Office.

News In Brief

Rivett Medal

Dr. F. J. Bergersen of the Division of Plant Industry has been awarded the David Rivett Medal of the CSIRO Officers' Association for his research on nitrogen fixation in legumes.

The award, which is made every second year, was established by the Association in 1964 in honour of the late Sir David Rivett who was Chief Executive Officer and later Chairman of CSIR.

Doctorate

Mr. B. Derbyshire, who joined the Division of Irrigation Research earlier this year, has been awarded the degree of Ph.D. by the University of Tasmania.

Farrer Oration

Dr. E. M. Hutton, Assistant Chief of the Division of Tropical Pastures, delivered the 1968 Farrer Memorial Oration last month at the University of Sydney. He spoke on 'Australia's Pasture Legumes'.

Book Award

The "Building Science Forum of Australia Book Award" has been awarded to Mr. W. H. Taylor of the Division of Building Research for his best-seller, "Concrete Technology and Practice". The presentation was made last month in Sydney during a conference on "Building for Function and Profit".

SAFETY NOTES

Cut It Out

The following extract is from a recent accident report:

How did the accident happen? While carrying a 10 litre glass aspirator filled with distilled water from building X to building Y, I accidently stepped into a shallow gutter outside the entrance-way and tripped. I fell with the aspirator in my hands.

Nature of injury: Lacerations to left and right arms, requiring the insertion of 12 stitches.

Large glass containers such as aspirators, carboys and winchesters should always be transported in a suitable protective carrier. Use cane or wire baskets for larger containers and winchester carriers for smaller vessels.

Is it really necessary to carry distilled water in bulk from one building to another? Please consider the installation of a still or pipeline to the point being serviced.

Central Heating

Central heating is a highly desirable installation in the workshop area, but not in the form recently experienced by one workshop. On this occasion, the fusible plug in an acetylene cylinder 'blew', and I understand the resulting fire was both spectacular and severe.

Apparently the cause was a slight leak in one of the fusible plugs. This formed a 'pilot' light, which in turn fused the first and then the second plug and discharged the cylinder's contents to the atmosphere.

Leakages at fusible plugs are not as rare as some people think, and I would strongly recommend testing cylinder plugs for leakage with detergent or soapy water on delivery.

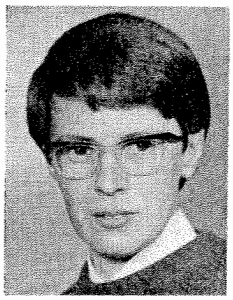
J. W. Hallam, Safety Officer.

New Appointees

Mr. I. A. Barger has been appointed to the Division of Animal Physiology and will work at the Pastoral Research Laboratory, Armidale, on the effect of internal parasites on the production of wool and meat by sheep.

Mr. Barger graduated B.Agr.Sc. from the University of Melbourne in 1963. He obtained his Diploma in Education the following year and since then has been teaching with the Victorian Education Department.

Dr. Elizabeth Bradford has joined the Division of Plant Industry and will work on quantitative aspects of methodology. Dr. Bradford graduated B.Sc. with honours from the University of Queensland in



Dr. Elizabeth BRADFORD

1958 and Ph.D. from the Australian National University in 1952. Since 1963 she has been research fellow with the theoretical physics division of the Atomic Energy Research Establishment at Harwell.

Miss Lynette Chambers has joined the Division of Plant Industry and will work at the Baas-Becking Laboratory on the biochemistry and physiology of microbial sulphur and metallic ion transformations. Miss Chambers graduated B.Sc. from the University of Queensland in 1959 and has spent the last twelve months working at the Baas-Becking Laboratory as a chemist with the Bureau of Mineral Resources.

Mr. J. P. Chesworth has been appointed to the Division of Radiophysics as station engineer at the Australian National Radio Astronomy Observatory, Parkes. Mr. Chesworth was elected an Associate Member of the Institution of Mechanical Engineers (London) in 1960. From 1953 to 1965 he worked with the British Atomic Energy Research Establishment, and since then he has been working with the Australian Atomic Energy Commission.

Dr. T. G. Corbett has been appointed to the Industrial and Physical Sciences Branch at Head Office, where he will be responsible for aspects of the Branch's work on patents and the maintenance of close liaison with research staff and patent attorneys. Dr. Corbett graduated M.Sc. from the Victoria University of Wellington in 1957, and Ph.D. from the University of Melbourne in 1964. Since 1962 Dr. Corbett has been working with Davies and Collison, Patent Attorneys.

Mr. J. I. Gosling has joined the Division of Applied Physics where he will be concerned with the development of a long range mercury pressure standard, with techniques for measuring high vacuum, and with the calibration of vacuum measuring instruments. Mr. Gosling obtained his Diploma of Applied Physics from the Royal Melbourne Institute of Technology in 1963, and for the last eight years has been working with the Defence Standards Laboratories of the Department of Supply.

Mr. R. J. Grognard has been appointed to the Division of Radiophysics and will work on the design and development of equipment for the radioheliograph. Mr. Grognard graduated in applied science from the University of Liege, Belgium, in 1965.

Mr. K. A. Harley has joined the Division of Textile Physics where he will work on the development of instruments and machines for the sampling and testing of wool. Mr. Harley graduated B.Sc. from the University of Sydney in 1947, and B.E. from the same University in 1949. Since 1954, he has been working with the firm of Norton Australia Pty. Ltd.

Dr. M. A. White has joined the Division of Textile Industry where he will work on wool dyeing. Dr. White graduated B.Sc. with honours from the University of New South Wales in 1962, M.Sc. from the Lowell Institute of Technology,

Dr. M. A. WHITE

United States, in 1963, and Ph.D. from the University of Leeds in 1968.

Mr. H. G. Mackenzie has joined the Division of Computing Research where he will act as a consultant to computer users and investigate new techniques for using the Division's computing equipment. Since graduating B.Sc. from the University of Sydney in 1965, Mr. Mackenzie has been working with the Commonwealth Department of Health as a computer programmer.

Mr. T. E. Norgate has been appointed to the Division of Chemical Engineering where he will study heat and mass transfer in fat rendering plants. Mr. Norgate obtained his Diploma of Applied Chemistry from Footscray Technical College in 1964 and has spent the last two years with I.C.I.A.N.Z.

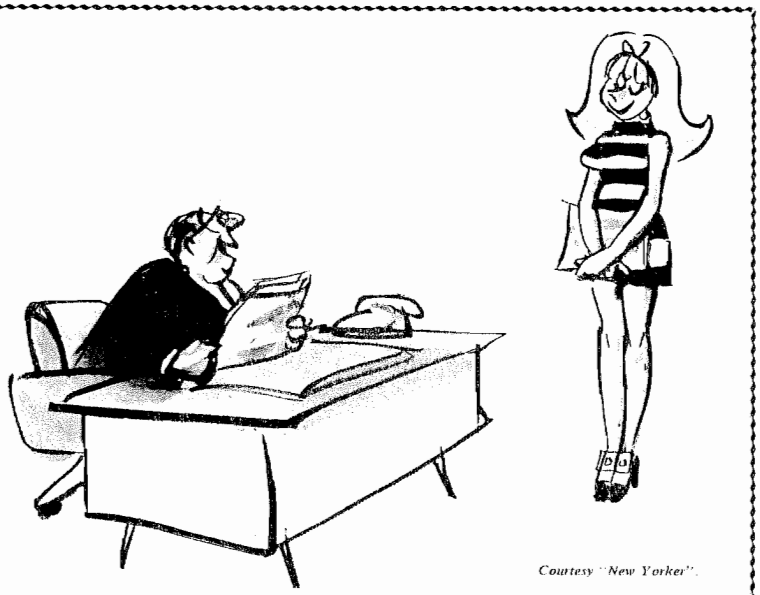
Dr. R. J. Park has joined the Division of Food Preservation where he will study chemical changes in meats during processing and storage. Dr. Park graduated B.Sc. with honours from the University of Queensland in 1962 and Ph.D. from the same university in 1966. Since 1955 he has been working with the Dairy Research Branch of the Queensland Department of Primary Industries on off-flavours in dairy products.

Dr. B. D. Patterson has been appointed to the Division of Food Preservation where he will study the initial stages of senescence of leaves and ripening of fruit. Dr. Patterson graduated B.Sc. from the University of Leeds in 1961 and Ph.D. from the same university in 1964. Since then he has been carrying out research at the School of Biological Science, University of East Anglia.

Mr. K. C. Richardson has been appointed to the Division of Food Preservation to provide liaison between the Division and the Australian food industry. After graduating B.Sc. from the University of Queensland in 1961, Mr. Richardson spent five years with the Food Preservation Research Laboratory of the Queensland Department of Primary Industries before joining Petersville Aust. Ltd. as a microbiologist.

Twenty-year-old Faye Keam (her middle name's Georgie) is entering this year's Miss Australia Contest as Miss CSIRO. Faye works at the Chemical Research Laboratories, Melbourne, as Secretary to the Administrative Officer, Mr. K. J. Fogarty. Her hobbies include squash, golf, skiing, surfing and dress-making. She is also devoted to football (Australian Rules, of course) but prefers watching to playing.

The aim of the Miss Australia Contest is to raise money for the Australian Cerebral Palsy Association which helps spastics. Mr. Fogarty is attending to the financial side of Faye's fund-raising activities and would be happy to receive any donations. He would also like to hear from the Secretaries of any of CSIRO's Social Committees who are interested in supporting Faye in her good work.



Courtesy "New Yorker".

"May I say, Miss Fulmer, that this data is very nicely processed."

INTERCESSION FOR CELIA

(Tune: Drink to me only . . .)

'Recent work in America has shown that the eye can play a sinister role — that of a repository and incubator of disease organisms. Dr. Jerome Goldman . . . told a meeting of ophthalmologists . . . that the antibiotic might have some difficulty . . . passing into the eye from the bloodstream. In addition the temperature at the centre of the vitreous humour is as much as nine degrees F. below the rest of the body, and the fluid in the eye is lacking in oxygen. Such conditions provide an ideal breeding ground for organisms . . . which prefer anaerobic conditions.'

New Scientist, 11 January, 1968.

Forgive, if Celia does not drink
The toast which you besought her.
An ophthalmologist, I think,
Has turned her wine to water;
Pronounced each eye a putrid pool —
A wild, infected waste —
Which only an unlettered fool
Would be prepared to taste.

Behind the lens within a gloom,
Aqueous and anaerobic,
Nestles a lethal little room,
Chilly and claustrophobic
(Lacks nine degrees of fahrenheit —
Though less in centigrade?),
Where happy pathogens sleep tight
Like shepherds in a shade.

Though, when she gazes in your eyes,
Of something she must think
Don't ask for fear the wench replies,
'The trap beneath the sink'.
And please, not pledge with dregs like these
But, neighbour-like, sniff twice
And so avoid immense disease
At little sacrifice.

If drink you must, my thirsty pet,
Her kiss within your glass
Is somewhat of a better bet
Though not a cert alas:
I beg you, take a tip from me:—
When seeking the sublime
Forget divine economy
And buy the girl some wine.

Marjory O'Dea, Special Assistant to the Chief, Division of Plant Industry.

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 113, MELBOURNE, AUGUST 1968

AID FOR CEYLON

In the last nine months, Community Aid Abroad groups at Head Office and at the Division of Forest Products and Textile Industry have raised nearly $1600 to help an agricultural colony at Pahariya in north-western Ceylon.

There are about 140 families settled at the colony although many of the inhabitants have not brought their wives or children to stay with them because of insufficient housing and lack of facilities.

An irrigation project to help them has been drawn up for CAA with advice from Government agricultural officers.

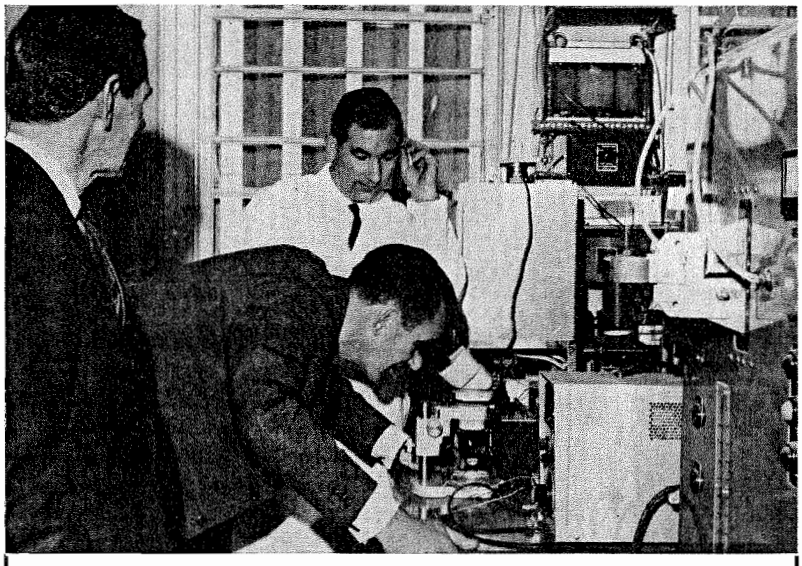
The project involves growing groundnuts, chillies, mustard, onions and vegetables. The people in the settlement will provide the necessary labour for implementing the project and the work will be supervised by a Japanese agricultural graduate who is a volunteer from Service Civil International.

It is expected that the project will help nearly 1000 people by providing higher incomes from the sale of crops.

Originally the CSIRO-CAA groups intended raising $2,200 to enable the people of the colony to buy the necessary irrigation equipment.

However, a CAA group in Canberra (not a CSIRO group) has joined the project and has provided the other $1,200.

Because of the decision taken by Ceylon last year to devalue her currency, it was decided to send aid in the form of equipment from Australia rather than as money.



Last June, the Minister for Education and Science, Mr. M. Fraser, visited the Division of Mineral Chemistry in Melbourne to see something of the Division's research. The Minister is seen here examining crystals of alkali titanates under a microscope. With him are the Chief of the Division, Mr. I. E. Newnham (left), and Dr. A. F. Reid.

Farrer Oration

Legume-based pastures were the key to unlock the vast potential of pastoral development in both southern and northern areas of Australia, Dr. E. M. Hutton, Assistant Chief of the Division of Tropical Pastures, said in Sydney last June.

Dr. Hutton, the 1968 Farrer Medallist, was presenting his Farrer Memorial Oration at the University of Sydney.

He said Australia's pasture legumes had had and would continue to have a tremendous impact on the country's prosperity because of their ability to provide cheap nitrogen in pastures.

These legumes could also make a significant contribution to the development of emerging countries where fertilisers, particularly nitrogen, were expensive.

It had been calculated that 10 per cent of the tropics was cropped, 20 per cent used for pastures, and 35 per cent occupied by forests, with the rest being waste land.

Dr. Hutton said the key to economic development in the tropics was legume-based pastures adequately fertilised with super and minor elements.

Following this, numbers and productivity of cattle would rise markedly and vital meat and milk would be cheaper and more readily available.

Conservation Foundation

The Australian Conservation Foundation is advertising for a Director to replace Dr. D. F. McMichael, who is shortly to take up the position of Director of National Parks and Wildlife in New South Wales.

The Foundation has had close links with CSIRO since it was established two or three years ago to foster the understanding and practice of conservation throughout Australia and its territories.

The idea of setting up a non-Governmental body of this kind stemmed from a small group of scientists and businessmen that was convened in 1963 to consider the practicability and desirability of Australia becoming a contributing member of the World Wildlife Fund.

It was decided that efforts should be concentrated first on the support of worthwhile conservation moves here in Australia, where there was an obvious need for a well organized body to speak for the people as a whole on conservation issues.

Dr. M. F. Day of the Executive; Dr. H. J. Frith, Chief of the Division of Wildlife Research; and Dr. F. N. Ratcliffe, Assistant Chief of the Division of Entomology, were members of the committee which brought the Foundation into being.

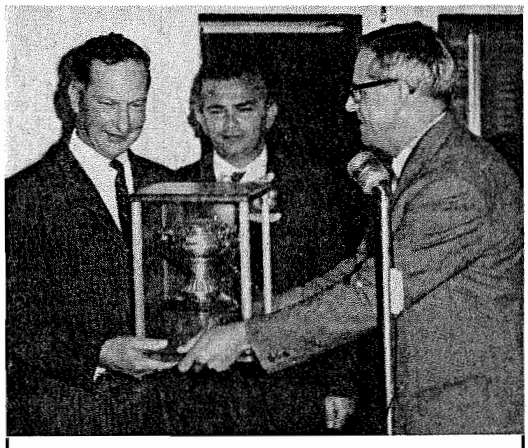
In addition to these three, the following CSIRO officers are members of the Foundation's Council—Dr. Nancy Burbidge, Dr. A. B. Costin and Dr. L. J. Webb (Division of Plant Industry), Dr. B. R. Grant (Division of Fisheries and Oceanography), and Dr. D. L. Serventy (Division of Wildlife Research).

The Conservation Foundation, as a private body that lacks executive power, has to achieve its objects by persuasion and education.

It is setting out to influence policy through recommendations and criticisms that are responsible, objective and knowledgeable, recognizing both the need for development and for preservation.

The position of Director of the Foundation is being advertised at a salary of $9000. Although the closing date is given as 1st August, applications received shortly after that will be considered. Anyone interested should contact the Foundation's Honorary Secretary, Dr. F. N. Ratcliffe, at the Division of Entomology, Canberra.

Any members of CSIRO who wish to support the Foundation by enrolling as members should write to either Dr. Ratcliffe or Dr. McMichael (P.O. Box 91, Eastwood, N.S.W. 2122) for application forms and explanatory literature.



Some 104 competitors including 14 teams from nine CSIRO Divisions and five timber industry organizations took part in the 1968 Division of Forest Products Annual Golf Day at Patterson River Country Club near Melbourne last June. The DFP (Muncey) Cup was won by the Soil Mechanics Team captained by the Chief of the Division, Dr. G. D. Aitchison. One of the members of the team, Mr. K. Wenham, also won the competition for nearest to the pin. The George Wright Memorial Trophy was won by Mr. A. Rosel and Mr. T. Hilton of Forest Products. Our picture shows Dr. W. G. Kauman (right), Assistant Chief of the Division of Forest Products, presenting the Muncey Cup to Dr. Aitchison. Looking on is Mr. A. Stashevski who organized the golf day.

This month, the Australian Post Office will issue two commemorative postage stamps to mark the occasion of the 9th International Congress of Soil Science, which will be held at the University of Adelaide from August 6th to August 16th, and the General Assembly of World Medical Associations, which will be held in Sydney from August 6th to August 9th.

Both stamps were designed by Mr. R. Ingpen of Head Office. Mr. Ingpen also designed the Gynaecology Congress stamp which was issued last year, and the INTELSTAT II stamp issued earlier this year.

The two stamps will be printed within the same sheet; 50 Soil Science stamps and 50 Medical Assembly stamps, in two separate panes will make up a full sheet of 100 stamps.

SAFETY NOTES

SIRO-limpics

Would those members of the staff who did not make the Olympic team in either the high jump or hurdles kindly refrain from practising during working hours.

Two aspirants recently came to grief while leaping over a fence, instead of using the gate or quietly climbing over.

One case resulted in an absence from work for 6 weeks! Leaping over a fence particularly a barbed wire one, can be spectacular, even more so if you don't quite make it.

Camouflaged

One of our regional laboratories recently purchased a Mini Moke. Drivers of this vehicle noted that oncoming drivers did not appear to see them until almost the last moment.

The standard colour of the Mini Moke is dull green, and together with its rather low profile, this vehicle blends in well with the bush on country roads.

The laboratory painted some of the frontal areas with bright yellow fluorescent paint, and the vehicle is now clearly visible to other road users.

Most of our field vehicles are finished in this same dull green paint. The use of the above idea is well worth your consideration.

For those people who take these vehicles "off the beaten track", it also makes them easier to find.

J. W. Hallam, Safety Officer.

FUTURE FOODS

The phrase "foods of the future" carries with it the implication that they are likely to differ in some way from "foods of the past."

Indeed it is interesting to speculate briefly on just what the contents of a talk on foods of the past might be.

Much of the talk would probably be devoted to food quality and topics would include:

- the use of spices to disguise advanced decomposition of meats.
- the use of food additives now regarded with disfavour such as sand, copper and lead salts, sulphuric acid and arsenic.
- the very interesting trade between different parts of Europe, and even across the Atlantic, in ice sawn from the surface of ponds and rivers.
- the economics of distribution with only the most primitive bulk packaging.

This article is based on a talk which Mr. M. V. Tracey, Chief of the Division of Food Preservation, delivered at the 2nd Annual Convention of the Australian Institute of Food Science and Technology in Sydney last June.

Little, however, could be said about the introduction of new foods apart from the spread of staple foods between cultures such as was seen with potato, maize, wheat and many fruits.

There may be a useful lesson for the future in the fact that the tomato on its introduction into Elizabethan England was called the love apple and widely credited with aphrodisiac properties. It is possible that this myth influenced its acceptance considerably.

The main past changes in the food industry have been the result of the spread of old foods to new markets and increased sophistication in their presentation.

An English dictionary of 1793 gives as sole meaning for sophisticate "to debase, corrupt or spoil liquors, etc., by mingling" and for sophistication "an adulteration or falsifying".

Thus improving bread by the addition of white lead used to be called sophistication.

A wide range of foods can now be offered to the consumer from all quarters of the globe in a form which can be stored and transported with little loss of quality but, while new forms of old foods have been introduced and are being introduced, intrinsically new foods are still largely a subject of speculation.

Now, as in the past, much of the human race goes short of food and the projections of the demographers suggest that the Malthusian spectre, however often it has been exorcised in the past by agricultural and technological advances, is still with us and may plague us increasingly in the future.

The race between an expanding population and our ability to produce more food continues, with demand in large areas of the earth always ahead of supply.

Many believe that the traditional forms of food production cannot either overtake demand or even maintain the present unsatisfactory balance. Others, Colin Clark in particular, argue that this is not so.

More and more a way out of this predicted global impasse is being sought by considering the development and introduction of radically new sources of food rather than by the expansion of present sources.

Many writers have suggested synthetic food taken in the form of pills.

However, there is no way past the fact that man needs a source of energy to live and that this energy can only come from the oxidation of carbon compounds.

If he requires 2,500 cals a day to live then about 400g dry weight of food is the minimum amount of a mixed diet of carbohydrates, fats and proteins that is likely to be enough.

Cod liver oil has a higher calorific value than most foods —even so 254g would be needed if it were the sole energy source.

The oxidation of material of higher calorific value such as petrol would only reduce the amount marginally.

If man could oxidise hydrogen efficiently the weight needed would be very greatly reduced —to a mere 73g which unfortunately would occupy 800 litres at normal temperatures and pressures.

So man must have nearly a pound of dry food a day as a minimum, and since he also requires a minimum of a litre of water a day, he might as well eat his food in an attractive wet form rather than as a pound of dry pills.

The possibility that his energy requirements might be supplied directly as ATP, the energy transferring material he makes by the combustion of food, is disposed of by the fact that he synthesises and breaks down his own weight of ATP in a day.

The products of the chemical industry must not be dismissed completely, however, as sources of appreciable amounts of energy.

Among the short chain carbon compounds cheaply available and known to be usable by man for energy are glycerol, ethyl alcohol, malic acid and other related compounds.

If taken throughout the day in small doses ethyl alcohol could well supply some 10-20% of man's energy needs without unduly hampering his activities and perhaps with desirable social effects.

Less is known of the effect of large amounts of glycerol and related compounds but it is reasonable to believe that they might play a useful part in supplementing more usual foods as sources of energy.

With this we can dismiss synthetic foods as a solution with one proviso.

Although a few years ago the possibility of synthetic protein for food would have been dismissed out of hand, there is new evidence to induce some caution in considering their possible role.

It is now known that the polymerisation of mixtures of amino acid derivatives does not result in completely random polypeptides but in a population of molecules with preferred amino acid sequences, some of which have appreciable enzymic properties.

Thus not only is it possible to produce synthetic polypeptides likely to be digestible but it is also possible that they might prove to have undesirable biological properties.

If industrial synthesis seems unlikely to provide, apart from vital components needed in small amounts such as essential amino acids and vitamins, only a small proportion of our food requirements then we must remain in our present position in which we rely on other living things such as plants and animals to do our synthesising for us.

Man is not physiologically adapted to be a vegetarian and from his point of view plants in general suffer from three cardinal disadvantages.

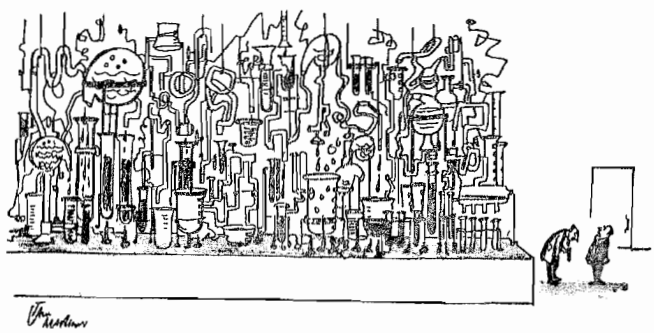
Their cells are normally enclosed in indigestible polysaccharide, their carbon-nitrogen ratio is high, and most do not synthesise vitamin B_{12}.

There are ways of avoiding these disadvantages—cell walls may be broken open by chewing the cud, and the carbon-nitrogen ratio may be reduced to a reasonable level by fermentation in the stomach and belching methane.

Man is not well adapted to either of these ruminant expedients but can do much by carefully selecting the parts of plants he eats. He can eat the wheat seed but not the plant, the coconut but not the palm.

The simplest plants to handle by the methods of biochemical engineering are the unicellular plants such as *Chlorella* and other algae, which have been suggested as a valuable new food.

We know little of their suitability as food for man, apart from reports that the Aztecs relished blue green algae collected from the surface of lakes in Mexico City.



"You mean to tell me Jenkins that after all those days of hope, those countless sleepless nights and those lonely hours of experimentation —all you could produce was a thimbleful of something that tastes like warm beer?"

Courtesy "Saturday Review"

It has been argued, however, that their culture needs a great investment in plant and expert supervision while use of the same amount of incidental sunlight by leafy plants in a field may be as efficient.

In spite of the tastes of the Aztecs the blue green algae, some of which have the notable advantage of being able to fix nitrogen for themselves, are not attractive. They appear to have a remarkably indigestible cell wall and when eaten by fish in Lake Victoria emerge unscathed by their passage through the gut.

It seems therefore that considerable processing would be required to make them digestible and roughage problems could be acute.

Multicellular algae, the sea weeds, have been used for food and are used today on a small scale, but they seem unlikely to become more widely used.

There remain opportunities for transcending man's physiological limitations by processing parts of plants normally rejected as a bulk source of food, in particular leaves and juicy green stalks.

Extensive bruising of leaves or other succulent organs makes it easy to press from them a sap from which a crude protein concentrate can be precipitated by heat or acid.

Pirie has demonstrated the feasibility of this process and trials have shown that the product has a high nutritional value.

Its protein content is at least 70% and its fibre content is low.

It is one of the very few really new foods and possible candidates as foods of the future that have reached the stage of advanced testing in the field.

The non-photosynthetic plants have also to be considered as possible sources of new foods.

Unlike the green plants they need a source of chemical energy in addition to water and inorganic nitrogen and phosphorus.

However, if an energy source is cheap and abundant they can be effective synthesisers of protein, fats and carbohydrates.

They have the advantage that techniques of culture are available on a large scale as a result of development in the fermentation industry.

The fungi are not promising as food owing to their encasement in a peculiarly tough indigestible chitinous cell wall.

The bacteria have also been suggested and some animal trials carried out.

They appear to have the disadvantage in those few instances tested of bulky residual cell walls and a high purine content which might resurrect gout as a common disorder.

Yeasts are currently the subject of intensive research as a new food source, because they will remove from crude oil the undesirable straight chain waxes which are a nuisance to the refiner and not easy to market after their enforced separation from the other fractions.

Extensive trials of yeasts in animal husbandry are beginning and will no doubt be cautiously extended to man in the near future.

We have in the past exploited most sources of animal food but there remain the twenty or so invertebrate phyla to explore as possible new sources.

Now that man has almost exterminated the baleen whale it may be that we shall be able to exploit the whale's crustacean food, krill, for our own benefit.

Fish protein concentrate, I do not regard as a new food for today's purposes, as it was used by the Persians in 325 B.C.

There are many possibilities of developing completely new foods in the future, but the solution to more immediate problems lies in exploiting existing foods. This is because the problems of their production have been largely solved and the vast difficulties of ensuring the acceptance of strange foods can be avoided.

The upgrading of existing foods by supplementation is likely to be the method by which the present and coming problems will be largely solved.

A man or a woman, neither lactating nor bearing a child, can get enough protein from wheat for their needs if they eat enough to satisfy their calorie requirements.

With lysine supplementation wheat is an adequate source of protein and calories for all stages of life.

Supplementation of rice with amino acids will also make it an adequate food.

In some areas where very low protein foods such as cassava are the staple, supplementation with protein such as fish protein concentrate or vegetable seed proteins will be needed as well.

The really new foods are unlikely to make much impact on the problem of quantity though they may have uses as supplements.

If the quality problem is solved, the quantity problem seems best tackled by conventional foods and by reducing losses due to pests during growth and storage.

It will also be greatly eased by using more plant products upgraded to a quality equivalent to that of animal products.

In this way the losses due to conversion of a primary plant product to a secondary animal food will be avoided. These losses are seldom less than 80% and may be more.

Food in the future is unlikely to differ greatly in origin from the foods we eat today but it will be of greatly improved quality and produced more efficiently, stored with fewer losses from pests, and preserved and distributed more widely, and it is hoped more equitably.

News In Brief

Fellow

Dr. E. A. Cornish, Chief of the Division of Mathematical Statistics, has been elected an Honorary Fellow of the Royal Statistical Society.

Director

Dr. H. Lloyd Davies of the Division of Plant Industry has been appointed Director of the M. C. Franklin Meat Laboratory and William Mellwraith Fellow in Animal Nutrition at the University of Sydney.

Gilruth Prize

Dr. D. Murnane, who retired from the Division of Animal Health and Production in 1958, has been awarded the Gilruth Prize of the Australian Veterinary Association for his contributions to veterinary science in Australia.

Doctorates

Dr. F. H. C. Stewart of the Division of Protein Chemistry has been awarded the degree of Doctor of Science by the University of Belfast.

Miss Judith Waltho of the Division of Food Preservation has been awarded the degree of Doctor of Philosophy by the University of Melbourne for her research on bacterial genetics.

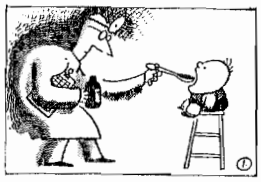
Masters' Degrees

Mr. H. G. Bate of the Division of Food Preservation has been awarded the degree of Master of Engineering Science by the University of Sydney for his work on heat transfer to polymer solutions.

Mr. W. A. Muirhead of the Division of Irrigation Research has been awarded the degree of M.Ag.Sc. by the University of Adelaide for his work on the growth on annuals sown in rice stubble.

Visitor

Professor A. D. Scott of the Iowa State University arrived in Adelaide recently to spend his sabbatical leave with the Division of Soils. Professor Scott will work with the Mineralogy Section of the Division on the release of potassium from micaceous minerals.



Quick Quiz

Q: What is the difference between pure and applied research?

A: Five to seven years.

Lecture Tour

Mr. W. Maier of the Division of Building Research has been invited to undertake a lecture tour of Germany to talk about Australia.

Mr. Maier migrated to Australia from Germany after the war and has been sending back to friends and relatives tapes bearing commentaries on various aspects of life in Australia.

The tapes have been used in German high schools for educational purposes and have been broadcast over the radio.

The Department of Immigration has recognized and supported his activities.

Deadline

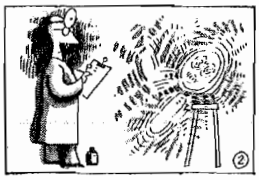
Contributions for the September issue of Coresearch should reach the Editor at 314 Albert Street, East Melbourne, by Wednesday, 14th August.

Last month the Film Unit completed a 40 minute colour film "Soils of Australia", which describes twelve Australian examples of different Great Soil Groups. Each soil group is dealt with in relation to climate, landscape, and land use. The film also describes something of the work which has been carried out over the last forty years to map Australia's soil resources and shows how lack of knowledge of our soils has led to the development of agricultural problems such as erosion and salting. Our picture shows Mr. David Corke of the Film Unit shooting a sequence near Mt. Kosciusko.

Thought for the Month

If the Romans had been obliged to learn Latin, they would never have found time to conquer the world.

Heinrich Heine, 1797-1856

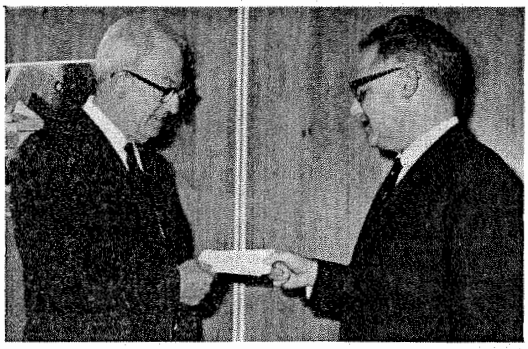


Historic Occasion

Last month, following the recent amendments to the Science and Industry Act, CSIRO drew its first cheque on its own bank account in favour of Sir Frederick White.

Left: The Secretary (Administration), Mr. L. G. Wilson, presenting the cheque to Sir Frederick White.

Below: Mr. R. C. McVilly (left) and Mr. K. L. Hodges of the Head Office Finance Section watch as Miss Marianne Dobin types the first cheque.



OVERSEAS VISITS

Dr. J. L. Brownscombe of the Division of Radiophysics leaves this month for Canada where he will attend an international conference on cloud physics. He will also visit cloud physics laboratories in the United States and Britain before returning in mid-September.

Dr. M. Clowes of the Division of Computing Research leaves shortly for Pisa, Italy, where he will attend the NATO Summer School on Automatic Interpretation and Classification of Images. Dr. Clowes will also visit research centres in Britain and the United States before returning early next month.

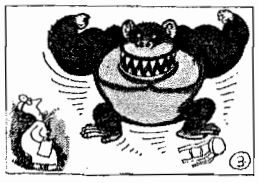
Dr. B. D. H. Latter of the Division of Plant Industry leaves for overseas this month to attend the Twelfth International Congress of Genetics in Tokyo, and the International Conference on Computer Applications in Genetics, Hawaii. Dr. Latter will then spend ten months at Iowa State University working on computer simulation in quantitative genetics.

Mr. L. L. Muller of the Division of Dairy Research will attend the annual meeting of the International Dairy Federation in Moscow next month. He will also study usage problems and quality standards for milk coprecipitates in the United States, Britain, Switzerland, Poland, Thailand and Japan. Mr. Muller will return in mid-October.

Mr. I. J. O'Donnell of the Division of Protein Chemistry leaves this month for the University of Oxford where he will spend a year working on the fractionation and structure determination of immunoglobulins. Mr. O'Donnell will also visit research centres in Europe.

Dr. H. R. C. Pratt, Chief of the Division of Chemical Engineering, will leave this month on a visit to laboratories in Thailand, Britain and North America. He will attend the Tripartite Conference on Chemical Engineering in Montreal before returning at the end of October.

Dr. D. S. Roberts of the Division of Animal Health leaves shortly on a three month visit to New Zealand, the United States, Europe, Britain and South Africa. Dr. Roberts will present a paper at the International Symposium on the Taxonomy of Actinomycetes in East Germany.

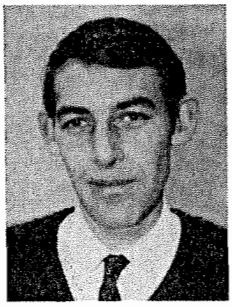


Dr. D. F. Waterhouse, Chief of the Division of Entomology, left recently for Moscow where he will attend the 13th International Congress on Entomology. He will also attend a meeting of an F.A.O. Working Party on Insecticide Resistance, Rome, and visit research centres in Britain, Europe and the United States before returning early next month.

Dr. A. W. Wylie of the Division of Mineral Chemistry leaves shortly on a three month visit to Europe, Britain, the United States and Peru. He will attend the International Symposium on Nuclear Electronics, Paris; an International Conference on Modern Trends in Activation Analysis, Washington; the annual conference of the American Nuclear Society and Atomic Industrial Forum, Washington; and a conference of the International Atomic Energy Agency, Lima.

New Appointees

Mr. J. G. Brown has joined the Agricultural and Biological Sciences Branch at Head Office where he will be concerned with the writing and editing of technical and semi-technical material. After graduating M.Hort.Sc. from the University of Canter-



Mr. J. G. BROWN

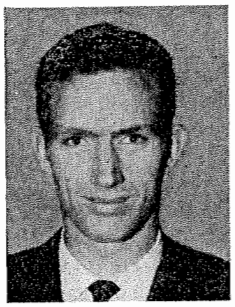
bury in 1963, Mr. Brown worked with the Entomology Division of the D.S.I.R. for eighteen months and then spent a year at the University of Hawaii. For the last two years he has been Science Writer for the New Zealand Herald.

Mr. B. G. Hunt has been appointed to the Division of Meteorological Physics where he will carry out research on the dynamics of the atmosphere. After graduating B.Sc. from the University of Bristol in 1959, Mr. Hunt joined the Weapons Research Establishment of the Department of Supply. He ob-

Mr. B. G. HUNT

tained his M.Sc. from the University of Adelaide in 1965, and then spent 2½ years in the United States at the ESSA Geophysical Fluid Dynamics Laboratory.

Mr. P. J. R. Chivers has been appointed to the Administration Branch at Head Office as a Staff Officer. Since graduating B.Sc.



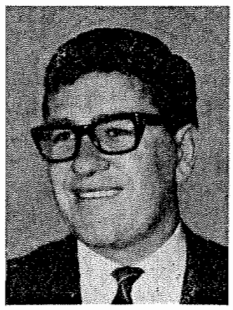
Mr. P. J. R. CHIVERS

from the University of Western Australia in 1964, Mr. Chivers has been working with C.S.R. as a process chemist.

Dr. D. G. Bishop has been appointed to the Division of Food Preservation where he will study the genetic and metabolic control of differentiation and ageing processes in plant cells. Dr. Bishop graduated B.Sc. from the University of Sydney in 1956, and Ph.D. from the same University in 1963. Since then he has carried out research at Twyford Laboratories, London, at the Chemistry Department, Harvard University, and with the Swedish Medical Research Council Stockholm.

Miss Pamela Phillips has joined the Division of Plant Industry to study the genetics of crop-environment interactions. Miss Phillips graduated B.Sc. from the Australian National University in 1966, and since then has been working as a chemist with the Department of Health.

Mr. M. J. Royal has joined the Industrial and Physical Sciences Branch at Head Office where he will take part in the Branch's work on patents and



Mr. M. J. ROYAL

maintain liaison with the research staff and patent attorneys. Mr. Royal obtained his Diploma of Applied Chemistry from Footscray Technical College in 1960, and since then has been an examiner of patents in the Commonwealth Patent Office.

Dr. G. T. Lloyd has been appointed to the Division of Dairy Research where he will work on the cultivation and preservation of bacterial cultures. Dr. Lloyd graduated B.Sc. from the University of Birmingham in 1958, and Ph.D. from the University of Wales in 1961. After four years with the British Milk Marketing Board he joined the Victorian Department of Agriculture in 1965.

Ambrose Bierce has defined a mouse as an animal which strews its path with fainting women. You'd think it would be the same with a rat, but as our picture shows you never can tell. Of course the girls at the Parkville Laboratory of the Division of Animal Health are a pretty stout-hearted lot—far from fainting at the sight of a rat they become positively lyrical. Admiring their favourite rat, known affectionately as Victor, are (from left to right) Rosemary Sellwood, Lynn Gough and Adele Samuel.

Mr. J. A. Neal has been appointed to the Division of Computing Research and will assist computer users in the Melbourne Divisions with their programming problems. After graduating B.Sc. from the Brighton College of Technology in 1966, Mr. Neal spent six months as a programmer at the University of Surrey, before going to Ceylon where he has been studying the Sinhala language.

Dr. L. J. Lynch has joined the Division of Textile Physics to carry out research on the sorption and mechanical properties of wool and their modification by chemical treatments. Dr. Lynch graduated B.Sc. with honours from the University of New South Wales in 1963, and has just obtained his Ph.D. from the same University.

Mr. P. D. Haines has joined the Division of Chemical Physics to work on the development of electronic instruments for use in the Division's research programme. Mr. Haines graduated from the University of Adelaide in 1959 and since then has been with the Department of Supply, first at its Ammunition Factory and then at the Government Aircraft Factories.

Mr. M. L. Rooney has been appointed to the Division of Food Preservation to work on food packaging. Since graduating B.Sc. from the University of New South Wales in 1964, Mr. Rooney has worked as a chemist with Taubmans Industries Ltd., and with Unilever Aust. Pty. Ltd.

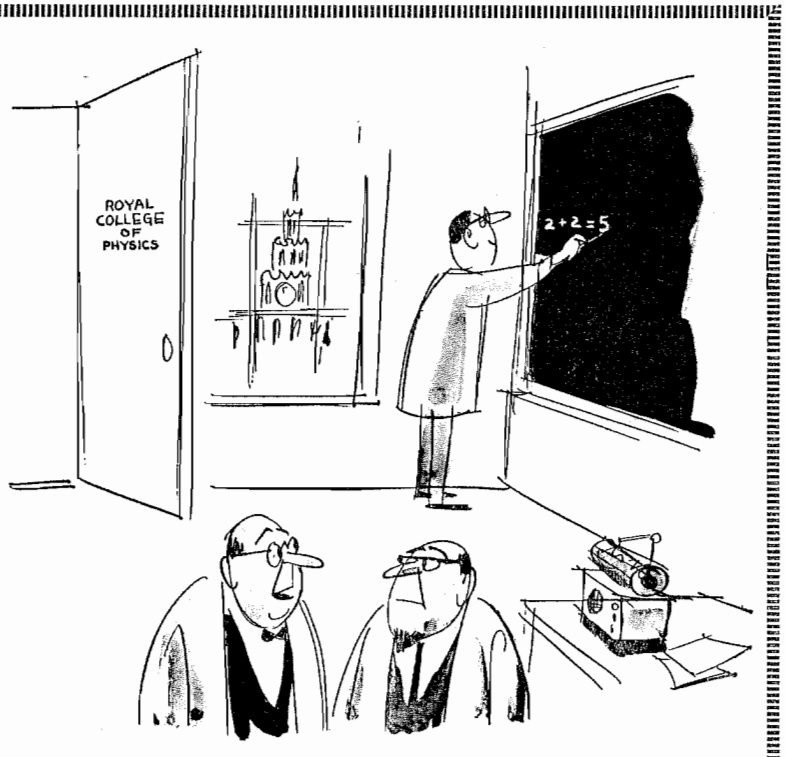
Dr. T. Schneider has been appointed to a research fellowship in agricultural meteorology with the Division of Meteorological Physics. Dr. Schneider

Dr. T. SCHNEIDER

graduated Ph.D. last year from the University of Wageningen, Holland where he has been working on frost and microclimate.

Dr. U. J. Schwartz has joined the Division of Radiophysics where he will study radio spectral lines by interferometry. He will work at the Australian National Radio Astronomy Observatory at Parkes. Since graduating Ph.D. from the University of Berne in 1962, Dr. Schwartz has been at the Kapteyn Astronomical Laboratory of the University of Groningen, Holland.

Dr. B. D. Siebert has been appointed to the Division of Animal Physiology to study the productive and reproductive performance of beef cattle in Northern Queensland. After graduating B.Sc. from the University of Adelaide in 1958 Dr. Siebert worked as a biochemist with the Commonwealth Serum Laboratories and then with the Northern Territory Administration. He obtained his Ph.D. from the University of Adelaide in 1967, and since then has been working at the Waite Agricultural Research Institute.



"It's the brain drain."

Courtesy "New Yorker"

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 114, MELBOURNE, SEPTEMBER 1968

$48,860,000 FOR CSIRO

CSIRO will have a total budget for 1968-69 of $48,860,000 for capital and non-capital expenditure, of which $38,450,100 will be provided directly by the Government and $10,409,900 by Industry Committees and other contributors.

Treasury Funds

Of the amount of $38,450,100, provided under the Treasury appropriation, $34,300,000 is for salaries and general running expenses, $3,820,100 for capital expenditure and $330,000 for repairs to buildings.

The allocation for salaries and running expenses represents an increase of $2,560,692 over the actual expenditure for 1967-68.

Inescapable salary increases arising from increments, reclassifications, and arbitration adjustments will absorb $710,000, leaving $1,850,692 available for other purposes.

Of the latter amount $31,325 had to be set aside for increased grants to such bodies as the Standards Association of Australia and the National Association of Testing Authorities.

The Executive then decided to allocate $611,000 to cover additional maintenance and $101,000 for additional travelling expenses.

Extra equipment allocations absorbed a further $283,000.

Having provided for the above increases the Executive then decided to make available $409,000 for new research projects and for the expansion of some projects started in the previous year.

The most important of these projects are: Molecular genetics ($30,000); animal diseases in Northern Australia ($61,100); research in the Arid Zone ($135,000); mechanical harvesting of grapes ($16,500); development of new insecticides ($52,000); operations research for the building industry ($20,000; bird studies ($18,800); and developmental projects ($50,000).

The new budget includes provision for 253 new Treasury positions, including those required for the above activities.

It was necessary to earmark 53 of these new positions for existing temporary staff.

The capital allocation from Treasury is divided into two categories—those items controlled by CSIRO and those handled by the Department of Works and Interior.

The first group will absorb $1,250,000. This will be spent mainly on developmental work at field stations ($443,000), the purchase of major items of equipment ($705,000), and capital expenditure ($102,000) for the development of the new cattle station now being established near Mundubbera, Queensland, for the Division of Tropical Pastures.

Of the $2,276,000 provided for building projects under the control of the Department of Works, $1,846,000 will be needed for buildings under construction, while the remainder will cover works to be commenced in the new financial year.

The major item in the current year's New Works programme is a laboratory to be constructed for the Division of Mineral Chemistry at North Ryde, New South Wales, for which the estimated total cost is $1,800,000. Only a small fraction of this sum will be spent during 1968/69.

Other Funds

The joint Commonwealth/Industry research funds provide most of the finance available to CSIRO from non-Treasury sources.

The Australian Wool Board has allocated $6,783,540, comprising $3,525,140 for wool production research and $3,258,400 for wool textile research.

The wool production figure includes $2,307,183 for salaries, and $1,217,957 for other purposes while the corresponding amounts for wool textile research are $1,801,868 and $1,456,532.

A new laboratory was approved last year for the Agronomy Section of the Division of Plant Industry and $200,000 is included in the non-salary vote for this purpose.

New buildings are also envisaged for two of the Wool Textile Research Laboratories.

The Division of Protein Chemistry is planning extensions to the main laboratory building at Parkville for which $150,000 has been included in the current budget. Full details of the proposal will be presented to the Wool Board for approval later in the year.

Approval has been given for the expenditure of $132,000 during 1968/69 on extensions to the Wet Processing building at Geelong for the Division of Textile Industry.

The Australian Meat Research Committee has agreed to provide a total sum of $1,477,500 comprising $647,410 for salaries, and $830,090 for other purposes.

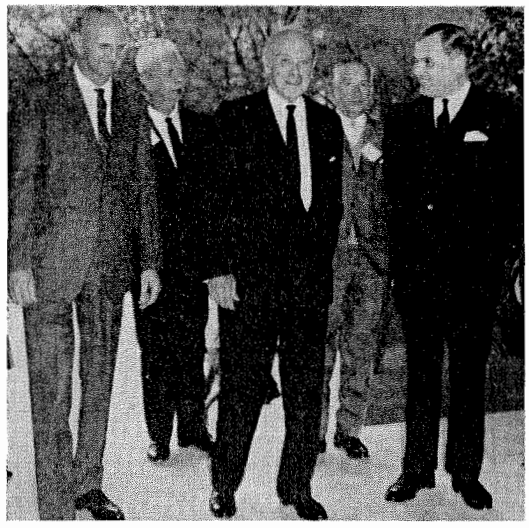
Because of a substantial reduction in income, due to drought conditions, the Committee was obliged to restrict CSIRO's 1968/69 allocation to 90% of the approved figure for 1966/67 plus inescapable salary increases.

This will have a detrimental effect on the research work. It has meant that inescapable increases in running expenses have had to be financed from funds which otherwise would have been available to expand current investigations.

The Wheat, Dairy and Tobacco Research Committees have provided $263,243, $299,500 and $216,400 respectively, for research for their particular industries.

SUMMARY OF ESTIMATES OF EXPENDITURE FOR 1968-69

	Estimates 1968-69	Expenditure 1967-68	Increase or Decrease
Under CSIRO control			
Salaries and general running expenses	34,300,000	31,739,308	2,560,692
Buildings, works, plant and developmental items	1,250,000	1,412,286	—162,286
Total under direct control of CSIRO	35,550,000	33,151,594	2,398,406
Under Department of Interior control			
Acquisition of sites and buildings	101,100	103,200	—2,100
Under Department of Works control			
Fittings and furniture	193,000	140,246	52,754
Repairs and maintenance of buildings	330,000	235,475	94,525
Buildings, works	2,276,000	3,217,268	—941,268
Total CSIRO—Treasury Funds	38,450,100	36,847,783	1,602,317
Contributory Funds			
Salaries and general running expenses	9,099,900	8,731,009	368,891
Buildings, works, plant and developmental items	1,310,000	577,258	732,742
Total funds CSIRO—all sources	48,860,000	46,156,050	2,703,950



Soils Congress

Some 1,200 scientists, including 700 visitors from 63 countries met in Adelaide last month for the Ninth International Congress of Soil Science.

It was the largest international gathering of specialist scientists ever to have met in Australia.

The Governor-General, Lord Casey, officially opened the Congress at Bonython Hall, University of Adelaide, on Tuesday, 6th August.

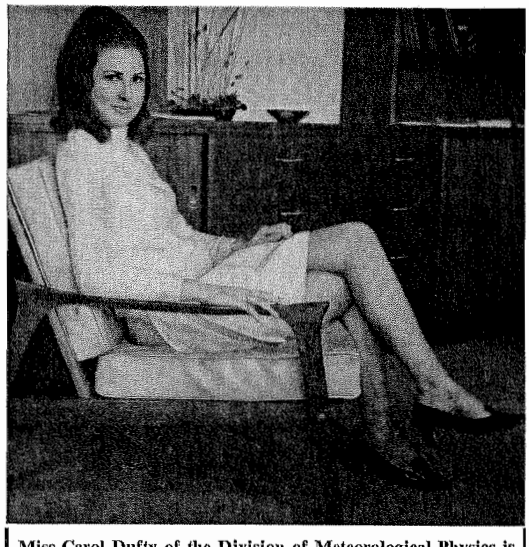
The Presidential Address was then delivered by Dr. E. G. Hallsworth, Chief of the Division of Soils.

All together some 313 scientific papers were presented and 8½ million pages of material printed.

As the Congress was international, it had three official languages, and a simultaneous translation service operated continuously so that the addresses and discussion could be heard through headsets in either English, French or German.

The Tenth International Congress will be held in Moscow in 1972.

Above: During the Congress an exhibition entitled "The Soils of Australia — Soil Science and Technology in Action" was held at John Martins Store in Adelaide. Arriving at the store are (from left to right) Dr. E. G. Hallsworth, Chief of the Division of Soils and President of the Congress; Mr. T. B. Paltridge, Congress Manager; the Governor-General, Lord Casey; Dr. F. A. van Baren, Secretary-General of the International Society of Soil Science; and Mr. I. S. D. Hayward, Managing Director of John Martins.



Miss Carol Dufty of the Division of Meteorological Physics is an entrant in the Miss Mordialloc Lions Quest. The quest is being conducted by the Lions Club of Mordialloc in conjunction with a local newspaper to raise funds for the Spastic Children's Society of Victoria.

LABORATORY LAPSES

Scientific research is a very odd occupation. It requires, in present-day circumstances, a great deal of physical space, elaborate organisation and expensive equipment — yet it depends for its ultimate success on processes in the investigator's mind which are fundamentally inspirational and creative. It is the conflict between these two aspects of the work which lies at the root of time-wasting in science.

Consider, for example a parallel situation in the arts. Supposing a typewriter cost £100,000, so that no aspiring author could hope to buy one.

The Government, not wishing to see the craft of fiction die out, would no doubt finance Faculties of Creative Writing in the universities.

Here the writers would be provided with equipment and an adequate salary, while the results of their work would become the commercial property of the university.

There would be great competition for jobs in these departments. Successful candidates would be selected in the British manner, partly on the result of a completely irrelevant examination and partly on the basis of some sample piece of original work, designed with no other purpose than to impress the professor.

The higher posts would be awarded for conscientious committee work, organisational skill, conformism, and creative ability, in that order.

One can easily visualise the kind of life which would go on in the departments so staffed.

Some of the lecturers, research fellows, and readers would settle down to spend the rest of their lives in idleness, since it is very difficult to fire a man from a university department.

Some, on discovering that they had no capacity for original thought, would busy themselves with purely academic aspects of the subject, and with teaching undergraduates how to do something which they had personally failed to accomplish.

Some would become adept at gaining finance for bizarre special projects, and would spend years at government expense writing vast documentary novels set in Bali or Quintana Roo.

One type of man would begin with a brilliant first book and then find out he had nothing further of any interest to say.

Another would turn out each year another instalment of some endless pedestrian saga, caught up in the kind of obsessional ritual from which only death can bring release.

A horrible fantasy, you will say. A ghastly catalogue of wasted lives. Yet each of these has its counterpart in science.

Science is a haystack in which one man grubs desperately for a needle while half a dozen lie on the top of the rick, sleeping their lives away. This is not because research workers are lazy by nature, but because of this inescapable dilemma in the nature of their employment.

It is interesting to observe how scientists, who pride themselves on the clarity of their thought, are just as prone to self-delusion as the rest of us when it comes to analysing their own situation.

A scientist who has shot his bolt by the age of thirty does not say, 'I have paid my debt to society. I have nothing further to contribute. I propose to idle away the rest of my life at the Government's expense.'

He would be quite justified in saying this, but he cannot bring himself to do so. And so, together with the natural third-rater, the opportunist, the man who is unable to raise enough money to do his work properly, and the man who has managed to raise so much that he has a full-time job simply administering it, he keeps himself occupied with a series of comforting, ego-massaging, but fundamentally time-wasting procedures.

by John Rowan Wilson

This article is one of a series on timewasting which appeared in 'London Punch' earlier this year.

There are three principal groups of spurious scientific activity, which come under the heading of Bandwagon, No Stone Unturned, and Fancy That.

Bandwagon is a most effective game for the man who wants to get on. The technique is to lie in wait and try to spot which way the scientific wind is blowing.

Take Chigwell, for instance, cosily installed in a well-equipped laboratory at Oxbridge University, but without an idea in his head. He reads in an obscure Italian journal that Fettuchini of Bologna has isolated a new anti-cancer principle from an extract of alfalfa.

He immediately sets his whole organisation to work on the same subject, repeating the original experiment over and over again with certain minor modifications. Within a year he has a whole series of publications ready on the same subject, and he begins to fire them like buckshot all over the world.

The editors of the scientific journals find themselves in a quandary. Chigwell's work is tedious, repetitive, and unoriginal, but the subject on which he is working is so important that it is hard to turn down anything even remotely connected with it. So they take the line of least resistance.

As a result of this, Chigwell soon ends up with more publications than the man who made the original discovery. His name begins to dominate the literature.

In any review of the subject he must be mentioned; if there is to be an international discussion he must be invited. He is, after all, in many ways better value than Fettuchini. He speaks English, he is an amusing orator, he has a knack for explaining technicalities in simple language — and he is always available.

Very soon people forget the meagre nature of his contribution. "Chigwell?" they say. "Yes, of course—the cancer man. A brilliant fellow."

From that moment onwards he has nothing to worry about. He can dig away happily at the same hole for the rest of his life.

No Stone Unturned is a much less ambitious game than Bandwagon. It is thought to have been taken over originally from scholars in the humanities, who have made brilliant and effective use of it to maintain themselves in subsidised idleness over the centuries.

No Stone Unturned rests on the assumption that no piece of knowledge, no matter how apparently boring or useless, is too small to demand a lifetime's investigation. Indeed in certain academic circles, where the study of large issues is regarded as showy and journalistic, triviality in itself may hold a kind of cachet.

A biologist who has dedicated his working life to the study of variations in the biliary passages of the codfish carries the same aura of scholarship as a historian who has immersed himself in the lesser-known texts of The Venerable Bede.

The other great research game, Fancy That, is an extension of No Stone Unturned into the more modern science of psychology and sociology. Fancy That consists essentially of a series of elaborate and time-consuming investigations designed to give irrefutable scientific proof to a cliché.

The practice of this game on a wide scale has filled the world scientific literature with papers designed to show, once and for all, that animals learn more quickly, if properly fed, or that human beings are distracted by loud noises.

Another group of games are connected with publication. The object of all publication games is to gain the maximum credit from the minimum of useful work. An expert player can make a little research go a very long way indeed.

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The original published paper is merely a beginning. After this it is possible to deliver the same results, assembled in a slightly different way, at a variety of meetings and discussions, all of which are in due course printed and add in a most gratifying way to the author's bibliography.

Letters can be written to learned journals, calling attention to minor additions to the work, and ultimately review articles covering the subject in question, with particular reference to the writer's own work.

Specific games, the names of which are more or less self-explanatory, are Priority, in which half-digested experimental work is published in letter form so as to establish a leading position in the field, the Chasing the Grant, in which similar publication is made with the object of pressurising some organisation into financing further work.

Linked with publication games is the great travelling game Symposium. This has the merit of wasting not only time but money also.

Symposium is a seasonal game. Every year, in the spring and autumn, the great scientific migrations begin. The scientists can be seen like a flock of birds settling on Vienna or Tokyo or San Francisco, sometimes in small groups, sometimes in enormous clouds of several thousand at a time.

Their shrill cries can be heard reverberating through meeting halls and hotel lounges. What are they doing there? Nobody really knows.

Certainly no new scientific information is ever given out at these international meetings. The papers read at the formal proceedings are never anything more than short summaries of previously published work. Indeed, it has been suggested that the only reason papers are read at all is to satisfy donors of travel grants and income tax authorities.

With any kind of luck, a conscientious scientist can retire from all useful work around the age of forty and still convince himself, by the use of the techniques outlined above, that he is leading a busy and useful life.

Indeed, if he wishes for material success, he would probably be better advised to do so than to devote himself to the very chancy business of experimentation.

He will soon find out that no man can serve two masters. Being an important scientific figure is an occupation in itself. It leaves little time for playing about in the laboratory.

Consider, for instance, our old friend Chigwell at the climax of his career. Now Lord Chigwell, OM, FRS, syrupy of voice and portly of physique, he steps from the door of his Belgravia house into his chauffeur-driven Rolls.

He has a heavy day in front of him. A committee at the Ministry of Technology about the peaceful uses of atomic energy, a board meeting at International Chemicals; then after lunch he has to give a lecture at the Royal Society of Arts on the importance of population control. In the evening, dinner with Lady Pamela Berry and a quick appearance on *The Frost Programme*.

He casts his mind back with nostalgia to the good old days in the lab, when he (with, of course, some help from Fettuchini) finally cracked the problem of the alfalfa principle. That was a really basic piece of work, not the kind of half-baked rubbish the young chaps are playing about with now. Ah, he thinks sadly to himself, they don't do work like that any more . . .

I'm sorry to have to tell him —they do.

POSITIONS VACANT

The following vacancies for professional appointments are current:

ASSISTANT EDITOR OF "SCIENTIFIC SERIALS IN AUSTRALIAN LIBRARIES" (Librarian 2)—Central Library—118/182 (6/9/68).

ELECTRONICS ENGINEER (Engineer 1/2)—Division of Mineral Chemistry—601/74 (13/9/68).

ECOLOGIST (RS/SRS)—Division of Plant Industry—130/931 (20/9/68).

CHIEF—Division of Tropical Pastures—(1/10/68).

PARASITOLOGIST (E01/2)—Division of Animal Health—202/326 (18/10/68).

VISITOR

Associate Professor Marcus Digre of the Mineral Dressing Laboratory, Technical University of Norway, Tronheim, is spending four months with the Division of Chemical Engineering. Professor Digre is working with Mr. D. F. Kelsall's group on the use of simulation techniques in grinding research.

News In Brief

PROFESSOR

Mr. J. W. Holmes of the Division of Soils has been appointed to the first Chair in Earth Sciences at Flinders University. Mr. Holmes will remain an officer of CSIRO, but will devote about half his time to his university duties.

U.S. APPOINTMENT

Mr. T. Pearcey of the Division of Computing Research has taken leave from CSIRO to accept a temporary appointment with Control Data Corporation, Minneapolis. Mr. Pearcey will join a team engaged in the design and development of new computers.

MILLION DOLLAR LOAN

The Laboratories Credit Union which caters for CSIRO staff located in New South Wales has completed another successful year. According to its latest Annual Report, the million dollar mark in loans to staff was reached during the year. Shareholders' funds and money on deposit now total more than $330,000.

This year the Annual Meeting of the Credit Union will be held in the Hicks Meeting Hall of the Division of Food Preservation on Wednesday, 25th September at 5.15 p.m. This is to enable staff in the Ryde-Epping area to learn more about the operations of the Credit Union and to meet its Directors.

MELBOURNE BALL

The annual ball for Melbourne Divisions and Sections will be held at the Royale Ballroom on Thursday, 12th September. Two bands will provide nonstop dancing till 2.00 a.m. the following morning and every couple will receive a free bottle of champagne.

COMMUNITY AID ABROAD

In the last three years Community Aid Abroad groups in Head Office and in the Divisions of Forest Products and Textile Industry have raised $3,700 to help communities in India and Ceylon.

These groups have now set about raising $1,100 to help an agricultural development project in the Gaya District of Bihar State in eastern India.

Sarva Seva Sangh an Indian social reconstruction organization based on the teachings of Ghandi has drawn up, in conjunction with the British aid organization, OXFAM, four development projects for the region.

The total cost of the four projects is $100,000.

One of the projects is based on the village of Sokhodeora and will cost $21,000.

CAA groups in Australia have undertaken to support this project and the $1,100 raised by CSIRO groups will go towards this.

The $21,000 will be used to advance agriculture in a large number of villages around Sokhodeora.

Among other things it will be spent on 40 wells, 20 pump sets, seed, a grain silo, 20 pairs of bullocks, spraying equipment, seed drills and cultivators and threshing machinery.

Two Victorians, Alan and Wendy Scarfe, who have worked for CAA in Sokhodeora have described their experiences in a book, "A Mouthful of Petals", published by Heinemann.

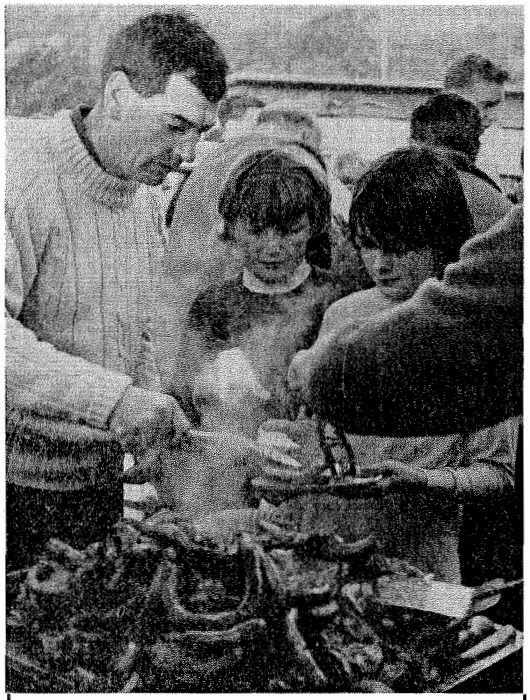
Apart from the CAA groups in Head Office, Forest Products, and Textile Industry, groups have also been formed in several other Divisions of CSIRO.

A group which started in the Division of Protein Chemistry in 1964, has raised over $1,000 for famine relief in India and for projects such as support for an extension worker at an Indian village near Dahanan, purchase of five sewing machines for a hospital and clinic at Nagpur, and construction of a well at Balarampur.

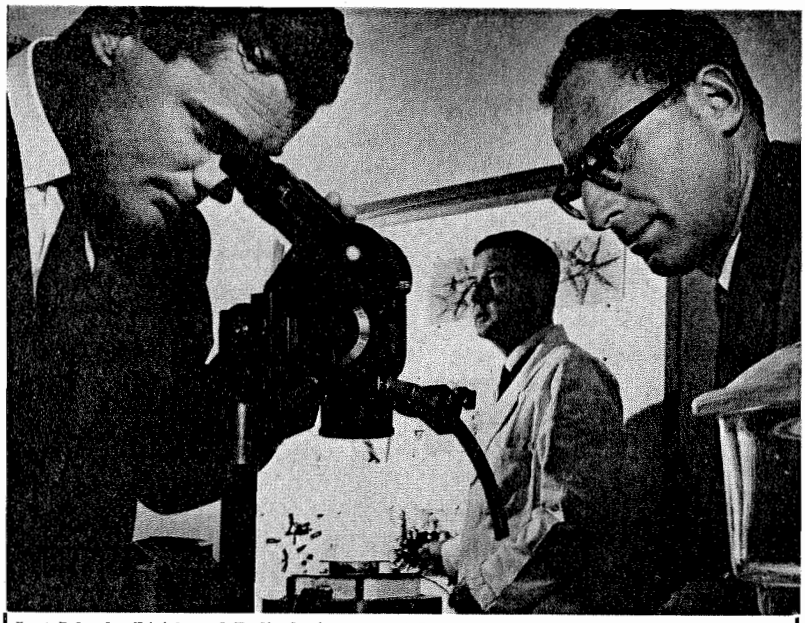
In November last year, members of the staff of the Divisions of Food Preservation and Mineral Chemistry (Coal Research Laboratory) and of the Wheat Research Unit, started a group at North Ryde, Sydney.

Since then they have raised nearly $500 to support an agricultural project at Medak in southern India.

Earlier this year six members of the group took part in a marathon "Walk Against Want" and raised $300 for CAA funds.



On Sunday, 28th July, the Social Club of the Division of Textile Industry held its annual picnic-barbecue for children from Geelong orphanages. Members of the Division and their families drove the children to the picnic in their cars. Our picture shows Mr. W. Kelly dispensing chops and sausages to a couple of hungry customers.



Last July the Division of Radiophysics conducted a two week school on cloud seeding techniques for officers from various state government departments. Several overseas visitors also attended. Our picture shows Mr. J. Mahon (left) of the New South Wales Department of Agriculture and Mr. K. Rosner (right) of Israel studying the growth of ice crystals on a miniature cold stage. In the background, Dr. S. Mossop of the Division demonstrates the shapes of ice crystals that form at different temperatures.

HOLIDAY CLUB

The Anglesea Holiday Club has two shares for sale at $220 each. Shareholders are entitled to book flats at Victoria's premier seaside resort throughout the year at extremely moderate rates. Any members of CSIRO who are interested should ring the Secretary of the Club, **Mrs. P. Fricker** (Melbourne 82 6757), for further details.

Agricultural Extension

Some Australian effort in agricultural extension may be misdirected and not meet the national interest nor the most urgent needs of farmers.

This warning is given by Professor D. B. Williams, Visiting Professor of Agricultural Economics at the University of Melbourne, in his latest book, "Agricultural Extension", published last month by Melbourne University Press.

Professor Williams, who is on secondment from CSIRO, says that extension, like research, should be established as an independent discipline; successful research programmes need to be supported by highly skilled professional extension specialists.

Extension should assume a much more positive educational note and aim at solving farmers' problems and improving managerial performance, he claims.

In his book, Professor Williams analyses recent growth, including the increase in farm advisory clubs and consultants, and compares Australian services with those in the United States and Britain.

He claims that with existing organisation patterns and beliefs, both official Australian bodies and agricultural scientists tend to deny their own best efforts to develop extension services.

"Agricultural Extension" by D. B. Williams. 218 pages (Melbourne University Press, $6.90).

EVALUATING TERRAIN

Last month 34 scientists and engineers from six countries took part in an eight-day overland study tour of Australia's inland followed by a one-day symposium on terrain evaluation for engineering.

The tour and the symposium were organized by the Division of Soil Mechanics and were attended by representatives of Commonwealth and State Government Departments, Universities, firms of consulting engineers, and CSIRO, as well as by delegates from Britain, Canada, India, South Africa and the United States.

Terrain evaluation for engineering is a comparatively new science concerned with methods of classifying, describing, mapping and evaluating country as an aid to planning the design and construction of roads and other engineering structures.

Terrain evaluation is important to the civil engineer in the construction of roads, railways, and water conservation and irrigation schemes.

The military engineer is also interested in it from the point of view of ground mobility and availability of material resources, and concepts of terrain evaluation are useful to the planning engineer in the development of natural resources.

The route followed on the tour included Winton, Boulia, Mt. Isa, Cloncurry and Camooweal in Queensland and Tennant Creek, Barrow Creek and Alice Springs in the Northern Territory.

The symposium which followed provided an opportunity for delegates to learn more about recent developments in terrain evaluation research and to assess the current status of this research.

SAFETY NOTES

A FLAMING MISTAKE

Act 1: Arrive at work, turn on electric radiator, drape coat over back of chair; settle down to work.
Act 2: Get up from desk and push back chair (conveniently mounted on castors). Leave room.
Act 3: Return to room. Find coat and chair, or their charred remains, soaked by fire extinguisher fluid.
Finale: Replace personal effects as best one can. Buy new coat and new chair (mounted on castors).

ANOTHER FLAMING MISTAKE

Act 1: Send instant temperature water bath out for repairs.
Act 2: Manufacture temporary water-bath out of plastic container, domestic immersion heater, and thermostat. Leave running overnight.
Act 3: Thermostat fails. Water boils. Plastic container melts. Laboratory catches fire.
Finale: Staff arrive at work next morning just in time to prevent fire from spreading to rest of building.

THE POWER OF MOTIVATION

Child proof pill bottles have been in the news recently as a new safety measure to protect children from harmful medicines.

To demonstrate their effectiveness, a number of bottles were given to a group of 4-year-olds to play with. Not one bottle was opened.

One father who observed the demonstration suggested that a few lollies should be put in the bottles.

Just one minute and twenty seconds later one enterprising child had managed to chew the plastic cap off a bottle and get at the sweets.

Nevertheless, the bottle is extremely effective, but don't make the mistake of regarding it as infallible.

J. W. Hallam, Safety Officer.

NEWDIGATE POEM

A Prize Poem submitted by Mr. Lambkin of Burford to the Examiners of the University of Oxford on the prescribed poetic theme set by them in 1893, 'The Benefits of the Electric Light'

HAIL, Happy Muse, and touch the tuneful string!
The benefits conferred by Science I sing.
Under the kind Examiners' direction
I only write about them in connection
With benefits which the Electric Light
Confers on us; especially at night.

These are my theme, of these my song shall rise.
My lofty head shall swell to strike the skies.
And tears of hopeless love bedew the maiden's eyes.
Descend, O Muse, from thy divine abode,
To Osney, on the Seven Bridges Road;
For under Osney's solitary shade
The bulk of the Electric Light is made.

Here are the works; — from hence the current flows
Which (so the Company's prospectus goes)
Can furnish to Subscribers hour by hour
No less than sixteen thousand candle power,
All at a thousand volts. (It is essential
To keep the current at this high potential
In spite of the considerable expense.)

The Energy developed represents,
Expressed in foot-tons, the united forces
Of fifteen elephants and forty horses.
But shall my scientific detail thus
Clip the dear wings of Buoyant Pegasus?

Shall pure statistics jar upon the ear
That pants for Lyric accents loud and clear?
Shall I describe the complex Dynamo
Or write about its Commutator? No!

To happier fields I lead my wanton pen,
The proper study of mankind is men.
Awake, my Muse! Portray the pleasing sight
That meets us where they make Electric Light.

Behold the Electrician where he stands:
Soot, oil, and verdigris are on his hands;
Large spots of grease defile his dirty clothes,
The while his conversation drips with oaths.
Shall such a being perish in its youth?
Alas! It is indeed the fatal truth.
In that dull brain, beneath that hair unkempt,
Familiarity has bred contempt.

We warn him of the gesture all too late:
Oh, Heartless Jove! Oh, Adamantine Fate!
Some random touch — a hand's imprudent slip —
The Terminals — a flash — a sound like 'Zip!'
A smell of burning fills the started Air—
The Electrician is no longer there!

But let us turn with true Artistic scorn
From facts funereal and from views forlorn
Of Erebus and Blackest midnight born.
Arouse thee, Muse! and chaunt in accents rich
The interesting processes by which
The Electricity is passed along;

These are my theme: to these I bend my song.
It runs encased in wood or porous brick
Through copper wires two millimetres thick,
And insulated on their dangerous mission
By indiarubber, silk or composition.
Here you may put with critical felicity
The following question: 'What is Electricity?'

'Molecular Activity,' say some,
Others when asked say nothing, and are dumb.
Whatever be its nature, this is clear:
The rapid current checked in its career,
Baulked in its race and halted in its course
Transforms to heat and light its latent force:

It needs no pedant in the lecturer's chair
To prove that light and heat are present there.
The pear-shaped vacuum globe, I understand,
Is far too hot to fondle with the hand.
While, as is patent to the meanest sight,
The carbon filament is very bright.

As for the lights they hang about the town,
Some praise them highly, others run them down.
This system (technically called the Arc),
Makes some passages too light, others too dark.

But in the house the soft and constant rays
Have always met with universal praise.
For instance: if you want to read in bed
No candle burns beside your curtain's head,
Far from some distant corner of the room
The incandescent lamp dispels the gloom,
And with the largest print need hardly try
The powers of any young and vigorous eye.

Aroint thee, Muse! Inspired the poet sings!
I cannot help observing future things!
Life is a vale, its paths are dark and rough
Only because we do not know enough:
When Science has discovered something more
We shall be happier than we were before.

Hail, Britain, Mistress of the Azure Main,
Ten thousand Fleets sweep over thee in vain!
Hail, Mighty Mother of the Brave and Free,
That beat Napoleon, and gave birth to me!
Thou that canst wrap in thine emblazoned robe
One quarter of the habitable globe.
Thy mountains, wafted by a favouring breeze,
Like mighty rocks withstand the stormy seas.

Thou art a Christian Commonwealth; and yet
Be thou not all unthankful — nor forget
As thou exultest in Imperial Might
The Benefits of the Electric Light.

Hilaire Belloc (Verses, 1910)

New Staff

Mr. D. R. Hudson has been appointed to the Division of Applied Mineralogy where he will carry out research on the conditions of emplacement of pegmatites and mineralised

Mr. D. R. HUDSON

zones with particular reference to the dispersion of minor elements throughout the associated rocks. Mr. Hudson graduated BSc. with honours from the University of Western Australia in 1962 and since then has been studying for his Ph.D. at the University of Queensland.

Mr. A. P. Power has joined the Division of Plant Industry where he will assist in communication of information about the Division's work both within and outside the Organisation. Mr. Power graduated

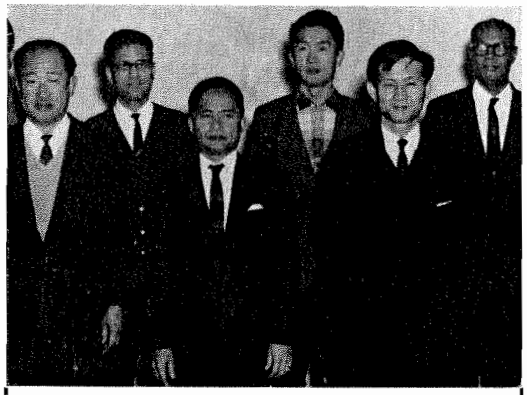
Mr. A. P. POWER

B.Ag.Sc. from the University of Sydney in 1959 and Batchelor of Sacred Theology from St. Patrick's College in 1965. He then spent two years working and travelling in Papua and New Guinea, Europe, Asia and the Middle East, before becoming a science teacher in Canberra at the beginning of the year.

Deadline

Contributions to the October issue of Coresearch should reach the Editor at 314 Albert Street, East Melbourne, by Thursday, 12th September.

Printed by CSIRO, Melbourne



These six scientists from five Asian countries are at present working at the Cronulla laboratory of the Division of Fisheries and Oceanography.

They are (from left to right): **Professor Y. Hiyama** of the Department of Fisheries, Faculty of Agriculture, University of Tokyo—spending three months with the Division as an exchange professor on a Leverhulme Visiting Fellowship and while in Australia will make a collection of fish specimens; **Mr. M. Ahsanullah** of the Marine Fisheries Department, West Pakistan—in Australia for two years as a Colombo Plan Fellow to study fisheries research and administration; **Mr. B. Castillo** of the Philippines Fisheries Commission—here for twelve months under the Colombo Plan to study research techniques in physical and chemical oceanography; **Mr. Y. M. Kwon**, a Colombo Plan Fellow from the Institute of Marine Biology at Seoul National University—spending twelve months with the Division carrying out research on phytoplankton; **Dr. H. Takano** of the Tokyo Regional Fisheries Research Laboratory, Ministry of Agriculture and Forestry, Tokyo—here for eight months on an Australian International Award Fellowship to study biochemical techniques and plankton biology; and **Dr. M. Durairatnam** of the Ceylon Fisheries Corporation—spending six months with the Division as a UNESCO Fellow to study techniques of measuring the primary production of the ocean.

OVERSEAS VISITS

Dr. E. K. Bigg of the Division of Radiophysics will return shortly from overseas. Dr. Bigg has been visiting research centres in Europe, Britain, and North America. Last month he attended a cloud physics conference in Toronto.

Mr. K. R. Hall of the Division of Chemical Engineering left early last month on a twelve weeks' visit to North America, Britain, Europe and Japan. He will attend conferences on rheology in Britain and Japan and the Tripartite Chemical Engineering Conference in Montreal.

Dr. A. R. G. Lang of the Division of Irrigation Research left recently for the United States where he will spend seven months at the University of Wisconsin studying plant-water-soil relationships.

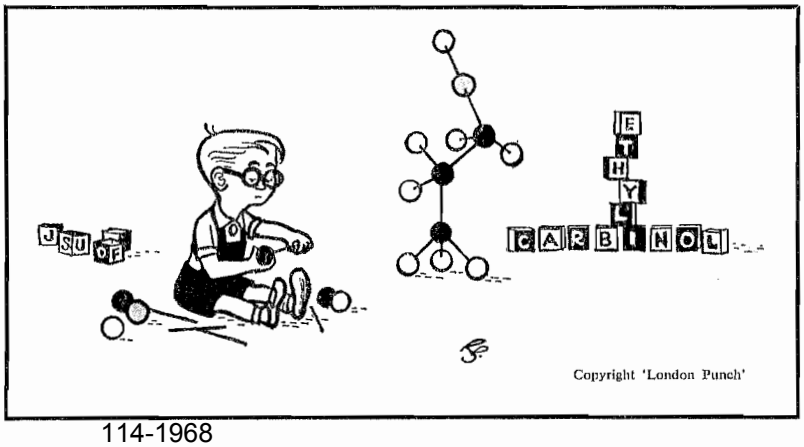
Dr. P. May of the Division of Horticultural Research left last month for California to attend a meeting of the American Society of Horticultural Science. Dr. May will study vine trellising methods and mechanical harvesting of grapes in the United States and Europe before returning to Australia in early November.

Dr. D. E. Scaife of the Division of Mineral Chemistry left recently for Israel where he will attend the International Conference on Co-ordinate Chemistry. Dr. Scaife will also visit research centres in Britain and the United States before returning next November.

Mr. J. P. Shelton, Secretary (Industrial and Physical Sciences), returned recently from India where he attended a UNESCO conference on the application of science and technology to development of Asia.

Dr. G. K. White of the Division of Physics left last month for the United States to take part in the NBS Symposium on Thermal Expansion and the Thermal Conductivity Conference in Indiana. He will also attend the 11th International Conference on Low Temperature Physics at St. Andrew's, Scotland, and the International Conference on Mean Free Paths of Electrons in Metals in Zurich before returning next month.

Dr. P. R. Whitfield of the Division of Plant Industry left last month for the United States where he will spend six months at the Department of Agricultural Biochemistry, University of Arizona. Dr. Whitfield will follow this with a period of six months at the Laboratory of Molecular Biology, University of Cambridge.



CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 115, MELBOURNE, OCTOBER 1968

News In Brief

Institute Fellows

Dr. D. O. Norris of the Division of Tropical Pastures and **Dr. R. C. Rossiter** of the Division of Plant Industry have been elected Fellows of the Australian Institute of Agricultural Science for their contributions to Australian agriculture.

Dr. Norris's early research was concerned with virus diseases of potatoes and tomatoes. In 1953 he switched to research on the bacteriology of tropical and sub-tropical legumes. His outstanding work in both of these fields earned him the Institute's Medal of Agricultural Science for 1960.

Dr. Rossiter has made a number of major contributions to pasture research in Western Australia, particularly in relation to the agronomy and ecology of subterranean clover.

Doctor of Science

Dr. W. F. Cole of the Division of Building Research has been awarded the degree of Doctor of Science by the University of Western Australia for his thesis "Studies on Clay Minerals, Australian Clays, Properties of Fired Clays and Set Cements".

Meeting With Chiefs

On Tuesday, 10th September, and Wednesday, 11th September, the Executive met in Canberra with the Chiefs of Divisions where they discussed a number of items of interest relating to the administration of the Organization. On the Wednesday evening the Executive entertained the Chiefs to a buffet dinner at the Commodore Motel.

Doctorate

Mr. J. I. Pitt of the Division of Food Preservation has been awarded the degree of Doctor of Philosophy by the University of California for his thesis "The yeast genus *Metschnikowia*".

OBITUARIES

Mr. J. C. M. Fornachon, Director of the Australian Wine Research Institute, died suddenly in Adelaide on Sunday, 25th August.

A graduate in agricultural science from the University of Adelaide, Mr. Fornachon joined the staff of the Waite Agricultural Research Institute in 1935.

He joined the C.S.I.R. Oenological Section in 1965 and ten years later was appointed Director of the Wine Research Institute.

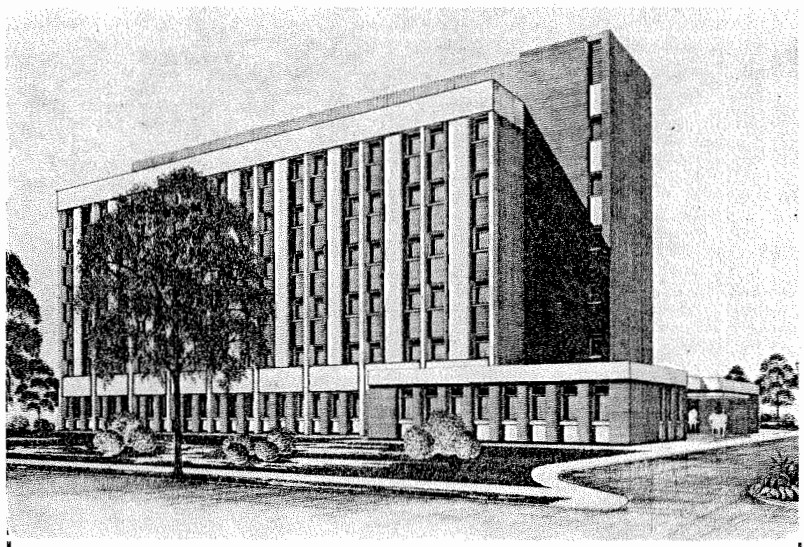
Mr. Fornachon achieved an international reputation for his research on the microbiology of wines and in 1955 he undertook the task of producing an English translation of the international dictionary of viticultural and oenological terms under the auspices of F.A.O.

Mr. E. H. Rafferty of Canberra Site Services, died last month after twenty-one years service with the Organization.

Mr. Rafferty, who was in charge of motor transport for CSIRO in the Canberra region, had a distinguished war record.

He was awarded the D.F.C. as a Flight Lieutenant in a Halifax squadron in operations over Europe.

The pictures below were taken during the dinner. They show: Top — Dr. J. R. Price (left) of the Executive and Dr. R. G. Giovanelli, Chief of the Division of Physics, and Bottom — Mr. B. Beresford Smith (left) Assistant Secretary (Works and Buildings), and Dr. A. E. Pierce, Chief of the Division of Animal Health.



Above is an architect's impression of a new coal research laboratory to be built for the Division of Mineral Chemistry at North Ryde, Sydney. The building will be air-conditioned and is estimated to cost $1.8 million. Tenders are expected to be called in March next year and tender drawings are now being prepared by Noel Bell and Ridley Smith, agent architects for the Department of Works in Sydney. Construction should be finished towards the end of 1970.

The ground floor of the building will house the administration group, library and staff amenities, while the five upper floors will provide laboratory space. The building has been specifically designed to provide standardisation of laboratory space as far as possible and maximum flexibility of services. Vertical and horizontal ducts throughout the building are designed to act structurally and, at the same time, allow ready access to all installed services and to allow any installation of additional services when required.

LAND EVALUATION SYMPOSIUM

Increased understanding of how to make the best use of the World's land resources could give more to human happiness than studies in almost any other field, Mr. C. S. Christian of the Executive said in Canberra last August.

Mr. Christian was opening an international symposium on land evaluation at the Academy of Science.

The symposium, which dealt with advances in techniques and concepts of assessing a country's land resources, was organized by the Division of Land Research in co-operation with UNESCO.

It was attended by 200 scientists from 13 countries.

Mr. Christian said that, although world population and the demands upon the world's lands were both advancing rapidly, changes in scientific competence were also rapid.

He said that he could see no reason why science should not outstrip reproduction.

There was a great need in developed countries as well as developing countries for more competence in the planning of land use and land management.

In developed areas, where extensive use of land was associated with high cost inputs, there was a need to watch closely the long-term effects of land use on the resource potential, he continued.

There was also a need for an almost daily watch to ensure that dangers such as disease, lack of moisture, or fire, were dealt with promptly.

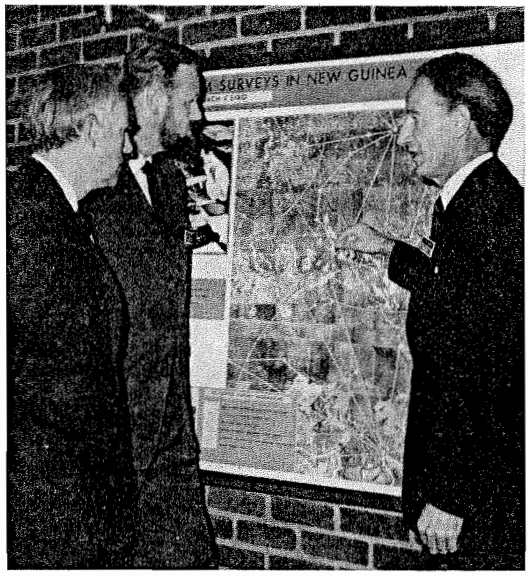
In developing countries, which ultimately had to depend largely on their own natural resources for their economic and social advancement, a knowledge of land for land use planning was essential.

Mr. Christian went on to say that Australia presented a wide array of situations from developed to undeveloped lands, some degraded, some well utilized, and some improved. It was an excellent laboratory for land-use studies.

The integrated approach to land assessment developed by CSIRO and used in mapping the resources of northern Australia and Papua-New Guinea had been adopted in many other parts of the world.

Advances in the use of science in land evaluation had been very rapid.

Below: Looking at one of the displays at the symposium are (from left to right): Dr. M. Batisse, Chief of the Natural Resources Research Division of UNESCO, Mr. R. E. Tomlinson of the Canadian Department of Forestry and Rural Development, and Mr. G. A. Stewart, Chief of the Division of Land Research.



Deadline

Contributions to the November issue of Coresearch should reach the Editor at 314 Albert Street, East Melbourne, by Tuesday, 15th October.

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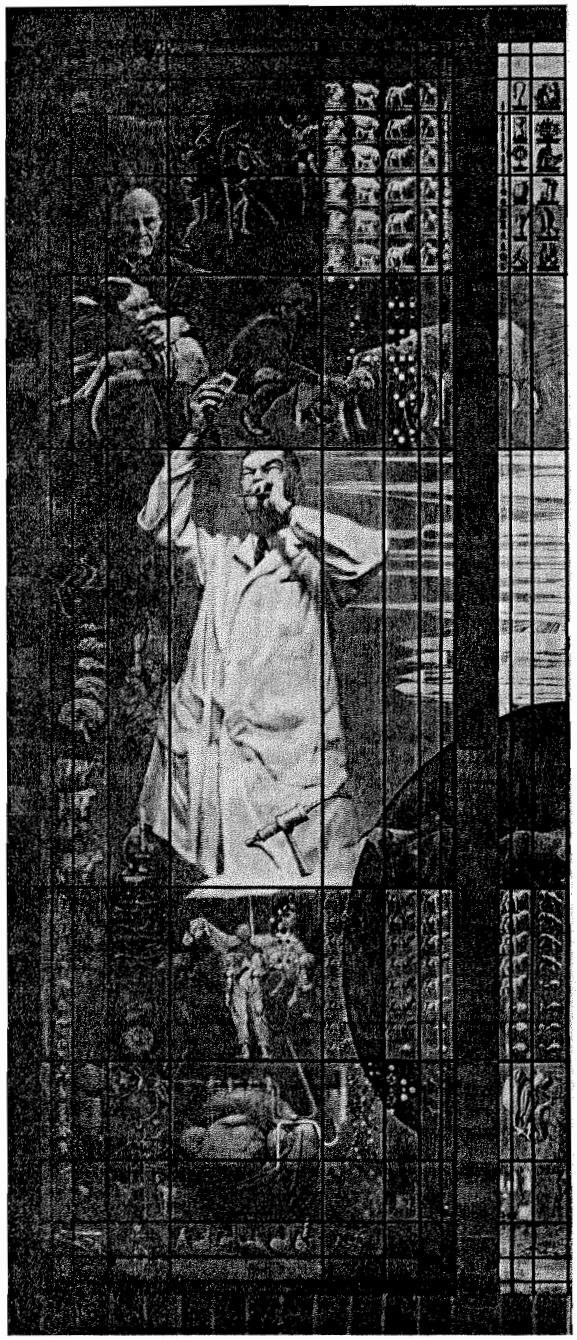
Clunies Ross Memorial Mural

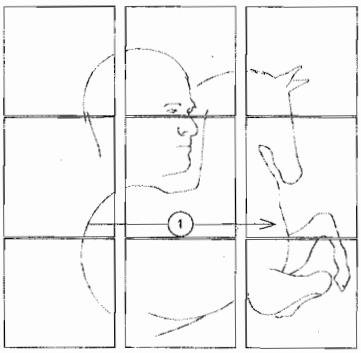
On Friday, 20th September, Dr. N. Needham, President of the Australian Veterinary Association, presented the Clunies Ross Memorial Mural to the Clunies Ross Foundation. The Foundation's President, Sir Ian McLennan, accepted the Mural on behalf of the Foundation.

The Mural, which stands in the foyer of the National Science Centre in Melbourne, was commissioned by the Australian Veterinary Association and painted by Mr. Robert Ingpen of Head Office.

It depicts the life and work of the late Sir Ian Clunies Ross, a former Fellow and President of the Australian Veterinary Association, and Chairman of CSIRO from 1949 to 1959.



A conventional portrait presents its subject as the artist sees him at an instant in time. A biography follows the life and activities of its subject, so that the reader must build up his picture of a person from an account of events spread over an extended period. The Clunies Ross Memorial Mural has some of the characteristics of both portrait and biography. Although it is made up of pictures rather than words, the mural refers to activities and events that occurred through the period of the working life of Clunies Ross. It is constructed around the central theme of Clunies Ross, the educated, civilized man, confronting ignorance, symbolized by the beast, dark, untamed, potentially dangerous, yet in some ways attractive.



Scientist Administrator Communicator

The mural is divided into three panels, which may be compared with chapters of a biography. They show Clunies Ross in the roles of scientist, administrator, and communicator. In each panel, he appears against a background related to the activities of the role. The upper part of each panel is concerned with things which might have influenced and motivated Clunies Ross. In the lower part of each panel, material considerations relating to the central activity are illustrated. In the central section of each, there is a progression in time from left to right and this movement in time continues across the three panels. The time scale, indicated by the representation across the three panels of a single stride of a galloping horse (1), suggests that the life-work of Clunies Ross, even though highly significant, is still only a small part of the continuing conflict between enlightenment and ignorance, leaving much for others to do.

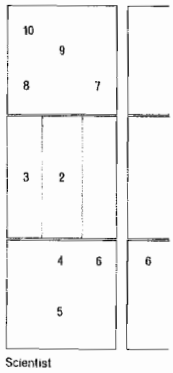
Within each of the panels, there is a further division into smaller areas. These vary in size. Those nearer the centre of each panel are larger, and generally their subject matter is closely related to the central activity with which the panel is concerned. The smaller, more distant areas show other things relevant to the central activity, but less directly related to it.

Whilst the three panels are concerned with these three major aspects of the life and work of Clunies Ross, they are interrelated and connected, as were his activities in the three roles. The mural shows how he moved from research in a specialized field to a broader concern with the administration of science, and to outstanding performance as a communicator. It emphasizes the conviction expressed by Clunies Ross in the quotation incorporated in the third panel—

> '. . . We can but hope that the time is not far distant when the Australian Government and people will no longer regard science and technology as something esoteric and apart, but as the motive force which interpenetrates and influences every aspect of our daily lives, as the ultimate source of material progress, and as the last best hope that mankind in this and other countries may outlive its age-old enemies of fear and want . . .'

Clunies Ross — Scientist

Clunies Ross graduated as a veterinary scientist and spent several years in the field of veterinary medicine as a research worker and university teacher. He is shown in the central area of the first panel (2) in this role. At the left (3) are pictures relating to subjects of study in the training of veterinary scientists. Much of his work in veterinary research was on diseases caused by parasites of animals and the area (4) below the centre of the panel is concerned with these activities. Below this are references to other fields of veterinary research in which Clunies Ross was active (5), in particular, rumen physiology and wool production in sheep.



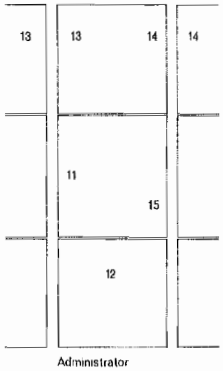
Scientist

There is evidence that the discoveries that came from research into parasitic diseases led Clunies Ross to a realization of the importance of rational management of farm animals as a means of achieving disease control in cases where eradication is not practical. This concept was developed in dealing with liver-fluke in sheep. Irrigation, which makes it possible for some areas to carry sheep, also provides the conditions for maintenance of the snails which are hosts for the fluke organisms at one stage in their life cycle. Control of the disease can be achieved through management practice based on understanding of the biology of the living organisms in the system. This concept is represented in the area at the lower right of the panel (6), continuing into the second panel where a primitive irrigation device appears within the dark mass of the body of the beast.

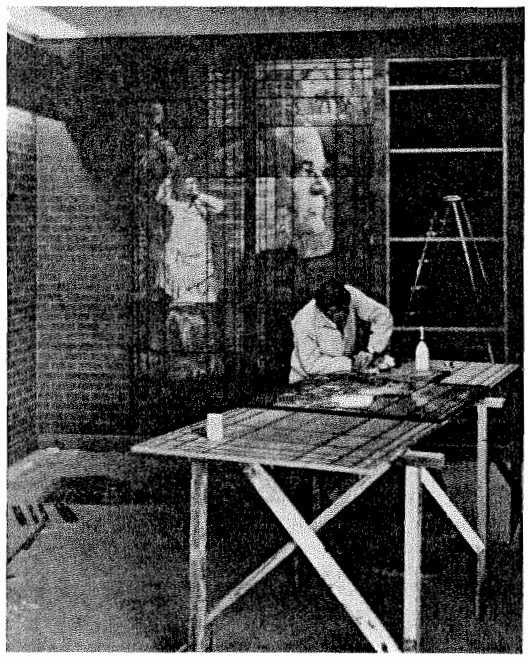
In a similar way, Clunies Ross saw that veterinary science was concerned with more than the treatment of sick animals (7). He promoted the idea, especially in the pastoral industry, that maintenance of the health and productivity of animals requires informed management methods and effective measures to prevent diseases. Clunies Ross, already deeply interested in human development through his involvement in education, was stimulated by many factors incidental to his scientific work. He observed, for instance, how there were close relationships between people and their pets (8). He saw, after travelling in the Far East, that some things that had been neglected in the West were recognized as important in the East. Whereas the West had emphasized material and physical development (9), the East had emphasized control over mental processes (10), even at the expense of physical well-being. Recognition of the importance of both aspects might well have influenced Clunies Ross in the decision to leave practical scientific work and move into the area of management of science.

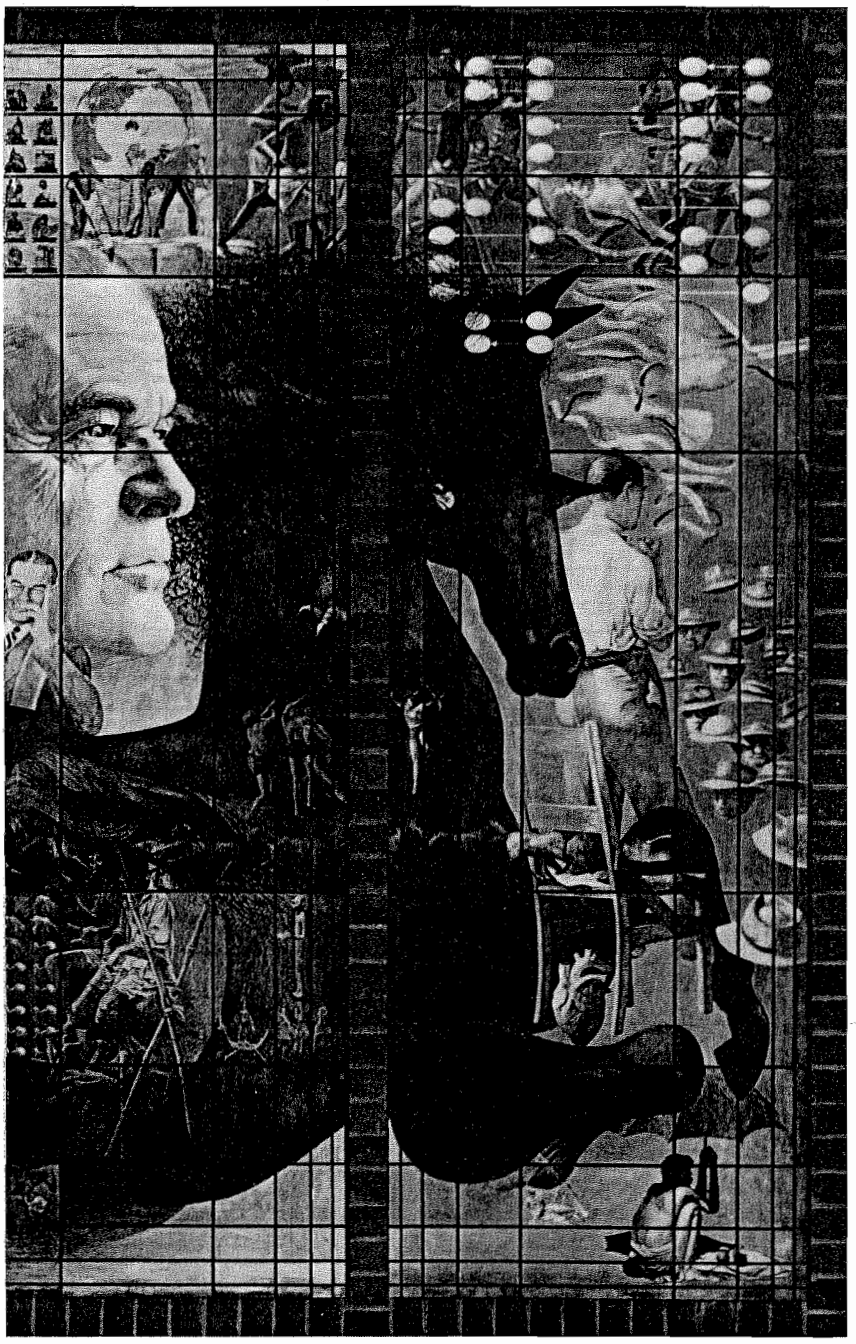
Clunies Ross — Administrator

The portrait of Clunies Ross as scientist is linked to the second portrait, Clunies Ross as administrator, by a chart (11) showing the development of C.S.I.R. and CSIRO during his career as a scientist and an administrator. Below this (12), the development of a practical technique for control of liver-fluke is suggested. The crude irrigation system is an example of the use of human effort with little benefit because of inadequate knowledge. The success of the system in bringing water to where it is needed creates the conditions for disease-producing organisms to flourish. The findings from research provide a basis for disease control, but this knowledge is of no value until it penetrates into the area of ignorance and is applied in a logical way.



Administrator



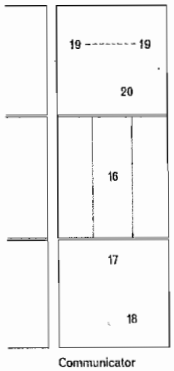


This example emphasizes the importance of following up scientific investigation with practical application and the introduction of management practices based on the scientific findings. The extension of this pattern to a whole industry, the pastoral industry, is dealt with in the upper parts of the first and second panels (13). The many factors interacting to affect the productivity of the industry are represented as chess pieces, success in their manipulation being dependent on adequate knowledge of the scientific basis of the industry. The application of this kind of thinking in one industry leads to the idea that a similar approach can apply in other industries and throughout society (14). This suggests the motivation for Clunies Ross in his third role, that of a communicator of the results of scientific research.

The problem he faced was that, although science continued to produce new information, this was not translated sufficiently quickly into practical application. While new information remained unapplied, the forces of ignorance continued to prevent the full realization of physical and mental well-being and even to cause physical and mental harm (15). Symbolically, the mural shows Clunies Ross as communicator ahead of the beast.

Clunies Ross — Communicator

The conviction that the results of research must be presented to people in terms they can understand readily led Clunies Ross to spend much time addressing audiences of many kinds. Often these were groups of farmers at field days and the central picture is of an occasion of this kind (16). He was conscious of the physical strain that this activity imposed on him (17) but was impelled to continue by his awareness of the basic human needs (18), which he realized could be met only if the resources made available through science and technology were used effectively.



Communicator

Although much of what he did as a communicator was necessarily concerned with the presentation of facts relating to particular problems in a simple, direct way, this was part of an effort to bring about a wider recognition of the contribution that science and technology could make to society. The upper part of the third panel presents a picture of a primitive society and, superimposed on it, a diagram of the flow of resources in a more complex society (19). Clunies Ross summarized his own view on the interactions between science, technology, and society in the quotation given on page 2, which appears in the mural on the ribbon carried by the three birds (20).

SAFETY NOTES

Where My Caravan Has Rested

With winter over for another year, many of you are no doubt thinking about going on a caravan trip in the months ahead. The following hints on towing caravans have been supplied by the Royal Automobile Club of Victoria.

Tow Bar

Before towing a caravan, the first and most important thing is to see that the tow bar on the car and draw bar on the caravan are free from any flexing or up and down movement. The tow bar on the car should not be fixed to the bumper bar alone, but should be attached to chassis cross members, spring hangers or to several independent points on the body.

How Much Can You Tow?

It is recommended that the LOADED WEIGHT of the towed vehicle be less than the unloaded weight of the towing vehicle, provided that the tandem operates on trafficable roads and that the towing vehicle is in sound mechanical condition.

Shock Absorbers

The shock absorbers on both front and rear of the towing car must be in good condition, otherwise the combination will pitch badly over uneven road surfaces and could become uncontrollable.

Loading

Ascertain from the maker or hirer the correct loading. This will vary with size and design of caravan and make of towing vehicle. Good forward loading is important to ensure steady towing. Steady touring speeds of about 35-40 m.p.h. are quite comfortable; higher speeds should not generally be attempted.

Load On Bracket

Many caravanners consider that the greatest strain is placed upon the towing bracket when a re-start is made on a hill, but they overlook the up and down stresses on a bumpy road, or the strain when the caravan passes at speed over a humpback bridge or portion of road.

A caravan invariably tows better when the front is slightly down and tows very badly if the front is higher than the back. When a caravan sways or pitches on normal roads, the weight on the draw-bar should be increased. Remember that 10 lbs. moved from the back to the front of the caravan means an increase in weight of 20 lbs. on the tow-bar.

Coupling

The coupling between the car and caravan provides a universal joint to allow free movement in any direction. It is incorrect to tighten the coupling with a wrench, as some component must bend or stretch and so create a danger which could be serious, particularly when crossing gutters, when maximum movement is required. Couplings should be tightened by hand. A little oil or the freeing of a tight thread or nut is often needed, but always see that the safety catch is in operation and safety chains connected.

Tyre Pressure

Tyre pressure should be increased from 2-6 lbs. when a caravan is towed.

Towing Dollies

The practice of using towing dollies is recommended for heavy caravans. (Minimum usual weight at tow-bar for use of a tow dolly is approximately 200 lbs.)

Note These Points

- Make your first run with a caravan a short one. Start out early or avoid heavy traffic to try out the "combination" for handling differences. Above all, remember, the acceleration rate of the car is considerably reduced.
- If you come to a standstill on a steep grade, it pays to chock the caravan wheels before restarting. You can get your car and the caravan at a slight angle by running back one or two feet and then starting from this position. This allows for a more gradual pull than if a straight pull is attempted.
- Before moving your caravan at any time, make it a routine procedure to walk around it to ensure that everything is ready for travel, i.e. windows fastened, the door locked, ventilators closed, parking legs and jockey wheel up, coupling properly screwed and fastened, safety catch or chains linked up, kerosene stove not over full, bottle gas turned off at cylinder, stop and tail lights connected and most important, see that no gear is left under caravan. Make sure all inside cupboard doors are securely fastened.

J. W. Hallam, Safety Officer

New Appointees

Dr. L. A. Baker has been appointed to the Division of Mineral Chemistry to study reaction kinetics in relation to extraction metallurgy. Dr. Baker graduated B.Sc. with honours from the University

Dr. L. A. BAKER

of New South Wales in 1960, and Ph.D. from the same university in 1964. He then spent two years at the McMaster University, Canada, before joining the staff of the School of Metallurgy at the University of New South Wales.

Dr. K. D. Cocks has joined the Division of Land Research to investigate methods of economic evaluation of research findings and economic aspects of agricultural land use in relation to land characteristics. Dr. Cocks graduated B.Agr.Sc. from the University of Melbourne in 1958, and M.Agr.Sc. from the same university in 1963. During 1959-60 and 1962-63 he was an extension officer with the Victorian Department of Agriculture and from 1963 to 1965 he studied at the University of Cambridge. Dr. Cocks recently obtained his Ph.D. from the University of California where he has spent the last three years carrying out research on agricultural economics.

Mr. J. J. Evans has joined the Division of Applied Chemistry to work on the synthesis of biologically active alicyclic and hetrocyclic compounds. Mr. Evans graduated B.Sc. from the University of Melbourne in 1964 and M.Sc. from Monash University in 1965. Since then he has been studying for his Ph.D. at Monash.

Dr. G. J. Faichney has been appointed to the Division of Animal Physiology to investigate ruminant digestion and intermediary metabolism of protected protein concentrates in relation to body growth and meat production. Dr. Faichney graduated B.Sc. from the University of Melbourne in 1960, M.Sc.Agr. from the University of Sydney in 1962, and Ph.D. from the University of Melbourne in 1967. He has spent the last twelve months on a CSIRO studentship at the Rowett Research Institute, Aberdeen, Scotland.

Dr. P. C. Kerridge has been appointed to the Division of Tropical Pastures to study plant nutrition and soil fertility in relation to the establishment and growth of improved pastures for dairy cattle in north Queensland. After graduating M.Agr.Sc. from the University of Queensland in 1960, Dr. Kerridge spent four years at the University of Bogor, Indonesia. He recently obtained his Ph.D. from Oregon State University.

Mr. P. H. Callington has been appointed to the Division of Chemical Physics where he will work on the development of high efficiency ion sources and study the ion optics of

Mr. P. H. CANNINGTON

mass analysing devices. Since graduating B.Sc. with honours from the University of Melbourne in 1963, Mr. Cannington has been studying for his Ph.D. in the University's Physics Department.

Dr. E. C. Potter has been appointed to the Division of Mineral Chemistry and will work at its Sydney Laboratory on problems associated with the presence of inorganic constituents in Australian coals. Dr. Potter graduated B.Sc. with honours from the University of London in 1944 and Ph.D. from the same university in 1950. From 1950 to 1951, he worked at the Paint Research Station, Teddington, and from 1950 to 1964 he carried out research on corrosion with the Central Electricity Generating Board. Since 1964 he has been Deputy Director of the Water Research Association at Marlow.

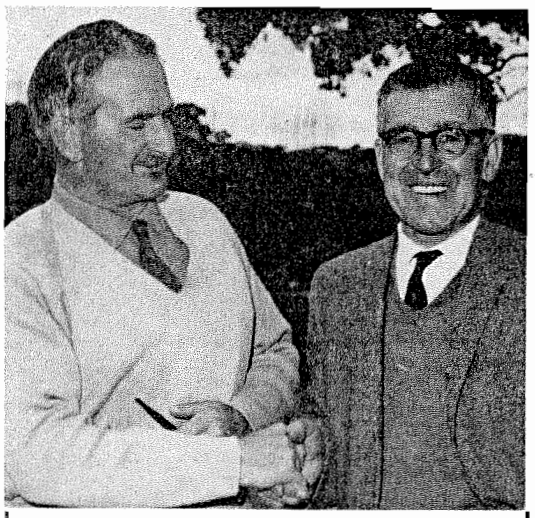
Mr. J. R. Jeffs has joined the Division of Applied Chemistry to carry out research on the adaptation and development of novel methods for separating

Mr. J. R. JEFFS

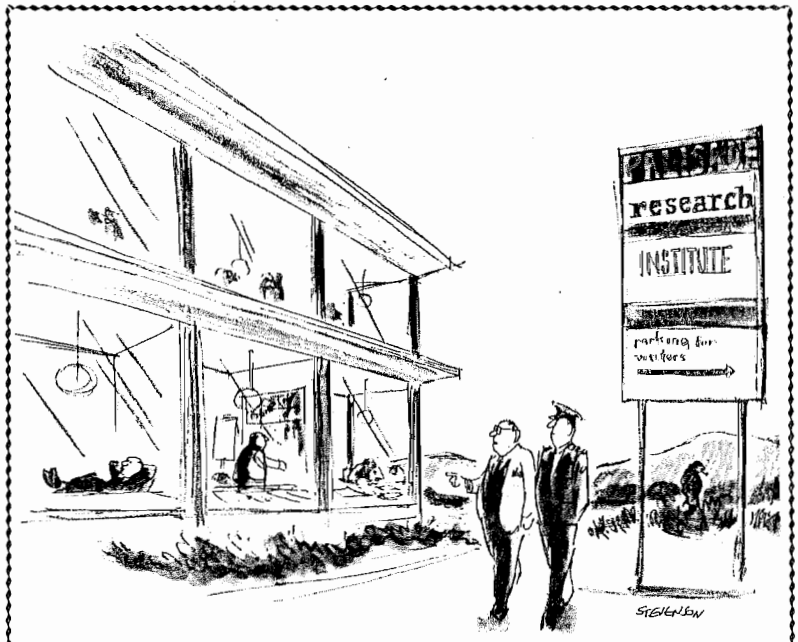
the components of natural products and mixtures of synthetic organic compounds. Since graduating B.Sc. from the University of Melbourne in 1962, Mr. Jeffs has been an analyst with the Chemistry and Physics Division of the Weapons Research Establishment at Salisbury.

Mr. T. M. Liptak has joined the Division of Building Research to work on the optimal planning and design of civil engineering and urban projects. Since graduating in civil engineering from the University of Melbourne in 1966, Mr. Liptak has been studying at the same university for his M.Eng.Sc.

Dr. D. A. Ritz has joined the Division of Fisheries and Oceanography to study the physiology of moulting and growth in the Western Australian crayfish. Dr. Ritz graduated B.Sc. with honours from the University of Wales in 1963 and Ph.D. from the same university this year.



Mr. J. A. Redpath retired from the Organization last August after 37 years with the Division of Plant Industry. Mr. Redpath joined the Division in 1931 as a member of the field staff at the Turner and Duntroon field experiment centres, Canberra. In 1940 the field station was moved to Dickson and Mr. Redpath became responsible for much of its initial development. He served as Station overseer from 1954 to 1961. Mr. Redpath then transferred to the Gininderra Experiment Station where he played an important part in the testing of new pasture species, improved methods of pasture and crop establishment, and phalaris toxicity studies. Our picture shows Mr. R. J. Hutchings (left), Supervisor of Gininderra Station, farewelling Mr. Redpath.



"Hofstetter is projecting urban blight in the 1970's, Dr. Bartley is hypothesizing after-effects of the Third World War in terms of agronomy, and Fitler, there, is, I'm afraid, wool-gathering."

Courtesy "New Yorker".

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER (EO1/2)—Upper Atmosphere Section—544/34 (5/10/68).

LEADER WHEAT RESEARCH UNIT (PRS/SPRS)—Wheat Research Unit—651/27 (11/10/68).

MATHEMATICIAN/PHYSIOLOGIST (RS/SRS)—Division Plant Industry—130/937 (11/10/68).

SAFETY OFFICER (SSO2/3)—Head Office—110/1056 (4/10/68).

CALIBRATION OFFICER (SSO1/2)—Division of Meteorological Physics—420/236 (4/10/68).

CHEMIST (SSO1) — Division of Food Preservation — 300/484 (4/10/68).

EXPERIMENTAL OFFICER ENGINEERING DEVELOPMENT (EO1/2)—Division of Mechanical Engineering—430/269 (4/10/68).

EXPERIMENTAL OFFICER (EO1/2/3)—Division of Textile Physics—465/303 (4/10/68).

WOOL TEXTILE RESEARCH (EO2/3)—Division of Textile Industry—464/453 (4/10/68).

INORGANIC CHEMIST (EO1/2)—Division of Applied Mineralogy —604/61 (4/10/68).

OVERSEAS VISITS

Dr. W. Boas, Chief of the Division of Tribophysics, left last month for London to attend an Executive meeting of the International Union of Pure and Applied Physics. Dr. Boas will also attend the "International Conference on Vacancies and Interstitials in Metals" in West Germany and visit laboratories in Britain, Europe, India and the United States before returning next month.

Dr. L. M. Clarebrough of the Division of Tribophysics left last month for Rome to attend an international conference on electron microscopy. He will also attend the "International Conference on Vacancies and Interstitials in Metals" and visit research centres in Britain before returning later this month.

Mr. O. G. Ingles of the Division of Soil Mechanics left recently for Japan, where he will attend the "Fifth International Congress on Rheology" at Kyoto and the "Symposium on Earth and Rockfill Dams" at Talwarra. Mr. Ingles will also visit laboratories in Japan and India before returning early next month.

Mr. F. J. Lehany, Chief of the Division of Applied Physics, left recently for Paris where he will attend meetings of the Radio Frequency Working Group, the Working Group for Gyromagnetic Ratio of the Proton, the Consultative Committee on Electricity, and the International Committee on Weights and Measures. Mr. Lehany will also visit New Guinea before returning in early November.

Mr. R. N. Morse, Chief of the Division of Mechanical Engineering, leaves shortly on a four-week visit to the United States where he will take part in a meeting of the United Nations Solar Distillation Panel and attend the Annual Conference of the Solar Energy Society.

Dr. W. J. Scott, Assistant Chief of the Division of Food Preservation, left last month for Japan where he will attend an international symposium on the freezing and drying of micro-organisms, and an international conference on culture collections. Before returning in December he will visit meat research laboratories in Russia, Britain, and North America.

Mr. H. E. Vivian of the Division of Applied Mineralogy left recently on a three-month visit to research centres in Japan, Korea, Hong Kong, and the United States. While in Japan he will attend the Fifth International Symposium on the Chemistry of Cement.

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 116, MELBOURNE, NOVEMBER 1968

BENEVOLENT FUND LAUNCHED IN MELBOURNE

A CSIRO Benevolent Fund to cover all Divisions and Sections serviced by the Melbourne Regional Administrative Office was launched last month at a meeting at Head Office.

The meeting was convened by the Finance Manager, Mr. R. W. Viney, and was attended by 26 representatives from Divisions in Victoria, South Australia, Western Australia and Tasmania.

The Fund will be built up from contributions of 10 cents a fortnight made on a voluntary basis by members of the staff.

Contributions will be deducted from salary payments by the Melbourne Regional Administrative Office as from the first pay in November.

It is expected that the income of the Fund will be about $5,000 a year and it is hoped to achieve a membership of at least 80 per cent. of the staff on the Melbourne salary register.

Grants from the Fund will be used to help less fortunate members of CSIRO who, through no fault of their own, are placed in extremely difficult financial circumstances.

The Fund will be controlled by a Management Committee comprising: Chairman: Mr. S. Brisbane (Applied Mineralogy); Secretary: Mr. V. Leonard (R.A.O., Melbourne); Treasurer: Mr. J. Bourne (R.A.O., Melbourne); Members: Mr. F. Blanksby (S.A. representative), Mr. J. Brophy (W.A. representative), Mr. D. James (Tasmanian representative), Dr. A. Nicholson (Chemical Physics), Mr. A. Davis (Tribophysics), Mr. F. B. Jones (Forest Products), Mr. J. Hayes (Dairy Research), Mr. B. Bond (Protein Chemistry), and Mr. K. Wenham (Soil Mechanics).

Grants from the Fund will be approved by the Management Committee and subsequently reported to the General Committee of the Divisional representatives for confirmation.

Sub-committees with Divisional representation will be set up to look after the interests of staff in each area.

Each Divisional representative will be responsible for submitting to the Management Committee any case which he considers worthy of financial support.

Provision is being made for the alleviation of cases of extreme and urgent need by giving these Committees immediate access to limited individual accounts set up for the purpose.

It is planned to extend the scheme to other States as the opportunity occurs.

The Canberra Regional Office hopes to be able to establish a Benevolent Fund during the first quarter of 1969 to cover all members of CSIRO's staff whose salaries are paid by that office.

In New South Wales several funds are operating on a Divisional basis.

It is hoped that discussions will be possible with the office-bearers concerned with the management of these funds during the next few months, with a view to arranging deductions from salary payments and for the introduction of a full-scale Benevolent Fund in New South Wales.

At a later date steps will be taken to introduce similar arrangements through the Brisbane Regional Office to cover all members of the staff located in the Queensland area.

Above: Four of the Benevolent Fund's founding fathers ponder a graphic presentation of the old saying, "Many a little makes a mickle". From left to right, they are Mr. J. Bourne and Mr. V. Leonard of the Melbourne Regional Administrative Office, Mr. S. Brisbane of the Division of Applied Mineralogy, and Mr. R. W. Viney of Head Office.

Another Record Year For Credit Society

The Eleventh Annual General Meeting of the CSIRO Co-operative Credit Society was held at Head Office on Wednesday, 30th October.

The Directors of the Society reported that the total membership of the Society at the end of the financial year 1967-68 was 2,139, a net increase for the year of 172.

During the same period, the net increase in capital of the Society was $149,500, the total capital reaching almost $1,320,000 by the end of the year.

Loans amounting to $530,000 were made to 405 members during the year. The total amount of loans outstanding at the end of the year was $1,305,600.

Over the last eleven years, the Society has lent some $2.5 million.

In their annual report, the Directors drew attention to the fact that the number of borrowers leaving the Organization in recent years had increased, as was to be expected when the continued growth of the Society as well as of the Organization was considered.

They pointed out that borrowers must finalize their amounts when leaving the Organization.

They added, however, that the Society was happy to advise borrowers intending to leave the Organization on alternative methods of refinancing their loans.

The Directors said that the recent amendments to the Science and Industry Research Act, which enabled loan repayments to be deducted direct from the borrower's salary, had been well received by borrowers and could be expected to result in useful savings in administrative costs.

With this photograph of the National Library of Australia, Mr. J. Cavanagh of the Division of Land Research won first prize in the "Progress of Canberra" section of the Fourth Annual Photographic Exhibition of the Canberra Photographic Society which was held last month. Mr. Cavanagh also won second and third prize in the same section. His National Library photograph was also awarded the Rudolph Gunz Trophy, while another entry "West Lake" was awarded the Ilford Trophy for the best entry from a Camera Club Member.

WALK ON WANT

Miss Jean Conochie of the Central Library will represent Head Office in a 26 mile walk from Melbourne to Frankston on Friday evening, December 13th, to raise money for Community Aid Abroad.

Miss Conochie is anxious to hear from sponsors who will undertake to contribute a minimum of 5 cents for each mile she walks.

In a similar "walk on want" last year, Miss Judith Stump of the Central Library raised $75 for C.A.A.

OBITUARY

Professor F. P. Bowden, F.R.S., Professor of Surface Physics at the Cavendish Laboratory, University of Cambridge, and former Officer-in-Charge of the C.S.I.R. Lubricants and Bearings Section, died in London last September after a brief illness.

Professor Bowden graduated in science from the University of Tasmania and later gained the degree of Doctor of Science at Cambridge.

When the Second World War broke out in 1939 Australia was in the process of establishing an aircraft industry, but there was nobody in the country familiar with the problems of manufacture of aircraft bearings.

However, Professor Bowden happened to be holidaying in Tasmania at the time and the Government of the day persuaded him to stay in Australia to initiate studies in this field.

He was appointed to C.S.I.R. and established the Lubricants and Bearings Section (later the Division of Tribophysics) which contributed much to the war effort.

Professor Bowden returned to England in 1944.

SCORE

MODERN OUTLOOKS IN WORLD METEOROLOGY

In September 1961, President Kennedy said, in an address to the General Assembly of the United Nations, "We shall propose further co-operative efforts between all nations in weather prediction and eventually in weather control".

This statement was certainly a milestone for meteorology; seldom does any one branch of science find itself singled out for special notice at the highest international political level.

Following President Kennedy's initiative international committees have been set up to make positive plans for the future of meteorology, and occasionally to dream their dreams, recognizing and anticipating advances in technology which could realize all of these plans and even some of the dreams.

In this article I want to take stock of the present and the future as it is emerging; what the present limitations of meteorology are, and why, and the way we hope to get round some of them, and how far we hope to get.

But first I would like to go back to the situation which existed in meteorology just over a hundred years ago when an important breakthrough occurred.

It was early last century that people first had the idea of collecting simultaneous weather observations from a number of places and putting them together on a map.

At once they saw that the pressure tended to fall into well defined patterns, that the wind blew more or less round the isobars of these patterns keeping low pressure to the left (for these were Northern hemisphere meteorologists).

They saw that the temperature and rainfall also bore close relation to these patterns of pressure and motion.

The power of this mapping method, which is now known as synoptic meteorology, soon became apparent, but for decades it remained little more than a scientific exercise because the slow collection of data by mail meant that a weather situation could not be analyzed until some days afterwards.

Scientific understanding had run ahead of practice, and meteorology had to wait for the invention of the electric telegraph in the 1860's before weather maps and forecasting services could become a practical reality.

The intervening hundred years have seen many developments in detail. There has been a great elaboration of regional networks of upper air sounding stations where temperature, pressure, humidity, and wind are regularly observed up to heights of 50 or 100 thousand feet.

This had led to a far greater depth of understanding of the way the motion and development of the pressure systems depend on the distribution of wind right through the whole depth of the atmosphere.

Although information from these increasingly greater heights is required for supersonic jet aircraft and other specialised needs, I would like to explain why it is also wanted for weather forecasts of the type required by the man in the street or on the land.

The forecaster is like a man standing on a bridge over a swirling river, watching the motion of the broad stream and the swirling eddies which lie within it, and who has to try to predict the full details of the development, the motion, and the final decay of each individual eddy.

The task is an immensely challenging one, and will remain so; complete infallibility may lie forever beyond reach. However, it is clearly a great help to be able to see not just the eddy but also the motion of the river as a whole.

This is what the observations of the upper atmosphere give us.

In most latitudes, as we go upwards, the wind takes on an increasing westerly component, and it is this that constitutes the broad stream, reaching its maximum in the jet stream at between 30 and 45 thousand feet.

This is the first of two articles by Dr. C. H. B. Priestley, Chief of the Division of Meteorological Physics. It is based on the 1968 Agricultural Bureau Oration which Dr. Priestley delivered at Bonython Hall, Adelaide, last September.

This broad stream is still far from uniform, its speed varies and its direction meanders, and it is these in turn which provide the forecaster with indications of the direction and speed with which the depressions and so on, embedded in the stream, will move.

The forecaster can also draw on more recent and more sophisticated knowledge in hydrodynamics, whereby more subtle patterns in the broad stream help to tell him whether the depressions and so on are likely to develop or decay.

The prediction of the future behaviour of a given disturbance thus depends on our having in the present a pretty good knowledge of the full three-dimensional structure of its pressure and flow pattern.

To get the flow pattern within a depression we obviously need observations at more than one point within it; in other words, we need a network of upper air measurements on a grid size smaller than that of the depressions and anticyclones whose behaviour one is required to predict.

Today we can define reasonably clearly what our area of interest is and what our grid size must be.

We are not yet sure about the tropics, but for middle and high latitudes it is generally agreed that the required grid size is 200 to 300 miles.

As for the size of the area of interest, the lower limit is set by the fact that influences from perturbations in the flow can travel typically around 1,500 miles per day.

For two days ahead we need to cover a sector 3,000 miles upstream of the forecast point, and proportionately more for longer periods ahead.

Happenings anywhere in one hemisphere are known to influence the other within three to five days. Forbidding as our requirements seem to be, it is surely something that we are able to define them in quantitative terms.

When we look at a map of the world showing conventional stations where regular upper air observations are taken, we find that only one-tenth of the area of the globe is covered with a grid approaching the specified closeness.

We recognize this grim reality at a time when we have reached the level of scientific understanding at which we can aspire to make predictions five days ahead: some meteorologists would say ten or even more days ahead.

These predictions would be detailed predictions, to a degree likely to be useful in scheduling farming operations. They would not be certain, but one could expect a considerable measure of success, provided we had observations everywhere they were needed.

Yet to cover the remaining 90% of the globe with the same density of conventional stations would involve an increase in world expenditure not of one but of two orders of magnitude; simply because the 90% includes the oceans, deserts, and other inaccessible parts and the air overlying the less developed countries, where data-getting is much more expensive.

It would seem that the final target is beyond reach financially unless we can find completely new and cheaper observing techniques to provide data from the vast empty areas.

However, if we assume for the moment that the observing problem has been solved, and that we have observations from a network covering the globe and with a grid size of 200 miles, this amounts to about 5,000 stations.

The complexity of vertical structure suggests that we should specify values of our variables at about ten levels at each station. $5{,}000 \times 10 = 50{,}000$ points.

There are seven basic variables at each point whose change we require to predict, namely three components of air motion (northwards, eastwards and upwards), pressure, temperature, density and humidity. $5{,}000 \times 10 \times 7 = 350{,}000$ variables.

This mass of information is more than a man's mind can handle and the actual job has only become feasible since the advent of the electronic computer.

One of the essential difficulties of the computation is that we cannot proceed forward in very long steps of time: as the computer technicians say, the computation "blows up" if we try to take time steps longer than about 10 minutes, so that a 24-hour prediction involves 144 time steps.

A 24-hour prediction for the globe may therefore require the computer to solve $5{,}000 \times 10 \times 7 \times 144$, and that means 50 million equations.

The fastest computer in operation today takes about 24 hours to do this calculation.

It is no wonder that the mathematician von Neumann, who fathered the modern electronic computer, considered the atmospheric problem to be "as complex and difficult a physical and mathematical puzzle as has yet been posed to the human mind".

The atmospheric problem has historically been one that has set the pace for the development of the modern computer, and it does so still.

Nevertheless, there is no reason for despair because there is already the prospect for the early 1970's of computers 100 times faster than those available today.

Our present position is like that of a hundred years ago, in that once again we feel that our scientific understanding justifies us in believing that we could radically improve the range and quality of meteorological services to the community.

However, before such predictions can be made, there must be advances from outside the science, firstly in computer technology and secondly in the development of quite new observing techniques to fill areas now empty of information.

The solution to the computing problem is in the offing, and we expect that satellites, capable of carrying instruments and circumnavigating the globe every two hours, will herald the breakthrough in data acquisition.

Quite recently scientists have had the idea that much information could be obtained from balloons travelling horizontally and remaining in the atmosphere rather than released from fixed stations and going up until they burst.

Balloons have now been developed to level off at a predetermined height.

So long as these stay up, and can be tracked, they will continue to yield measurements of the winds.

In a feasibility trial carried out in the Southern hemisphere, one balloon stayed at 40,000 ft. and was tracked for 351 days, completing nearly 30 full circuits of the hemisphere.

There are plans under way to distribute balloons carrying instruments sensitive to temperature and humidity, over the hemisphere, and later the globe.

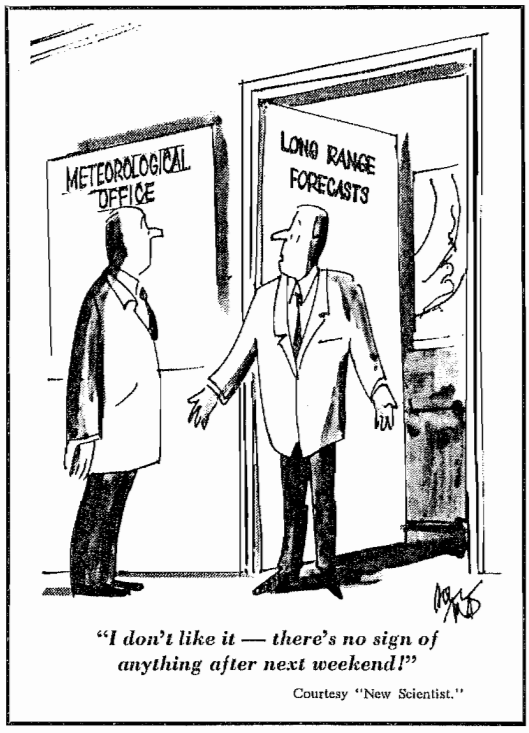
These balloons, which, incidentally, present no danger to aircraft, will yield their position and their measurements on interrogation by a satellite which would relay the information to earth.

There is thus a good prospect for much more information from levels of 30 and 40 thousand feet on a global basis in a few years time.

Unfortunately all levels are not equally promising. At higher levels the balloon's lifetime is shortened by ultraviolet radiation, and at lower levels by weather phenomena themselves, such as icing, or by actual collision with mountains.

Coming now to satellites as observing platforms, rather than as communication links, the most spectacular development so far is that of cloud photography from the satellite.

(Continued on page 4)



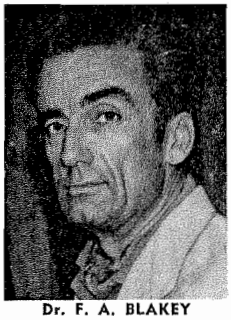
"I don't like it — there's no sign of anything after next weekend!"

Courtesy "New Scientist."

News In Brief

Assistant Chief

Dr. F. A. Blakey has been appointed Assistant Chief of the Division of Building Research. Dr. Blakey graduated in engineering from the University of Western Australia and obtained the degree of Doctor of Philos-



Dr. F. A. BLAKEY

ophy from the University of Cambridge for his work on the deflection of concrete members. He joined the Division in 1949 and has been Officer-in-Charge of its Concrete and Technology Section since 1951.

Doctorate

Dr. G. H. Taylor of the Division of Mineral Chemistry has been awarded the degree of Doctor of Science by the University of Melbourne.

Engineering Award

Mr. R. Birtwhistle of the Division of Building Research and **Mr. P. A. Taylor** of the Division of Mechanical Engineering have been awarded the Engineering Applied to Agriculture Award for 1967 by the Institution of Mechanical Engineers, Britain, for their paper, "Experimental studies of force systems on steered agricultural tyres".

Clearance Sale

Last September a clearance sale was held at "Gilruth Plains", the former field station of the Division of Animal Genetics at Cunnamulla, Queensland.

Everything which could be moved was sold, many items bringing better than new prices.

Included in the auctioneer's catalogue were such curious items as:

Wooden stove with flu

6 tins Pigmie *(He meant pigment)*

Master Mister *(A "mist-master"?)*

1 tin Dogs

2 Toe ropes *(Without shoes)*

A Dinning Table (vynyl) with 8 Laminex chairs.

The pigmies were sold along with everything else.

The financial success of the day was attributed by some to the thousands of flies which the 800 buyers had to brush away from eyes, ears and noses.

Visitors

Dr. Thor A. Bak, Professor of Theoretical and Physical Chemistry at the University of Copenhagen, visited the Divisions of Applied Chemistry, Chemical Physics, and Forest Products last September and gave seminars on his work in chemical kinetics and irreversible non-linear thermodynamics.

Dr. J. M. Bremner, Professor of Soils at Iowa State University, is at present working with a research group of the Division of Soils at the Cunningham Laboratory, Brisbane, on nitrogen losses from soils and the soil-plant system. Dr. Bremner's visit has been made possible by a John Guggenheim Fellowship. He will work with the Division until next March.

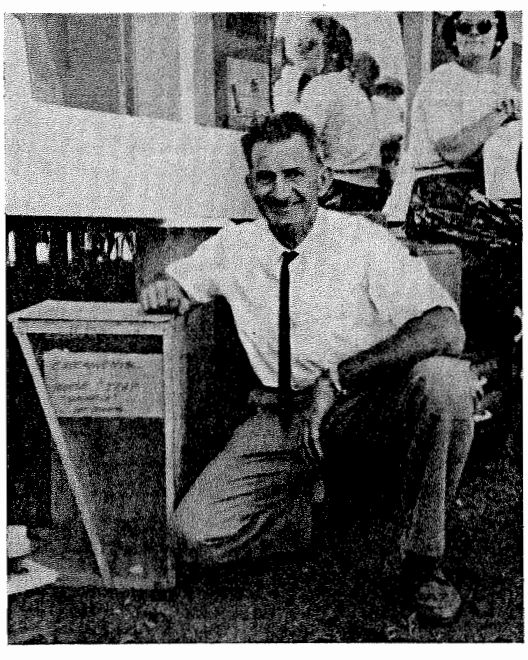
Professor J. J. Lyons, Chairman of the Department of Vegetable Crops at the University of California, is spending twelve months sabbatical leave with the Division of Food Preservation where he is studying metabolic processes related to senescence in plants, especially the ripening of fruits.

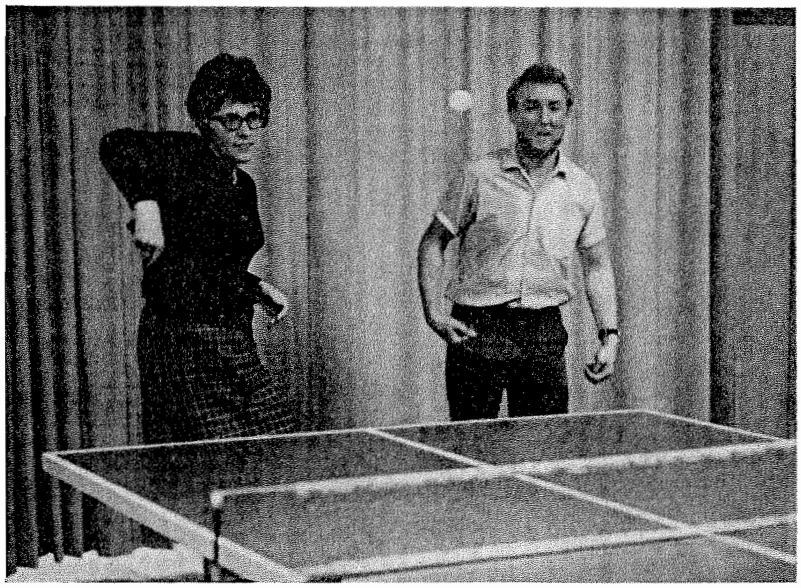
Win for Ski Team

Competing for the second time in interclub racing, a team from the CSIR Ski Club won the "C" Grade Club Championship at Mt. Hotham, Victoria, on Saturday 28th September.

The successful team comprised **Miss Rhonda Pilkington,** daughter of **Mr. E. Pilkington** of the Division of Mineral Chemistry, **Mr. R. R. Hughan** of the Division of Applied Mineralogy, and **Mr. C. J. Restarick** of the Division of Chemical Engineering.

Below: No-one was certain what this left over piece of laboratory equipment was so it was described as an experimental mouse trap and given the name "Sirokatch". It was bought by a local resident for use as a chicken feed hopper.





Above: Miss Pauline Nichols and Mr. R. Gosman of the Protein Chemistry "D" Team demonstrate the championship form with which they smashed their way to victory.

Divisions Clash

Last September the Division of Textile Industry played host to a team of table-tennis players from the Division of Protein Chemistry.

Each Division fielded a team of 16 divided into 4 grades.

Protein Chemistry emerged triumphant, scoring 28 wins to Textile Industry's 4.

Cause For Confusion

Members of the press, radio and television descended excitedly on the lounge at Launceston Airport last month following a tip-off that **Dr. Christian Barnard** was on a flight to Melbourne after a quiet holiday in Tasmania.

When the familiar, lean figure of the famous heart-transplant pioneer was nowhere to be seen, Dr. Barnard was paged.

Non-plussed, Dr. Barnard came forward. He was **Dr. Colin Barnard** of the Division of Plant Industry who had been attending a two day conference at the Mount Pleasant laboratories of the Department of Agriculture.

Convincing Demonstration

A salesman was demonstrating a new photo-microscope to a group of scientists at the Division of Forest Products recently.

Several of the assembled onlookers asked if they could see the lens system.

The salesman explained patiently that one of the virtues of this particular instrument was that the lens system was enclosed in a completely dust free case and therefore never needed any maintenance. To open up the case would only expose the lens system to the dangers of contamination.

Undaunted, his audience persisted. If they couldn't see the lens system they didn't want to buy it.

Mumbling protestingly, the salesman produced a screw driver and with ill concealed lack of grace proceeded to unscrew a panel from the side of the case.

He removed the last screw and moved the panel aside—and out flew two large moths!

Deadline

Contributions to the December issue of Coresearch should reach the Editor at 314 Albert Street, East Melbourne, by Thursday, 12th November.

SAFETY NOTES

Where My Caravan Has Rested

This month we continue our hints on towing caravans. The following information has been supplied by the Royal Automobile Club of Victoria.

Braking

Independent brakes fitted to a caravan should be applied before the car brakes, especially on loose gravel or under wet conditions. The braking efficiency of a car is greatly reduced when towing a caravan not equipped with independent brakes, due to the weight of the van. It is therefore necessary to allow for this before braking or when travelling in traffic. Before descending a hill, always engage the gear that would have normally been used to make the ascent of that hill.

Driving

The art of caravan towing involves a gentle take-off without excessive riding of the clutch. Avoid a re-start from standstill on a steep up-grade. Do not stop on loose gravel or grass, which would reduce traction between the tyres and road surface. Engine revolutions mean power and an engine should not be allowed to labour.

It is wise to change down a gear when the accelerator has no effect over half throttle. A racing engine used up a long climb is frequently the cause of a normal engine overheating, so make sure your road speed is in relation to the gear being used and do not over-rev your engine.

To make a turn on a steep hill, avoid cutting the corner and do not ease off the accelerator. It is better to build up engine revolutions (and power) by changing down a gear to take a corner, then changing up a gear when clear of the corner.

Turning and Overtaking

Do not turn off sharply as soon as your car is through a gateway or camping ground entrance in case you have not allowed the caravan tail to clear the gateway before the car hauls it around. On the road, be particular about overtaking other cars and avoid cutting in.

Do not overtake unless you have a clear road ahead. When you have overtaken a car, do not pull into the left until you have allowed for the additional length of your caravan. Even experienced caravanners have sometimes been "caught".

Be careful about kerbside parking where telegraph or verandah poles are near the kerb. The camber of some roads will throw the caravan roof over some 12 or 18 inches, resulting in a bad rub when pulling away.

When "U" turning around an obstacle, remember that a caravan describes a smaller arc than that of a car and will "cut the corner".

Reversing

Those who have not had experience in towing caravans, should avoid unnecessary reversing. When approaching a turn-off point, take care not to over-run the turn. Make sure of the route, so that you do not have to back-up to a missed turn. If you do miss a turn off, it is better to turn round rather than back up any long distance.

However, if the road is too narrow, it will probably be easier to unhitch the caravan, turn the car (and the caravan if necessary) and hitch up again. If there is the slightest incline, do not uncouple until the caravan wheels are securely chocked.

J. W. Hallam, Safety Officer.

APPOINTMENTS TO STAFF

Dr. H. C. Barrett has been appointed to the Division of Horticultural Research and will work at Merbein, Victoria, on the mechanical harvesting of grape vines and on evaluating the effects of various trellising and pruning systems, both for drying and wine grapes. Dr.

Dr. H. C. BARRETT

Barrett arrived in Australia last month from the United States where he was Associate Professor of Plant Breeding, Department of Horticulture, University of Illinois. Dr. Barrett graduated B.S. from the University of Illinois in 1948 and Ph.D. from the same university in 1952.

Dr. T. E. Bellas has joined the Division of Entomology and will work on the synthesis of biologically important compounds labelled with stable isotopes. After graduating B.Sc. with honours from the University of Western Australia in

Dr. T. E. BELLAS

1958 and Ph.D. from the University of Sydney in 1963, Dr. Bellas spent 18 months at University College, London, on a CSIRO studentship, followed by a year at the Worcester Foundation for Experimental Biology at Massachusetts. Since August last year he has been with the Life Sciences Division of the Stanford Research Institute, California.

Dr. June Cumbrae-Stewart has been appointed to the Division of Food Preservation and will work at the Tasmanian Regional Laboratory, Hobart, on problems concerned with the processing and preservation of fish, crayfish and shellfish. Dr. Cumbrae-Stewart graduated B.Sc. with honours from the University of London in 1944 and Ph.D. from the same university in 1950. Since 1951 she has been working at the Ministry of Technology's Torry Research Station at Aberdeen, Scotland. She recently obtained her D.Sc. from the University of London.

Dr. C. L. Gupta arrived in Melbourne last month from India to take up an appointment with the Division of Building Research where he will study indoor thermal environment and factors affecting

Dr. C. L. GUPTA

it. Dr. Gupta graduated M.Sc. from the University of Delhi in 1961 and Ph.D. from the University of Roorkee in 1967.

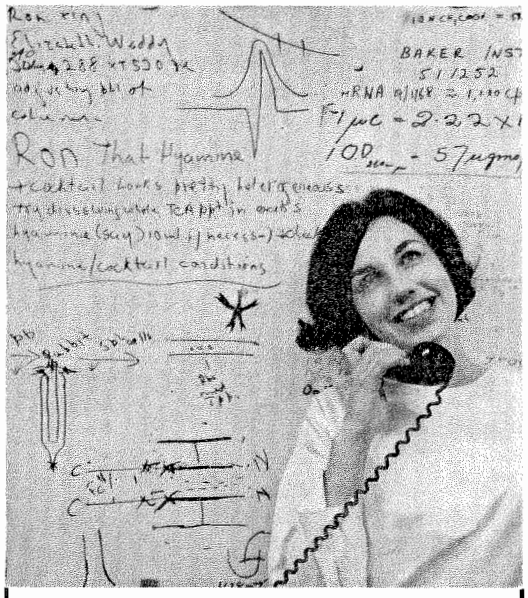
Dr. T. McAllister has joined the Division of Chemical Physics and will work on the elucidation of chemical structure and energetics by mass spectroscopic techniques. Since graduating B.Sc. with honours from Queen's University, Belfast, in 1963, and Ph.D. from the same university in 1966, Dr. McAllister has been working at the Canadian National Research Council's Division of Pure Chemistry, Ottawa.

Dr. J. M. Norris has been appointed to the Division of Soils to investigate the interrelation of soil profile features and their significance in crop production. Dr. Norris graduated B.Sc. with honours from the University of Durham in 1965 and recently obtained his Ph.D. from the same university.

Mr. G. J. Walker has been appointed Divisional Editor of the Division of Food Preservation. He will edit scientific and technical papers and prepare technical and semi-technical reports of the Division's work. Mr. Walker joined the Infor-

Mr. G. J. WALKER

mation Section of CSIRO in 1950 after graduating M.Sc. from the University of Melbourne. From 1954 to 1957 he worked as a chemist with the Melbourne and Metropolitan Board of Works and since then he has been a chemist with the P.M.G. Research Laboratories, Melbourne.



In "The Merchant of Venice", Bassanio says of Portia: "Sometimes from her eyes I did receive fair speechless messages". That might be all very well for Shakespeare, but, when there's work to be done in the laboratory, Genevieve Slack of the Division of Animal Health finds that it's necessary to rely on more positive means of communication.

Outlooks In World Meteorology

(Continued from page 2)

With this technique one can record on film a whole day's cloud development over an enormous area such as the whole of the Pacific Ocean.

Satellite cloud photography has one shortcoming, it does not make measurements of the type which can be fed into a computing system.

It may still take years of experience to learn to extract the full information from this new and grander view of the clouds, but there are already a host of other instrumental satellite prospects which we hope will help us.

Some of these are under experiment, some on the drawing boards, and others as yet still only at the visionary or dream stage.

Looking down at the ocean with an instrument known as a radiometer, a satellite can record the radiation from the surface.

Since radiation depends on the temperature of the emitter, we obtain information on the distribution of sea surface temperature.

It is now becoming widely recognized that sea surface temperature plays a major part in governing atmospheric processes, particularly in the longer term context such as abnormal seasons, and this aspect will be worked on intensively as the information begins to accumulate.

At the same time, the glitter pattern observed at the satellite from reflection of sunshine by the wavelets affords a measure of the wind speed at the surface.

With a more elaborate type of radiometer now under preliminary test, the satellite will be able to look down on radiation emitted from the atmosphere by a minor constituent such as carbon dioxide, and from this we hope to be able to reconstruct the distribution of temperature with height.

This distribution of temperature with height is of course what a radiosonde gives, but the difference is that each radiosonde has to be sent up from one fixed station and at the cost of considerable manpower, whereas a satellite, once in orbit may cover the whole globe within 24 hours.

As a serious disadvantage, it will not be able to see downwards through clouds, so that such soundings would begin at the top of the atmosphere and finish at the height of the cloud tops.

It seems then quite possible that from these sorts of devices the meteorological office of the future will have quite a bit of information from above such places as the oceans and deserts, but that there will be more and somewhat better information from the top of the atmosphere than from the bottom.

This is the opposite of how data comes from conventional stations today.

Moreover, despite the impression I may have given, a satellite is not a box of conjuring tricks: it is basically just an observing platform, viewing the atmosphere upside down.

The scientist not only faces the challenge of understanding the detailed dynamics of the circulation, but he knows that, in order to do so, he has to turn his present thinking upside down, perhaps inside out as well.

(Part 2 of this article will appear in the December issue of Coresearch.)

". . . . . Sex and violence everywhere!"

Courtesy "Saturday Review"

OVERSEAS VISITS

Mr. C. S. Christian of the Executive will attend the 5th Meeting of the Commonwealth Scientific Committee, in Karachi, Pakistan, from 10th to 24th November.

Mr. F. A. Dale of the Division of Forest Products will spend three weeks in New Zealand this month. Mr. Dale will visit the Forest Research Institute at Rotorua, have discussions with the N.Z. Forest Service and the N.Z. Railways, and inspect timber preservation plants.

Mr. P. A. Grant, Assistant Secretary (Industrial and Physical Sciences), left last month on a six week visit to International Wool Secretariat offices and patent attorneys in South Africa, Britain, Europe, North America, Japan and Hong Kong.

Dr. A. L. G. Rees, Chief of the Division of Chemical Physics, returns shortly from overseas. Dr. Rees attended a meeting of the Executive Committee of the International Union of Pure and Applied Chemistry in Paris and visited laboratories in Britain and the United States.

Mr. G. T. Sibley of Head Office will attend the 5th Meeting of the Commonwealth Scientific Committee in Karachi this month and will visit research organizations in Thailand, Taiwan and the Philippines before returning in mid-December.

Mr. J. H. Taplin of the Division of Applied Mineralogy left last month for Tokyo where he has been attending the Fifth International Symposium on the Chemistry of Cement. Mr. Taplin will visit laboratories and cement companies in North America, Britain and South Africa before returning next February.

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CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 117, MELBOURNE, DECEMBER 1968

New Tropical Pastures Chief

Dr. E. M. Hutton, Assistant Chief of the Division of Tropical Pastures, has been chosen to succeed Dr. J. Griffiths Davies as Chief of the Division. Dr. Hutton will take up his new appointment when Dr. Griffiths Davies retires next May.

On graduating B.Agr.Sc. from the University of Adelaide in 1933, Dr. Hutton joined the South Australian Department of Agriculture to carry out field investigations of pastures.

Two years later he became Assistant Plant Breeder at Roseworthy Agricultural College.

He was awarded the degree of M.Sc. by the University of Adelaide in 1940, and in 1941 he joined the Division of Plant Industry, where he began research on the genetics and mechanism of virus resistance in the potato and the tomato.

This work led to the development of high yielding virus resistant potato and tomato hybrids, and, in 1950, to his being awarded the degree of Doctor of Science by the University of Adelaide.

Dr. Hutton also undertook work on the breeding of temperate pasture species.

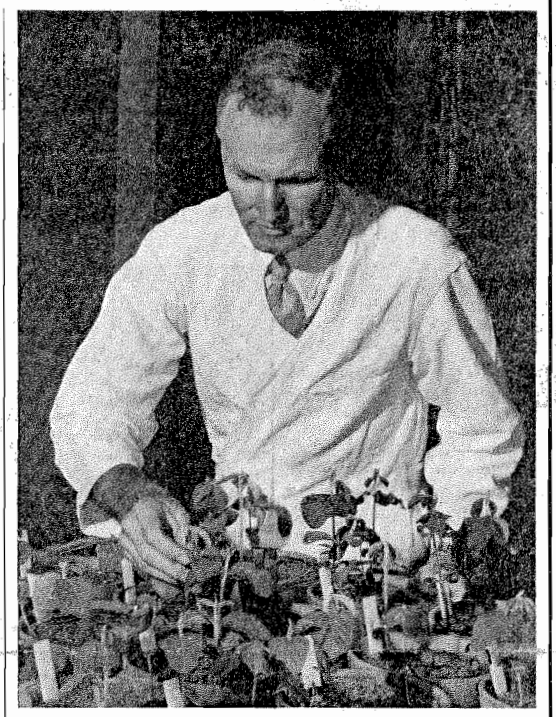
In 1954 he transferred from Canberra to Brisbane where he began a programme of plant breeding aimed at the improvement of sub-tropical pasture species, particularly legumes.

His most outstanding achievement was the breeding of a new tropical legume known as Siratro.

In 1959 the Division of Plant Industry's pasture research team in Queensland became the Division of Tropical Pastures, and in 1964 Dr. Hutton was appointed Assistant Chief of the Division.

Dr. Hutton was Federal President of the Australian Institute of Agricultural Science in 1966/67 and was elected a Fellow of the Institute in 1967.

He was awarded the Farrer Memorial Medal for 1968 and in June this year he delivered the Farrer Memorial Oration in Sydney on the subject "Australia's Pasture Legumes".



Above: Dr. Hutton examining young Siratro plants.

NEW CHAIRMAN FOR CREDIT SOCIETY

Mr. R. W. R. Muncey, Chief of the Division of Forest Products, was elected Chairman of Directors of the CSIRO Co-operative Credit Society at a special meeting of the Board of Directors last month.

He succeeds Mr. Ives who resigned from the post of Chairman of Directors following his appointment as Secretary of the Department of Primary Industry.

Mr. R. W. R. MUNCEY

A graduate in engineering from the University of Melbourne, Mr. Muncey joined the CSIR Lubricants and Bearings Section in 1943.

He transferred to the Division of Building Research in 1946 and became Chief of the Division of Forest Products in 1966.

MR. IVES TO HEAD PRIMARY INDUSTRY

Mr. W. Ives of the Executive has been appointed Secretary of the Department of Primary Industry

He will take up the appointment in January as successor to Mr. A. C. B. Maiden who will become Managing Director of the International Wool Secretariat.

Mr. Ives has worked closely with the primary industry organizations in the past and with the Department of Primary Industry.

He is Chairman of the Australian Meat Board Selection Committee which advises the Minister for Primary Industry on appointments to the Meat Board.

He is also a member of the Australian Wool Board's Production Research Committee and the Australian Dairy Produce Research Committee.

After graduating in economics from the University of Sydney in 1938, Mr. Ives joined the Bank of New South Wales as a research officer in agricultural economics.

He received the degree of Master of Economics in 1942 and was appointed to the Rural Industries Division of the Department of War Organization and Industry and later the Rural Division of the Department of Post-war Reconstruction.

In 1945 he became a senior research officer in the Bureau of Agricultural Economics and in 1946 he joined CSIRO as Technical Secretary of the Division of Plant Industry.

Mr. Ives was made an Assistant Secretary of Head Office in 1949 and Secretary (Biological Sciences) in 1952.

Mr. W. IVES

From 1954 to 1956 he served in London as Chief Scientific Liaison Officer.

He was appointed Executive Officer in 1959, Associate Member of the Executive in 1962, and Member of the Executive in 1966.

Following his new appointment, Mr. Ives has resigned from the position of Chairman of Directors of the CSIRO Co-operative Credit Society, a position he has held since the foundation of the Society in 1957.

Advisory Council Meets in Sydney

The thirty-eighth meeting of the Advisory Council was held in Sydney on Tuesday, 12th, and Wednesday, 13th November.

A report presented to the Council said that CSIRO's research for the Australian mineral industry had been expanded greatly in recent years and had been reoriented to the rapid developments taking place in Australia today.

There were now 167 professional and 201 other staff engaged in research for the mineral industry, compared with 122 professional and 143 others in 1962.

Annual expenditure in this field had risen from $1,280,000 to $2,637,000 over the same period.

Dr. A. E. Pierce, Chief of the Division of Animal Health, told the Council that Australia's $1,000 million export trade in animal products would be prejudiced if foot and mouth disease gained entry to Australia.

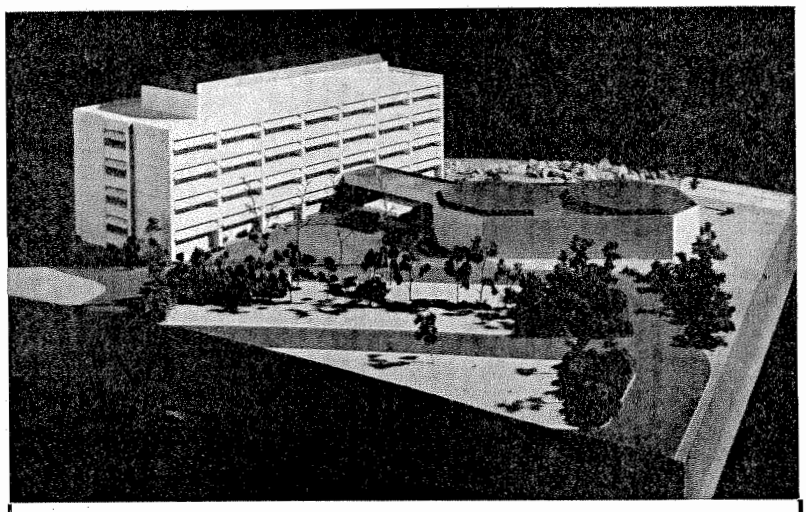
He said that a special maximum security laboratory was a vitally important facility which Australia needed urgently.

Such a laboratory might cost about $9 million, but it could mean early isolation, identification and diagnosis of a virus, and would speed up the production of a vaccine.

Mr. M. V. Tracey, Chief of the Division of Food Preservation, spoke to the Council about the importance of research on flavour in food.

He said that a number of novel sources of food were being explored for feeding the world's expanding population, but that some of the exotic foods produced had been unacceptable on flavour grounds although they were highly nutritious.

The addition of natural flavours produced by synthetic means might solve the problem.



Above is a model of the new Head Office to be built for CSIRO in Canberra. The building was designed for the National Capital Development Commission by the Sydney architectural firm of McConnel, Smith, and Johnson. It is expected that the building will reach the stage for calling tenders by next June. The model shows how the Head Office will look when viewed from the north-east looking towards the main entrance. The low buildings to the right comprise the conference area.

S(COR)

MODERN OUTLOOKS IN WORLD METEOROLOGY

Given that the next decade will see a fully operative World Weather Watch, a computer fast enough to keep pace with nature, and sufficient first-class people to answer the scientific challenges and feed the machine with ever-more-realistic models, what practical benefits will accrue?

Naturally there is some division of opinion among the experts, but most would expect at least a doubling of the time scale of the detailed weather forecast.

That is to say, the sort of accuracy achieved today at two days ahead will be extended to four or five, with some useful information in the form of a further outlook for 10 days, possibly longer.

Of equal significance, measurement of the atmosphere and of sea surface temperatures on a global scale will bring a deeper understanding of what we term the general circulation of the atmosphere, and so open the door to a proper scientific approach to longer term phenomena such as droughts, warm or cold seasons, and climatic fluctuations.

I must repeat that at no point of the time scale can one promise infallibility; the problem is just too difficult for that.

At the longer distances the forecast may prove to be no more than a probability, a "shade of odds".

But a shade of odds, a season or more away, should have considerable impact if it is recognized for what it is and intelligently exploited.

Moreover it seems likely that an overall trend for a group of seasons may prove more predictable than one individual season.

The scientist is also excited by the possibility of using his computer to predict the consequences of imaginary situations as well as real ones.

Americans and Europeans have dreamed of damming the Bering Straits and so making their climates less harsh: but that this effect would follow is only an intelligent guess, to which the computer would bring far greater certainty.

In exploratory studies of this sort the computer will be able to ring the changes on the various alternatives at a rate far greater than nature does.

In short, large scale meteorology will become an experimental science as well as just an observational and predictive one.

In this country we could learn how closely the monthly rainfalls follow the sea surface temperature offshore, and whether rainfall could be significantly increased by modifying the surface of some of the more unproductive land so as to increase the amount of convection.

We could study the effects on future climate of allowing atmospheric pollution to continue unchecked.

These are just some of the possibilities.

Weather modification on the larger scale can be seriously envisaged as a target of the future, but a depth of understanding of all the ramifications must come first, otherwise havoc could ensue.

Now, since the World Weather Watch will cost money, the question will be asked as to how certain are the benefits which the scientists hope for.

Since the experiment has never been tried, the only true answer is that indeed we can't be sure.

However, there is a reasonable prospect, and the dividends could well outweigh the cost a hundredfold or more, so we would be failing in our obligations if we did not point out what could be done and be ready with plans to do it.

Whether or not to implement the plans will rest with the United Nations, the consortium of world governments, and in finally coming to this decision, the UN will have to face a calculated risk.

For we admit that our techniques of exploitation are by no means finally developed, in fact can only be fully developed on the basis of a complete world network of observations.

No amount of advanced theorizing will guarantee success.

So we are in a bit of a vicious circle, and to get out of it we are proposing a programme known as the Global Atmospheric Research Programme, referred to under the somewhat ugly name of GARP.

This is the second of two articles by Dr. C. H. B. Priestley, Chief of the Division of Meteorological Physics. It is based on the 1968 Agricultural Bureau Oration which Dr. Priestley delivered at Bonython Hall, Adelaide, last September.

The idea of GARP is that about the mid-1970's, as soon as a considerable body of the projected devices have been developed and tested, a trial programme of intensified, world-wide observation will be run on a non-operational basis.

That is to say it will not at this stage be fed into the forecasting offices, but will be used as research material for the workers to make a real assessment of the benefit accruing from running such a programme permanently.

As the ultimate objectives include the development of longer range forecasting, it is self-evident that GARP will have to be sustained for at least a year in order to cover all seasons.

The full GARP will require a number of preliminary observational experiments, more regional in nature, to provide corner-pieces of the ultimate jig-saw puzzle.

One such experiment, "Project Wangara", was carried through by Australian meteorologists on the flat plains of the Riverina last year.

A much more ambitious one, requiring international collaboration in the tropics, where processes are least well understood will be launched as soon as practicable.

Thus even though the full GARP may be almost ten years off, the detailed planning of it and of its sub-programmes is already under full steam, as indeed it has to be for the largest piece of international scientific collaboration ever yet projected.

No doubt there will be some setbacks and disappointments, as there were 100 years ago when synoptic meteorology began. But, once again, an air of expectancy prevails.

I would like to bring out four points which were implied though not stated in what I have said so far.

- Meteorology, especially today, is essentially international, in that the quality of work and progress in any country is dependent on the standards and practices currently prevailing in all others: for example, improvements in Australian forecasting depends on high quality of observations from South Africa and South America. There are few if any other activities in which this applies with such force.

- While the main impetus and technological advances have come from the Northern hemisphere, the greatest relative advantage may well accrue in the Southern, because of its present handicap, as an oceanic hemisphere, in terms of conventional sounding stations.

- On the other hand, however advantageously we in Australia are placed by geography, we shall not draw our full benefits unless we prepare a larger and more fertile body of expertise. The hardware may be provided, but the solution of local, regional and even hemispheric problems must be sought internally. In this country, Meteorology has been treated rather like Cinderella by our ugly sisters in science and by the universities. It is time that the science of the weather was given a place in the sun.

- Quite apart from what is achieved technically, the demonstration of goodwill and the reality of practical international collaboration of this sort are by no means insignificant in helping to generate a wider mutual understanding and reduction of world tensions. The principal regret of all those participating is that there remains one major country and territory which, being outside the United Nations, is excluded from making its full contribution to this common cause.

"I'll tell you what gets me down about this job — it's having to turn out in all weathers!"

Courtesy "New Scientist"

Most of what I have said so far has been on one main topic, the general circulation of the atmosphere. I have concentrated on this because it is the most exciting situation which has existed in meteorology in my own lifetime, and the one most pregnant with potential benefits to the community.

However, I would not like to leave you thinking that a modern meteorologist regards his subject as beginning and ending with forecasting and with the provision of climatic statistics, important though both these services are.

Of recent years, much publicity has attended the widespread attempts to increase rainfall by artificial seeding of clouds. Whatever view one may hold of the degree of success attained so far, and this is known to be a controversial question, it is one avenue of research which must certainly continue.

So, surely, must research be directed towards making the utmost use of the rain which falls.

Here the meteorologist will continue to be concerned with questions about evaporation, and thereby help to see that our water storage and irrigation schemes are planned and operated at greatest efficiency.

Different surfaces and different crops evaporate at different rates, and may vary in the extent of their dependence on the controlling elements of wind, radiation and air temperature.

Studies are being pursued of all these factors, and on methods of reducing evaporation from storages, and reducing evaporation from crops without interfering with their growth.

In this way meteorology blends closely into studies of natural processes in plants.

Historically, in this country, a group of meteorologists provided the initial stimulus for much of the work which is done today on the interrelationships between plants and animals and their environment.

A new grouping is now emerging, known as "environmental sciences", where meteorologists and some others trained in physical sciences get together with botanists, conservationists, and others from the biological side.

We note with pleasure a movement in some university departments towards lowering the barriers which have previously tended to keep these types of people apart: one might even say, push them apart.

This is a trend which could make a major impact in Australia.

Central to environmental science is the special topic known as micrometeorology, concerned with the details of what is happening in the layers very close to the ground.

Normal air temperatures are taken from a screen at a height of 4 feet, but the surface of bare ground may be 30 to 40° warmer than this by day and 10° or so colder at night.

An insect or the tip of a seedling may therefore experience in a single day a bigger range of climate than a man, standing upright, would experience in a year.

The air motions near the ground are just as irregular, relative to the average motion, as the large-scale currents which I discussed earlier.

It is the eddies within them, which can now be detected with properly sensitive instruments, which control the heat and moisture balance of plants and animals outdoors, and hence their health and growth of tissue.

Oddly enough, too, micrometeorology plays a key part in the general circulation as soon as the time scale exceeds about 48 hours.

This is because the tiny whirls provide the mechanism whereby energy and momentum are fed into the large ones.

And so we started by discussing whirls of air hundreds or possibly a thousand miles in extent, and we end up with whirls of air a small fraction of an inch in size which govern the temperature and evaporation of, say, an ear of wheat.

That the meteorologist has to be concerned with the biggest through to the smallest phenomena is part of the fascination of his subject and part of its difficulty.

News In Brief

Deputy Chancellor

Dr. F. G. Lennox, Chief of the Division of Protein Chemistry, has been appointed Deputy Chancellor of Monash University. He fills the vacancy caused by the retirement of Sir Michael Chamberlain.

Council Member

Dr. D. F. Waterhouse, Chief of the Division of Entomology, has been appointed a member of the Council of the Canberra College of Advanced Education.

Visitor

Professor J. M. Ziman, F.R.S., Professor of Theoretical Physics in the University of Bristol, spent two weeks in Australia recently at the invitation of the National Standards Laboratory before visiting India and Pakistan as the 1968 Rutherford

Professor J. M. ZIMAN

Lecturer of the Royal Society. Professor Ziman, an expert on the theory of metals, previously spent six months at the Laboratory in 1963 as a sabbatical visitor. His course of lectures on the behaviour of electrons in ordered and disordered systems was attended by a large group of physicists from Sydney laboratories and from interstate.

Doctorates

Mr. N. Anderson of the Division of Animal Health has been awarded the degree of Doctor of Philosophy by the University of Glasgow for his work on Bovine ostertagiasis.

Mr. H. McL. Gordon of the Division of Animal Health has been awarded the degree of Doctor of Veterinary Science by the University of Sydney for his studies on helminthosis in sheep.

Record Sale

In a spectacular buying spree last October, 22 buyers paid out more than $150,000 for 32 head of Afrikander and Brahman bulls and females at the fifth reducing sale at the National Cattle Breeding Station, Belmont, operated jointly by the Division of Animal Genetics and the Australian Meat Board.

A purebred Brahman female, Belmont Lady Hima, established a new world record when she sold for $13,000 — only $4,000 short of the record Australian price paid for a Brahman bull and $5,000 more than the previous Australian record for a purebred female. Two other Brahman females also exceeded the old record of $8,000.

A pure Afrikander bull, Belmont A16, sold for $13,000 — $2,200 more than the previous record.

Belmont A23, the first purebred Afrikander female ever offered for sale in Australia, sold for $8,000.

Sound Investment

While the CSIRO Co-operative Credit Society has a paid-up capital of $1.3 million, it still needs further funds to provide CSIRO staff with a source of low-interest finance.

A gilt-edged security investment of 6% a year is offered to investors in the Society for periods of twelve months or longer.

Money may be deposited with the Society for shorter terms, but in these cases the interest rate is 4%.

Thoughts for the Month

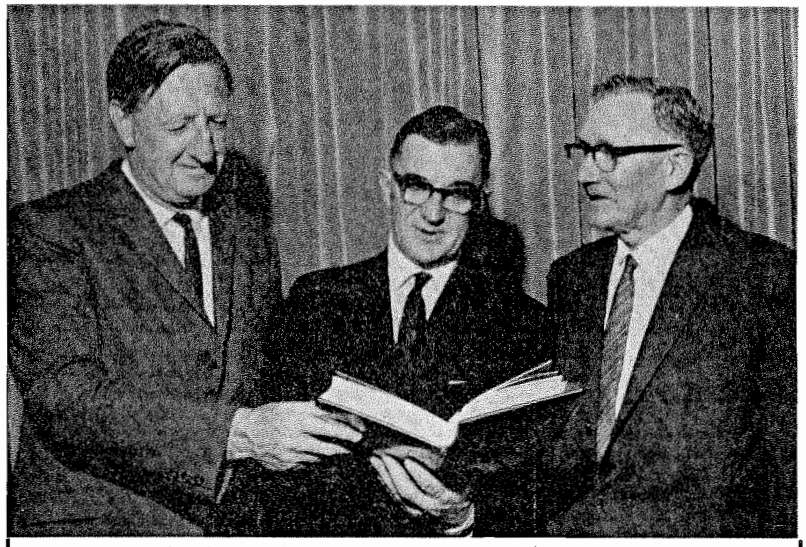
"Very few things happen at the right time, and the rest do not happen at all; the conscientious historian will correct these defects."

Herodotus, 484?-425 B.C.

"A doctor gets no pleasure out of the health of his friends."

de Montaigne, 1533-1592

The A.B.C. Education Department is producing a series of 14 programmes, "Men and Science", in support of a new science course for secondary schools. The latest programme, "Parting for Profit", deals with the separation of minerals from beach sands, manufacture of dairy products, and the fractional distillation of oil. Most of the beach sand segment was shot last month at the Ore Dressing Investigations Laboratory. It showed gravity separation by pinched sluices, spiral concentrators and tables, and separation of the heavy minerals from each other by magnetic and electrostatic concentration. Our picture shows script writer Mr. R. Murfett (left) discussing a script with the Officer-in-Charge of the Laboratory, Mr. K. S. Blaskett. The programmes are scheduled for screening next year.



On the evening of Monday, 11th November, present and past members of the Division of Chemical Physics celebrated the Division's tenth anniversary at a dinner dance at the South Yarra Club. The evening took the form of a surprise party for the Chief of the Division, Dr. A. L. G. Rees. As a gesture of appreciation of his leadership, a bound volume of the Division's Annual Reports from 1958 to 1968 was presented to Dr. Rees by Dr. A. Walsh, Assistant Chief of the Division. Dr. Walsh also presented a spray of flowers to Mrs. Rees. Our picture shows, from left to right, Dr. A. Walsh, Dr. A. L. G. Rees, and Dr. I. W. Wark (former Chief of the Division of Industrial Chemistry and Director of the Chemical Research Laboratories from 1958 to 1960) examining the Annual Reports.

Erratum

In the November issue of Coresearch we reported that **Mr. R. Birtwistle** of the Division of Building Research was a joint recipient of the 1967 Engineering Applied to Agriculture Award. This was incorrect. Mr. Birtwistle is a member of the Division of Mathematical Statistics and is on secondment to the Division of Building Research.

Deadline

Contributions for the January issue of Coresearch should reach the Editor at 314 Albert Street, East Melbourne, by Tuesday, 10th December.

OVERSEAS VISITS

Mr. M. J. Goodspeed of the Division of Land Research left recently on a four-week visit to the United States. He will attend the National Meeting of the American Geophysical Union in San Francisco and an I.H.D. symposium on the use of analogue and digital computers in hydrology at the University of Arizona.

Dr. E. A. N. Greenwood of the Division of Plant Industry left last month for the United States to spend nine months at the Virginia Polytechnic Institute. He will visit research institutes in New Zealand, Britain, Holland, Israel and South Africa before returning next October.

Mr. R. D. Hill of the Division of Dairy Research, leaves this month for the Department of Dairy Technology at Ohio State University where he will spend nine months. Mr. Hill will visit dairy research centres in Denmark, France, Holland, and Israel before returning in December next year.

Dr. M. A. Jermyn of the Division of Protein Chemistry leaves this month for the United States to spend eleven months at the Department of Biological Chemistry, University of Michigan.

Dr. J. V. Possingham, Chief of the Division of Horticultural Research, leaves later this month to spend nine months at the Department of Botany, University of Edinburgh. Dr. Possingham will visit research centres in Europe and the United States and attend a botanical congress in Seattle before returning next September.

SAFETY NOTES

Cocktails in the Laboratory

The following is a condensed report of a recent accident at one of our laboratories.

"Wall shelving carrying a number of chemicals collapsed on to the floor, resulting in the breakage of containers of materials such as hydrofluoric acid, amines and ethyl bromoacetate (a lachrymator).

"The safe handling of the resultant mess depended as much on the skill and expert knowledge of the staff concerned as on the provision of safety devices such as respirators which were available in the adjacent corridor.

"On hearing the crash, an assistant ran in to inspect the damage, promptly turned on the fume cupboard and ran out of the room, shutting the door. Staff could only enter the room when wearing respirators.

"The shelving which collapsed was the second wall attachment. This was inappropriately fastened to the wall. A third set of shelves has since been found to be coming away from the wall."

Fortunately no-one was hurt, but the collapse could just as easily have happened while some-one was nearby or handling chemicals on the shelves.

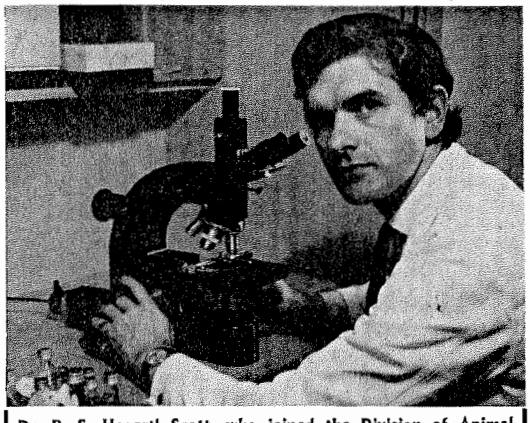
As far as possible any new laboratory shelving should, in addition to being fastened to a wall, have feet or sides resting on a bench or the floor. Existing fittings should be inspected, and feet or supports fitted as required.

In view of the above accident, it is recommended that all laboratories consider the purchase of adequate respirators, or better still, self-contained breathing apparatus.

Christmas Message

Remember — the taxi fare home from that smashing party is probably about 5% of your "No-claim Bonus". Make this Christmas a safe one and a happy one.

J. W. Hallam, Safety Officer.



Dr. R. S. Hogarth-Scott, who joined the Division of Animal Health earlier this year to carry out research on helminth infestations of sheep, has received a Churchill award to study experimental pathology and immunology in Britain and the United States. He will leave early next month and will be away for 14 weeks.