CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 94, MELBOURNE, JANUARY 1967

C.S.C. Meets In Ghana

The fourth meeting of the Commonwealth Scientific Committee was held in Accra, Ghana, from November 14th to 27th. Australia was represented by Mr. C. S. Christian and Mr. C. D. Kimpton, of Head Office.

The Commonwealth Scientific Committee consists of representatives of national research organizations in Commonwealth countries and meets every two years to discuss science policy and the organization and management of scientific research.

This was the first meeting of the Committee to be held in Africa; earlier meetings have been held in Britain, India and New Zealand.

Chairman of the meeting was Dr. J. Yanney Ewusie, of Ghana. In summing up at the conclusion of the meeting he noted that the Committee stressed the value of science and technology in accelerating the progress of developing nations.

Dr. Ewusie said that the Committee had recognized the need for developing countries to understand thoroughly their natural resources and the ways in which they might be utilized as a necessary basis for planning technical and economic development and determining priorities for research.

This planning was best undertaken in conjunction with research workers in universities and government laboratories and with extension officers from the various ministries.

Dr. Ewusie said that a good deal of the Committee's discussions had centred on the part which technical aid schemes could play in developing the scientific and technical potential of younger countries and the problems of operating present schemes.

One of the problems with aid given in the form of scientific equipment was the failure to provide for adequate servicing and replacement of worn out or broken parts which were not readily available in many younger countries.

The Committee had examined this problem and made a number of recommendations as to how it might be overcome.

The Committee also felt that, through its Executive Secretary, it could give valuable assistance to the developing countries in framing requests for scientific aid and in suggesting through which channels such aid might best be obtained.

The practice of twinning, whereby a research laboratory in a more developed country establishes links with a sister laboratory in a less developed country, was commended by the Committee as an excellent means of encouraging advisory contacts in a consistent and continuing manner.

Dr. Ewusie said that the Committee had been gratified by the decision taken at the recent Prime Ministers' Conference to ask the Executive Secretary to act as Scientific Adviser to the Secretary-General of the newly established Commonwealth Secretariat.

W.M.O. Seminar in Melbourne

The World Meteorological Organization held a seminar on agrometeorology in Melbourne from November 28th-December 14th.

The seminar was designed to familiarise participants with agro-meteorological practices and with methods in world-wide use for the practical application of agro-meteorology to primary production with special reference to countries in South-East Asia and the South-West Pacific.

The seminar took the form of a series of lectures and practical sessions, given by experts in meteorology, hydrology, soil conservation and agricultural science, including specialist consultants from Germany, the Netherlands and South Africa.

Australian lecturers were drawn from the Bureau of Meteorology, CSIRO, the Victorian Soil Conservation Authority and the Waite Agricultural Research Institute, Adelaide.

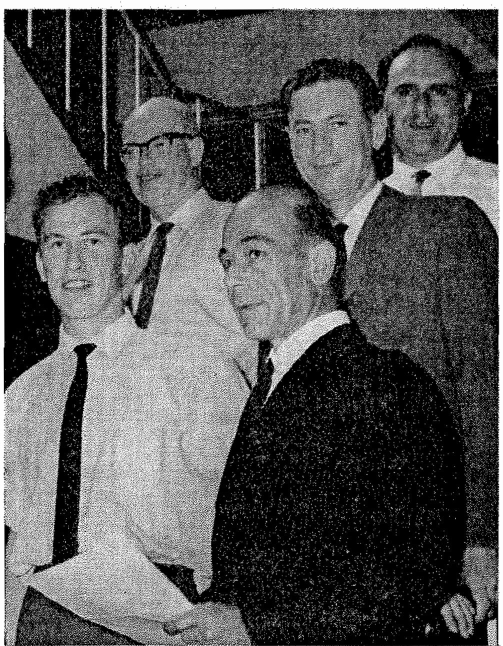
The CSIRO lecturers included Mr. C. Andrew (Tropical Pastures), Drs. R. Slatyer and W. R. Stern (Land Research), Dr. O. T. Denmead (Plant Industry), Dr. D. E. Angus and Mr. I. C. McIlroy (Meteorological Physics).

Students came from Afghanistan, Ceylon, the Republic of China, India, Indonesia, Iraq, Korea, Laos, New Caledonia, New Zealand, Pakistan, the Philippines, Saudi Arabia, Thailand and the United States in addition to Australia.

Overseas participation was financed by the technical assistance component of the United Nations development programme, arranged through W.M.O., and the Australian Government was meeting local expenses.

The seminar was held at "Mt. Derrimut", Deer Park, the field station of Melbourne University's school of agriculture.

During the seminar participants visited the laboratories of the Division of Meteorological Physics at Aspendale.



About 100 astronomers attended the first meeting of the newly-formed Astronomical Society of Australia, which was held in Sydney from November 30th to December 2nd. The Society will provide a forum where astronomers from all parts of the Commonwealth can meet to present new research results and to discuss ideas. Basically professional in character, with most of its members coming from the Universities and CSIRO, it includes in its ranks recognised leaders in many fields of research.

Australia has won a very high place in international astronomy and the Society will be a strong one, with representatives from every State. Besides the well-known fields of optical and radio astronomy, research is carried out actively in solar and cosmic ray physics, X-ray sources, and the interplanetary medium.

About 60 papers were given at the meeting. They included invited papers from two distinguished visiting astronomers, Dr. J. B. Oke of the Mt. Wilson and Palomar Observatories, and Dr. T. A. Chubb of the U.S. Naval Observatory.

Among the office-bearers elected were Dr. J. P. Wild (a Vice-President), Dr. S. F. Smerd and Mr. K. V. Sheridan (joint Secretaries), all of the Division of Radiophysics. Dr. R. G. Giovanelli (Physics) was elected to the Committee.

Pictured at the meeting are Dr. R. R. Shobbrook (University of Sydney), Dr. Giovanelli, Dr. Smerd, Dr. Wild and Mr. B. J. Harris (Western Australian Government Astronomer).

One upon a time the Division of Plant Industry was housed in one laboratory, with a glasshouse. Now the Division is scattered through dozens of buildings covering several acres. The girls carrying correspondence and files around the area were walking five or six miles per day. But now Kathleen Ross (left) and Christine Mitchell (right) ride around the site in a powered golf buggy. And oh, how it saves their aching feet!

Syme Prize Awarded to G. K. White

Dr. Guy K. White, of the Division of Physics, has shared the 1966 David Syme Research Prize. The other winner was Dr. L. W. Nicol, a biochemist at the University of Melbourne.

The 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.

Dr. White's work involves the measurement of some of the most well-known and elementary properties of materials; the expansion on heating, the conduction of electricity and heat, and magnetism.

Dr. G. K. WHITE

The great value of this work is that, when these quantities are measured with extremely high accuracy and at temperatures down almost to absolute zero (490°F or 273°C below freezing point), inferences can be drawn from them relating to the most fundamental questions which can be asked about matter.

For example, what are the forces which hold atoms together to make a solid, how do electrons travel between atoms to give electrical conductivity, how do the atoms vibrate, and how do these vibrations interact when a substance is heated?

In the investigations for which the Syme Prize was awarded, Dr. White has made measurements of the thermal expansion of a wide range of substances at temperatures of only one or two degrees above absolute zero with fantastic precision.

Using the electrical capacitance technique of Mr. A. M. Thompson (Applied Physics) he could detect changes in length of a sample of less than one billionth of an inch, which represents less than one tenth of the diameter of an atom. Among other results these measurements have led to entirely new information on how the motions of electrons influence the interactions of atoms.

Dr. White is author of a standard text book on "Experimental Techniques in Low Temperature Physics".

CHOOSING CAREERS IN SCIENCE

Every year many thousands of Australian children reach a crucial point in their lives — the point at which they must choose a career.

For some of them the choice is easy.

But the great majority of children need help and advice in coming to the great decision. A very large number of them, especially in Victoria, are now getting this advice from the Science and Technology Careers Bureau.

The Bureau was established nearly 10 years ago, by a group of professional institutions — The Royal Australian Chemical Institute; the Institution of Engineers, Australia; the Australasian Institute of Mining and Metallurgy; the Australian Institute of Physics; the Australian Pulp and Paper Industry Technical Association; and the Australian Veterinary Association.

The first thing to do was to establish a Council, composed of two representatives of each institution. The present day Council includes two CSIRO officers, Mr. W. M. Balding (Head Office) and Dr. A. Walsh (Chemical Physics).

Donations and subscriptions were invited, and a full-time Director was sought. The first Director was Mr. W. E. Purnell, who had previously been UNESCO representative in Indonesia. Mr. Purnell resigned in 1962 to become Executive Secretary of the Royal Australian Chemical Institute, and was succeeded by the present Director, Mr. F. W. Cropley.

The bulk of the Bureau's income of about $13,000 per annum comes from grants from industry. CSIRO was a contributor this year. Since most of the Bureau's operations are in Victoria, the Victorian State Government makes an annual grant equal to forty per cent. of the other contributions.

The Bureau's job is to help young people to find a career in science or technology which will give them ample scope to make the most of their talents for good reward.

In the course of a year the Director speaks to thousands of young people, and sends information to thousands more. Throughout the year, requests pour in for his services at "career nights" or similar functions organized by Headmasters, career masters, or entrepreneur groups like the Rotary Club.

The Director or a Bureau representative gets around to most of the secondary schools in Victoria about every two years. The proceedings typically consist of a general talk, a question and answer session, and a distribution of leaflets.

The demand for printed information is very high. Some forty leaflets about different careers, ranging from Actuarial Mathematics to Zoology, are prepared and printed by the Bureau.

They are only given out in response to a specific demand for a specific leaflet; even so the consumption is about 10,000 per month. The Bureau also distributes leaflets prepared by other bodies, including, of course, "A Career in CSIRO".

Many children and their parents seek the opportunity of a thorough discussion. When this happens (about 300 times per year) the Director sets aside an hour for the appointment so that the boy's or girl's problems can be properly sorted out. This service, like all the other services of the Bureau, is absolutely free.

Mr. Cropley has taken under his wing one other activity. Every year the various professional scientific bodies sponsor Youth Lectures, such as the R.A.C.I.'s Hartung Lectures and the A.I.M.M.'s Wainwright Lectures. Sometimes these are given by CSIRO officers; Mr. J. J. McNeill of Chemical Physics gave the Australian Institute of Physics Lectures this year.

The Bureau makes all the arrangements for these lectures, sets the dates, chooses the places, and issues the invitations.

About ninety per cent. of the Bureau's work is in Victoria. The Director has made a couple of excursions to Adelaide, and literature is supplied to enquirers from anywhere in Australia.

No doubt many CSIRO officers are asked, both in their official and private capacities, for information about careers in science and technology. They can always refer enquirers to the Science and Technology Careers Bureau, 55 Exhibition Street, Melbourne, with confidence that the right information will be forthcoming.

SAFETY NOTES

The following three accidents have occurred during the last few months. Don't let a similar mishap mar your record.

1. A workshop employee who normally wears safety boots left them off one day because they were pinching his toes. On this one day wearing ordinary boots, he suffered a fractured toe from a falling object.

2. An employee was riding on the back of a truck on top of some bales of wool. When the truck turned a corner, the man was thrown off on to the road.

3. An assistant was removing the cork from a winchester of ether. It was a tight fit, and the winchester was held under the arm. When the cork suddenly came out, the bottle of ether shot backwards and shattered on the laboratory floor, spreading 2½ litres of ether, which fortunately did not catch fire.

The above shows how easy it is to have an accident by either not using protective equipment, or using unsafe or thoughtless procedures.

Erratum: *In the October issue of Safety Notes, some lines were inadvertently crossed. The statement that it is not mandatory to have a switch in the active line of a power outlet is incorrect. It is the polarity of the outlet which is not mandatory.*

In the case outlined, the switch was in fact wired correctly, water apparently entered the switch. I apologize for misinterpretation of the facts as presented.

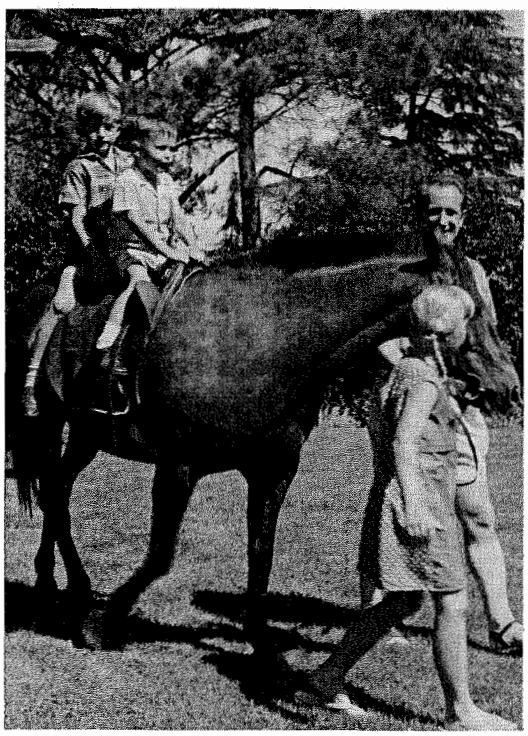
J. W. Hallam, Safety Officer.

After a "careers night" talk at Warrnambool, a budding scientist and his parents have a lot of questions for Mr. Cropley (right).

Above, left: Chef Peter Hume and Social Club President Ron McTaggart dispense chops and hamburgers to Jeanette Beauchamp, Margaret Starling, and John Thomson at the Division of Building Research's Barbecue at Highett on Friday evening, December 2nd.

Left, centre: Miss Helen Cholson, daughter of Norman Cholson of the Division of Fisheries and Oceanography. It seems that Peter Hopwood brought the guitar to the Division's Christmas party to entertain the children. But he turned his back for a moment and Helen saw her chance.

Below, left: Father Christmas at the Division of Forest Products children's party was Bob Hall of the Maintenance Section. Apart from all the offspring of the Division's staff, twenty children were invited from Allambie Reception Centre. The children enjoyed cartoons, a puppet show, and an enormous party tea. Father Christmas was helped by two angels, Andrea Cox (left) and Lorraine Ogilvie. If you want to know who the devil is, turn to page four.



Above, centre: The Division of Wildlife Research held its Children's Christmas Party on Saturday, 10th December. Father Christmas, alias Alan Terry, had 65 children to cope with. On the figures given to "Coresearch" they consumed two-thirds of a pint of ice cream per head. Pony rides were, of course, in great demand.

Below, centre: At Prospect, Arthur Braine was Father Christmas for the sixth successive year. Other fathers hope that he will do it for the next six years. He was the star attraction, but some entertainers from A.B.N. Channel 2 also came along to amuse the children.

Above, right: The weather held fine, as usual, for the Christmas Party for the children of the CSIRO Highett staff. For over ten years the sun has shone beautifully on the Highett Santa, played this year by Gerry Holt, of Mechanical Engineering. The Social Club Committee organised presents, food, and lashings of ice cream for 216 children, who enjoyed hay rides, swings and roundabouts.

Right, second from top: President of the Social Club, Mr. Peter Butler and his wife, welcomed fifty members to the Executive and Canberra Regional Office Christmas Party at the Queanbeyan Leagues Club on Friday evening, December 2nd. Our picture shows Alan Terry (Wildlife), Sue Bayin, Peter Trainor and friend and Mrs. P. V. Taylor (Wildlife).

Right, third from top: The Head Office Children's Party began with races for the children in the Fitzroy Gardens just across Albert Street from the office. Twenty-five children from the Antonian Institute joined in with 117 CSIRO children. Jack Bourne was Father Christmas for the 15th time.

Below, right: The Chemical Research Laboratories joined forces with the Aeronautical Research Laboratories for a joint children's party on December 10th. This Father Christmas had a new angle — he arrived by light aircraft at the Fishermen's Bend airstrip to the resounding cheers of the assembled infants.

APPOINTMENTS TO STAFF

Dr. R. J. Bartell has arrived (or is en route, depending on the airline strike situation) to take up a post with the Division of Entomology in Canberra. Since graduating from Sir John Cass College, University of London, he has been working for his Ph.D. at Imperial College.

Miss Susan Beveridge has been appointed to the staff of the Division of Plant Industry, where she will work on the synthesis of compounds of

Miss S. BEVERIDGE

potential biological activity. She recently completed requirements for her B.Sc. at the Australian National University.

Mr. D. R. Burton, an Englishman, has joined the staff of the Division of Mechanical Engineering, where he will work on engineering aspects of air conditioning systems. Since graduating B.Sc. (Eng.) in 1962 he has been working in the Human Engineering Division of the Royal Aircraft Establishment, Farnborough.

Dr. I. R. Cowan has been appointed to a fellowship in climatology in the Division of Land Research. After graduating from the University of London in 1952 he worked for some years for the Sugar Manufacturers Association, initially in Rothamsted, but later in Jamaica. Since 1952 he has been on the staff of the University of Nottingham.

Mr. I. E. Galbally has been appointed to the staff of the Division of Meteorological Physics, where he will take part in studies on atmospheric ozone. Since graduating from Monash University in 1965 he has been lecturing in physics at the Royal Melbourne Institute of Technology.

Dr. R. Hamilton, a Dutch soil scientist, has accepted a short-term appointment with the Division of Soils in Canberra. A graduate of the University of Utrecht, his special field is tropical soils. Much of his work has been done in the West Indies.

Dr. R. HAMILTON

Mr. B. T. Savvas has joined the Computing Research Section, and will be stationed in Adelaide. Since graduating B.E. from Western Australia in

Mr. B. T. SAVVAS

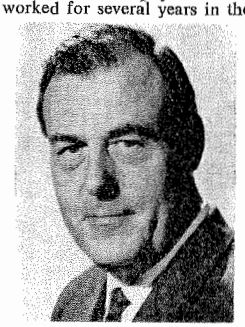
1962 he has been on the staff of the Army Design Establishment. He recently completed part-time work for the B.Sc. degree of the University of Melbourne.

Mr. T. G. G. Hodges has been appointed to the staff of the McMaster Laboratory, Division of Animal Health,

Mr. T. G. G. HODGES

where he will work on footrot, foot abscess and cutaneous actinomycosis of sheep. Since graduating in veterinary science from Glasgow in 1962 he has been in private practice as a veterinarian in Britain.

Mr. G. J. Winsbury has been appointed to the position of Engineer-in-Chief at the Division of Radiophysics. He worked for several years in the



Mr. J. G. WINSBURY

John Curtin School of Medical Research, developing electrophysiological methods for Sir John Eccles' team. For the past seven years he has been with the Australia Atomic Energy Commission.

News in Brief

I.U.P.A.P.

Dr. W. Boas, Chief of the Division of Tribophysics, has been elected to the Executive Committee of the International Union of Pure and Applied Physics.

Professor

Dr. W. R. Stern, of the Division of Land Research, has been appointed Professor of Agronomy in the University of Western Australia.

Films in Research

Professor G. Wolf, Director of the Institute for Scientific Films at the University of Göttingen, West Germany, is visiting Australia this month on behalf of the Federal German Government. He has been invited to read a paper on "Films in Research" at 8 p.m. on Monday, 16th January, in the main theatre, School of Architecture, University of Melbourne.

Silver Award

"The Birth of the Red Kangaroo", released by the CSIRO Film Unit earlier this year, has earned a Silver Award from the Australian Film Institute.

Professor A. D. Ross

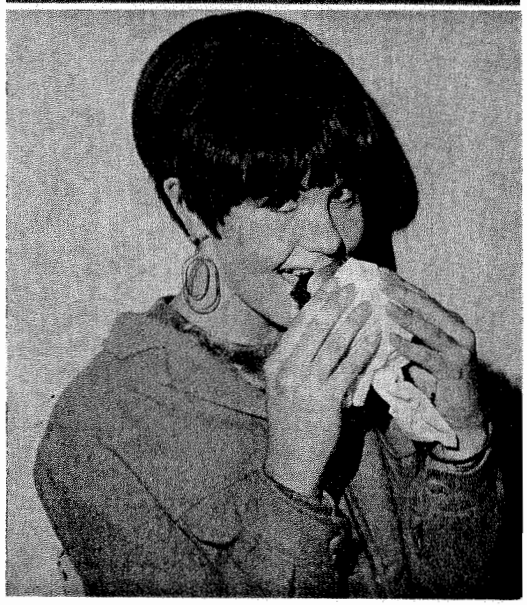
Emeritus Professor A. D. Ross, C.B.E., M.A., D.Sc., a member of the Western Australian State Committee died at his home in Albany on December 14th at the age of 83. He was Professor of Physics at the University of Western Australia for 40 years. After retiring he founded the Pan Indian Ocean Science Association.

President

Mr. Derrick A. Watson, of the Agricultural Liaison Unit, Head Office, has been elected Federal President of the Australian Commercial and Industrial Artists' Association.

"Well, I suppose you could call it a breakthrough of sorts."
Courtesy "Saturday Review".

DEVIL UNMASKED



Janet Ward, of Forest Products, is quite a party girl. She appeared as a devil at the Division's children's party (see inside). Here she's snapped at the Building Research barbecue.

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER (EO1/2) — ORGANIC CHEMIST/BIOCHEMIST — Division of Plant Industry — 130/814 (16/1/67).

EXPERIMENTAL OFFICER (EO1/2) — CHEMICAL ENGINEER/APPLIED PHYSICIST — Division of Chemical Engineering — 608/64 (16/1/67).

RESEARCH SCIENTIST (RS) — POSTDOCTORAL FELLOWSHIP IN CHEMISTRY — Division of Applied Chemistry — 586/34 (16/1/67).

RESEARCH SCIENTIST (RS/SRS) — RESEARCH STAFF — Division of Textile Industry — 464/396 — (27/1/67).

RESEARCH SCIENTIST (RS/SRS) — Division of Animal Genetics (Cattle Research Laboratory) — 682/41 (13/1/67).

EXPERIMENTAL OFFICER (EO1/2) — Division of Chemical Physics — 582/101 (13/1/67).

EXPERIMENTAL OFFICER (EO1/2) — CHEMICAL ENGINEER/APPLIED PHYSICIST — Division of Chemical Engineering — 608/64 (13/1/67).

EXPERIMENTAL OFFICER (EO1/2) — METALLURGIST/CHEMIST/CHEMICAL ENGINEER — Division of Chemical Engineering — 608/67 (20/1/67).

EXPERIMENTAL OFFICER (EO1/2) — Division of Chemical Physics — 582/14 (13/1/67).

RESEARCH SCIENTIST (RS/SRS) — PHYSICAL OCEANOGRAPHER — Division of Fisheries and Oceanography — 320/383 (13/1/67).

SCIENTIFIC SERVICES OFFICER (SSO2/3) — EDITOR — Editorial and Publications Section — 112/47 (13/1/67).

EXPERIMENTAL OFFICER (EO1/2) — ELECTRON MICROSCOPY — Division of Food Preservation — 300/447 (20/1/67).

SCIENTIFIC SERVICES OFFICER (SSO1/2) — RESEARCH ADMINISTRATION — Industrial and Physical Sciences Branch — 111/16 (13/1/67).

ENGINEER (Eng. 1/2) — Division of Mineral Chemistry — 601/51 (10/2/67).

RESEARCH SCIENTIST (RS/SRS) — Irrigation Research Laboratory — 500/202 (20/1/67).

EXPERIMENTAL OFFICER (EO1/2) — Division of Physics — 770/340 (6/2/67).

EXPERIMENTAL OFFICER (EO1/2) — ELECTRON MICROSCOPY — Division of Plant Industry — 130/820 (13/1/67).

RESEARCH SCIENTIST (RS) — POSTDOCTORAL FELLOWSHIP IN PROTEIN CHEMISTRY — Division of Protein Chemistry — 462/274 (10/2/67).

EXPERIMENTAL OFFICER (EO1/2) — ENGINEER — Division of Textile Physics — 465/268 (20/1/67).

EXPERIMENTAL OFFICER (EO1/2) — ORGANIC CHEMIST/BIOCHEMIST — Division of Plant Industry — 130/814 (16/1/67).

Mr. Jim Deans, Officer-in-Charge of the Black Mountain Experimental Area, retired last month half way through his thirtieth year in Plant Industry. A senior member of the technical staff, he trained dozens of technical assistants in glasshouse work and pasture sampling. He was for many years Secretary of the Canberra branch of the Technical Association.

Our picture shows Sir Otto Frankel (left) presenting Mr. Deans with a farewell gift from the Division.

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CO RESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 95, MELBOURNE, FEBRUARY 1967

World Food Crisis Worsening

The food producing potential of the land had to be developed to the full, not only in North America, Western Europe and Australasia, but in all countries, if man was not to succumb to his own fecundity, Professor E. J. Underwood of the Executive told delegates to the A.N.Z.A.A.S. Congress in Melbourne last month.

Professor Underwood was delivering the Farrer Memorial Oration and had chosen as his theme "Man, Land and Food".

He said that the great success of the developing countries in applying modern medical science to their people, which had resulted in so many more mouths to feed, contrasted strikingly with the failure of most of them to achieve comparable successes in agriculture and food production.

The underdeveloped world was losing the capacity to feed itself. In Asia and Latin America, food production per head had fallen in the last five years by 4% to 5%.

Professor Underwood emphasised that the answer to the world food problem lay in increasing the per capita food production of the underdeveloped countries and in reducing their rate of population increase. There was no other way.

However, he added, a more informed and realistic approach was needed to the technical needs of agriculture in the developing countries.

Many of the failures and disappointments in agricultural development schemes and technical assistance programmes in the developing countries resulted from a failure to recognise that most developing countries lay in the tropics or subtropics whereas modern agricultural science was overwhelmingly a product of temperate regions.

Temperate zone technology could rarely be applied directly to the tropics, quite apart from the profound social, educational and organizational differences that existed.

Development needed to proceed on a broad front if food production was to increase significantly.

Moreover, the richer industrialized nations would have to give greatly increased amounts of capital and technical know-how if the developing countries were to have any chance of success in providing enough food for their growing populations.

Professor Underwood said that Australia had a unique opportunity to make a major contribution to the world's food problem.

Australian experience and expertise in the selection, breeding, inoculation, and management of leguminous pasture plants in both southern Australia and in the tropics and subtropics of our north were in the fore-front of the world.

More leguminous crops and pastures with the ability to fix their own nitrogen were urgently needed in developing countries where there were large areas where soil fertility was low and where artificial nitrogen was generally beyond the means of the farmer.

Legumes not only had an important role to play in soil fertility but were increasingly required as direct sources of protein for human consumption.

Professor Underwood said that our knowledge and our techniques with legumes were not necessarily directly applicable to other countries; nevertheless, Australia had the trained scientists and the resources to send a team to live and work in one of the developing countries with the scientists of that country.

There was no better way in which the agricultural scientists of this "lucky country" could help the people of countries less fortunate than themselves.

NEW MINISTRY

In his policy speech before the last election, the Prime Minister, Mr. Holt, said that the Government believed the time had come to establish a Commonwealth ministry of education and science.

The new ministry, said Mr. Holt, would be responsible not only for education but also for certain areas of scientific activity.

Following the elections, Mr. Holt announced that Senator Gorton had been appointed Minister for Education and Science.

In the past, the Science and Industry Act was administered by the Prime Minister who appointed a deputy to act as Minister-in-Charge of CSIRO.

Under the new arrangements, however, the Minister for Education and Science will administer the Science and Industry Research Act.

There will be no other changes in the way CSIRO operates and in spite of inaccurate reports that the Department will be taking over responsibility, the administration of CSIRO will remain unaltered, except that the Executive will be responsible direct to the new Minister.

In his new role, Senator Gorton will also be responsible for the Australian Universities Commission, the Australian Research Grants Committee, and the Comonwealth Advisory Committee on Advanced Education.

Departmental Head

The appointment of Professor Sir Hugh Ennor as head of the new Commonwealth Department of Education and Science was announced last month.

Professor Sir HUGH ENNOR

Sir Hugh is Deputy Vice-Chancellor of the Australian National University and Dean of the John Curtin School of Medical Research. He was a member of the Martin Committee which enquired into tertiary education.

Sir Hugh will probably take up his appointment next April.

The gardens at the Irrigation Research Laboratory, Griffith, were awarded second prize in the Riverina Zone of the Sydney Morning Herald's recent Country Garden Competition. Our picture shows part of the laboratory gardens which are cared for by Mr. R. Dalgeish. In front of the main building are displays of delphiniums, snapdragons, pansies and mesembryanthemums, while in the big park-like area are palms, grevilleas, golden conifers and banks of roses. At the side is an avenue of kurrajongs covering the drive and near the glasshouses are a variety of wattles.

A.N.Z.A.A.S. CONGRESS

Scientists should speak to the public in language they could understand, the Governor General, Lord Casey, said last month. They should brighten up the image of science in the public mind.

Lord Casey was addressing some of the 3,600 delegates who attended the 39th Congress of the Australian and New Zealand Association for the Advancement of Science which was held at the University of Melbourne from 16th to 20th January.

"I wish you would devote more time and thought to speaking and writing in terms the average educated individual can readily understand", Lord Casey said.

"How often have I wanted to read what some scientist of renown has to say about some subject of interest to me, but have had to give it up as he used half a dozen terms on the first page that were unknown to me or the meaning of which I was in doubt.

"Because of this, a race of scientific interpreters is growing up who aim to translate the minds of scientists into everyday language.

"Many of us are getting science at secondhand.

"To remedy this you would have to start to live your lives again and to think back to what the layman knows and doesn't know of your scientific shorthand.

"If you were to do this, I believe you would find a vast lay audience, anxious and ready to read and to listen to what you have to say."

He said there was a large and growing shortage of mining, metallurgical and chemical engineers as well as agricultural scientists in Australia.

"This situation is unhealthy and even dangerous for the future", he said.

"Unless it is remedied it would seem we are likely to become more dependent on importing specialists from other countries."

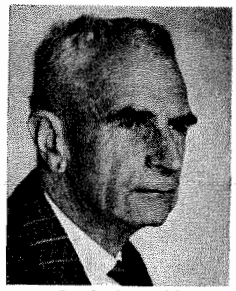
Lord Casey also said that secondary industry in Australia had generally been slow and reluctant to learn the lesson that scientific and technical research would be more and more essential if we were to develop and hold overseas markets in an increasingly competitive world.

With a few notable exceptions, the great bulk of companies either did no scientific and technological research on their own products, or they bought the results of other countries' research in their own fields from overseas and got it secondhand and very late in the day.

A.N.Z.A.A.S. Medal

The A.N.Z.A.A.S. medal for 1967 was awarded to Dr. L. B. Bull, Chief of the Division of Animal Health and Production from 1935 to 1954, for services in the advancement of science in Australia.

Dr. Bull took a leading part in the early investigation of myxomatosis in rabbits and was the first to show that biting insects, especially mosquitoes, would play an essential part in the epidemiology of the disease among the wild rabbit population in Australia.



Dr. L. B. BULL

He also carried out valuable research on toxaemic jaundice in sheep and Kimberley horse disease.

For the last twelve years he has continued his research on liver diseases in animals as a senior research fellow of the Division of Animal Health.

Margins Award

On 22nd December, 1966, the Commonwealth Conciliation Commission, by a majority decision, awarded varying increases in margins to employees covered by the Federal Metal Trades Award.

Nearly all adult CSIRO staff will benefit from the decision which will take effect from 2nd February. In most cases the increases will be about 2½% of actual salary.

NEW DIRECTORS

The CSIRO Co-operative Credit Society has appointed two more associate directors. They are Mr. P. Knuckey of Head Office and Mr. F. W. Blanksby of the Division of Soils, Adelaide.

Mr. Knuckey and Mr. Blanksby will be happy to help anyone who would like to find out more about obtaining loans from the Society or investing money in it.

GHANA TODAY

Ghana, the first African State in the post-war world to achieve independence, took its name from the old West African Empire of Ghana which flourished between about 300 A.D. and 1076 A.D. in the region now occupied by the Republic of Mali.

Ghana became independent in March, 1957, following successful nationalist pressure against British rule.

In 1960, following a referendum, the Constitution was altered, and Ghana became a Republic with Dr. Nkrumah as its first President.

However, increasing Government mismanagement plunged the economy into chaos and in February, 1966, Ghana's Army and Police deposed Dr. Nkrumah and suspended the Constitution.

The government of the country was taken over by the National Liberation Council under the chairmanship of Lieutenant-General Ankrah.

The Council instituted a number of reforms and set up a Political Committee to recommend what steps should be taken to prepare the ground for the country's return to civilian rule.

Ghana is a rectangular country, roughly 400 miles long and 250 miles wide. It is divided into four regions.

Running along the coast is the former Gold Coast Colony, a belt of savanna country 50 to 150 miles wide.

Inland from this is Ashanti, a wide, rectangular region with tropical rain forests and fertile farmlands.

North of this again is the relatively poor and undeveloped savanna country of the Northern Territories, while bordering the eastern side of the country is a long strip of land which is that part of the former German colony of Togoland, which joined newly independent Ghana after a U.N.-sponsored plebiscite.

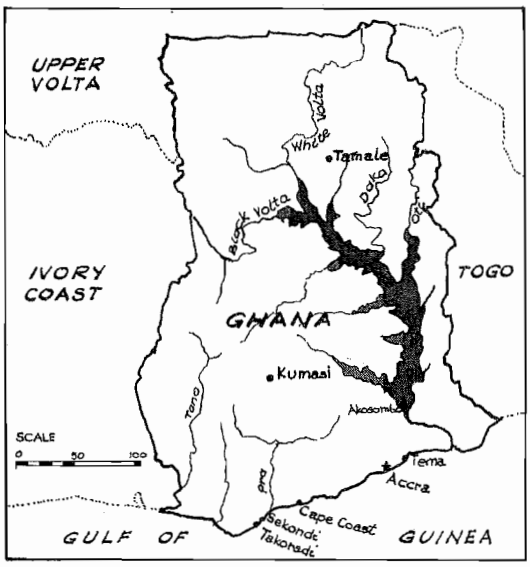
Christianity is the principal religion in Ghana and Moslem influence is mainly confined to the north of the country.

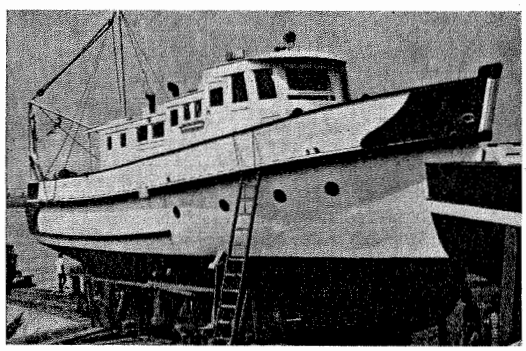
This is the first of two articles on Ghana. The second, dealing with science in Ghana, will appear in the next issue of Coresearch.

Ghana is the richest country in tropical Africa with an average income per head of population of about $175.

Although not very high by our standards, this is three times as high as in some other African States.

The wealth of Ghana is heavily dependent on cocoa, of which it is the world's leading producer, and which accounts for over half of its exports.





Most of it comes from southern Ashanti.

Timber, gold, diamonds and manganese are the present principal contributors to national income after cocoa, but bauxite is likely to overtake these now that the $160 million Volta River Project is nearing completion.

Production of all the major minerals is confined to Southern Ashanti and the coastal regions, with the richest concentration in an area close to the Kumasi-Takoradi railway.

The Volta River Project is the largest hydro-electric scheme in Africa. It was started in 1961.

Ghana provided half of the finance for the project; the rest was raised in the form of loans from the International Bank of Reconstruction and the British and United States Governments.

A 370 ft. high rock-fill dam was built across the Volta River at Akosombo. The 300 mile long lake is now almost fully formed and will have an area of nearly 3,300 square miles, making it the largest man-made lake in the world.

The lake will greatly improve transport facilities in the area and will provide water for irrigating part of the Accra plains.

Some 67,000 people have been displaced by the lake and an extensive town planning and re-settlement scheme has been carried out as an integral part of the scheme.

A hydro-electric power station at Akosombo is already operating and will eventually have six generators each producing 128 megawatts.

Power from the station will be distributed throughout southern Ghana for domestic and industrial use, but the main purpose of the station is to provide power for a newly constructed aluminium smelter at Tema, near Accra.

This smelter, the largest outside North America, began operating last November and has a capacity of 135,000 tons of aluminium a year.

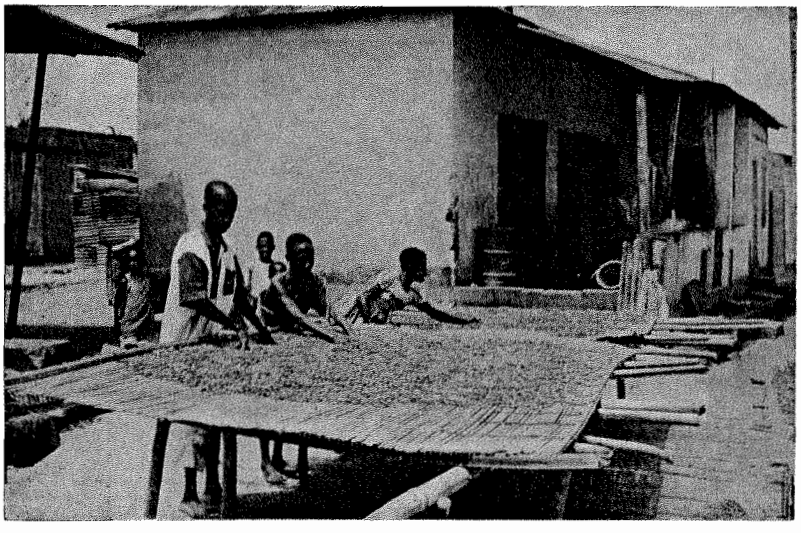
Bauxite for the smelter comes from immense deposits west of Kumasi.

A new harbour has been developed at Tema and was opened in 1962. Before this practically all of Ghana's cargo was handled at Takoradi harbour, 140 miles west of Accra.

Tema is fast becoming a large industrial township; in addition to the harbour and the smelting works, it has a steel works, oil refinery, cocoa processing factory and boat building yard.

Above: Ghana boatyards, Tema. Fishing boats, motor boats and sailing boats are built at Tema and Sekondi, both for domestic use and for export.

Below: Cocoa beans being spread out in the sun to ferment.



Academy Forum

Several people from CSIRO have been included in the membership of the recently formed Science and Industry Forum of the Australian Academy of Science.

Announcing the creation of the Forum last December, the President of the Academy, Sir Macfarlane Burnet, said that it would function as a standing committee of the Academy and that its aim was to increase understanding and co-operation between scientists, industrialists and community leaders.

Members of the Forum include Sir Henry Somerset and Dr K. L. Sutherland of the Executive; Dr. D. F. Martyn, Officer-in-Charge of the Upper Atmosphere Section; Dr. A. L. G. Rees, Chairman of the Chemical Research Laboratories; and Dr. D. F. Waterhouse, Chief of the Division of Entomology.

Sir Macfarlane said the Forum will advise the Academy Council on such matters as:

- the inter-relations of science, industry and government in Australia.
- the place of science in industry and national development.
- the utilisation of scientists in industry.
- the education of scientists for industry.

It will eventually consist of about 70 scientists, industrialists, and some government departmental leaders and will meet two or three times a year.

Smaller working parties will be established from time to time to study specific problems.

Above: Dr. M. F. Day of the Executive and Mrs. K. J. Prowse chat with Professor D. Chitty at a barbecue held in his honour last month in the grounds of the Division of Wildlife Research at Gungahlin, Canberra.

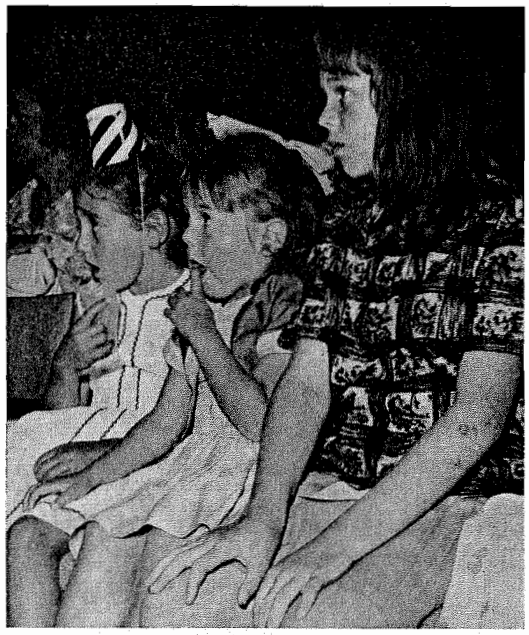
Professor Chitty, who is from the Department of Zoology at the University of British Columbia, spent some time with the Division last month before going on to the A.N.Z.A.A.S. Congress where he was a key speaker in the symposium on ecology and behaviour.

He is one of the foundation members of the Bureau of Animal Populations at Oxford and has had considerable influence on the development of mammal ecology. His own research has been concerned principally with population regulation in small mammals.

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER (EO1/2) — Computing Research Section — 900/70 (3/2/67).
EXPERIMENTAL OFFICER (EO1/2) — Division of Animal Genetics — 675/177 (10/2/67).
ENGINEER (Eng. 2/3) — Division of Plant Industry — 130/827 (17/2/67).
RESEARCH SCIENTIST (RS/SRS) — PLANT ECOLOGIST — Division of Plant Industry — 130/825 (17/2/67).
SCIENTIFIC SERVICES OFFICER (SSO3/4) — Division of Plant Industry — 130/818 (24/2/67).
RESEARCH SCIENTIST (RS/SRS) — FELLOWSHIP IN METAL PHYSICS — Division of Tribophysics — 370/181 (24/2/67).
SCIENTIFIC SERVICES OFFICER (SSO1/2) — POPULATION ECOLOGIST — Division of Entomology — 180/395 (3/3/67).
EXPERIMENTAL OFFICER (EO1/2) — PHYSICIST — Division of Forest Products — 270/796 (3/3/67).
EXPERIMENTAL OFFICER (EO1/2) — Division of Protein Chemistry — 462/276 (10/3/67).
RESEARCH SCIENTIST (RS/SRS) — Division of Mineral Chemistry — 601/54 (10/3/67).
RESEARCH SCIENTIST (PRS/SPRS) — BIOCHEMIST — Division of Animal Health — 202/293 (14/4/67).



MORE CHRISTMAS PICTURES

Top left: A tug of war team from the Ecology Section of the Division of Plant Industry tugs its way to victory in a contest with a team from the Division of Entomology. However, most of those who attended the Canberra Divisions' Christmas party found less strenuous ways of celebrating.

Bottom left: Father Christmas receives a deputation from Jo-Anne, David and Kim Snaith at the Textile Physics Christmas party.

Top right: Zim the Magician held these children spellbound at the Division of Textile Industry's Christmas party.

Centre right: Father Christmas arrived in true country style at the Division of Animal Genetics children's party at Badgery's Creek. Those who were brave enough swam in the dam while the others romped about the wide open spaces.

Bottom right: A good deal of ingenuity and resourcefulness went into the planning of the Badgery's Creek party to ensure that everyone was adequately catered for.

News In Brief

C.M.G.

Dr. I. W. Wark, C.B.E., Chairman of the Commonwealth Advisory Committee on Advanced Education and a former Member of the Executive, was appointed a Companion of the Order of St. Michael and St. George last month in the New Year Honours.

Essay Prize

Dr. D. J. Walker of the Division of Nutritional Biochemistry has been awarded a divided second prize by Stichting ILRA, International Research Association, Denmark, in an international essay competition on the role of lactic acid and its derivatives in the nutrition and metabolism of ruminants.

Edward Noyes Prize

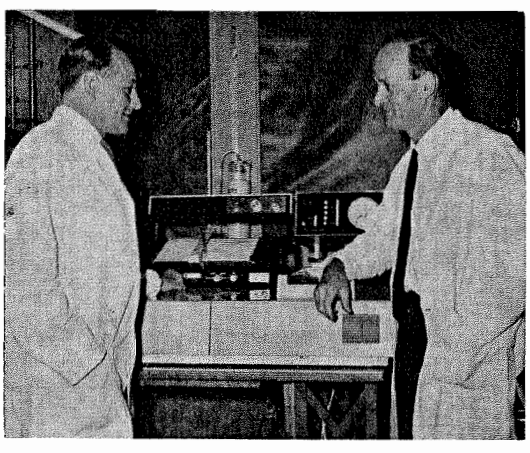
Mr. D. J. Close of the Division of Mechanical Engineering has been awarded the Edward Noyes Prize by the Council of the Institution of Engineers, Australia, for a paper on rock-pile thermal storage for comfort air-conditioning.

Visitor

Professor W. Hansel of the Department of Animal Husbandry, Cornell University, is spending a year in Australia on a National Science Foundation Grant. He has recently completed a four-month period at the Division of Animal Physiology's beef cattle unit in Brisbane where he has been associated with Dr. Lamond on the purification and measurement of pituitary gonadotraphic hormones in cattle.

He is now spending 3½ months at the Ian Clunies Ross Animal Research Laboratory working with the Assistant Chief of the Division, Dr. K. A. Ferguson, on various aspects of the endocrine control of reproduction.

Below: Professor Hansel (left) discusses his research with Dr. Ferguson.



C.S.I.R. Ski Club

The C.S.I.R. Ski Club, which last year celebrated its 21st birthday, is looking for new members among CSIRO staff and their families.

Anyone interested in joining should contact the Club's Secretary, Dr. A. Lawson, of the Division of Tribophysics, Melbourne, before the 28th February.

The C.S.I.R. Ski Club was the first club to build a lodge at Mt. Buller, now Victoria's most popular ski resort.

Its membership has grown over the years to more than 250 and a second lodge has been built at Falls Creek.

Laboratory Craftsmen

The first meeting between representatives of the Laboratory Craftsmen's Association and the Executive in May last year was the culmination of efforts, dating back to 1963, to form an association concerned with furthering the interests of trades staff in CSIRO.

From small beginnings among trade staff at the National Standards and Radiophysics Laboratories, came the formation of the New South Wales Branch. Branches were then formed in the A.C.T. and Victoria, and Sections in South Australia and Queensland.

Total membership is now in excess of three hundred, a figure which represents more than seventy-five per cent. of the staff who are eligible to join.

The current office-bearers of the Association are: Federal President, H. K. King (Animal Physiology, N.S.W.); Federal Secretary, R. Morelly (Applied Physics, N.S.W.); Federal Treasurer, R. Shearstone (Radiophysics, N.S.W.); Publicity Officer, M. Kelly (Textile Physics, N.S.W.); Proxy for Victoria, E. Pallister (Animal Physiology, N.S.W.); Proxy for Canberra, W. Menzies (Animal Genetics, N.S.W.).

The State Branches are represented on Council by the following: Victorian Chairman, E. Hindell (Chemical Research Laboratories); N.S.W. Chairman, J. Jones (Coal Research); A.C.T. Chairman, D. Brown (Wildlife Research).

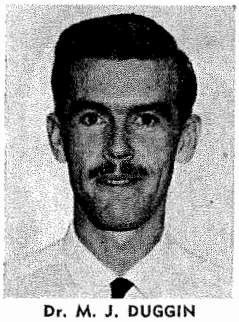
The drafting of a Constitution has now been completed and the next step is the lodgment of an application for registration with the Commonwealth Conciliation and Arbitration Commission.

Unfortunately, it has been necessary to restrict coverage to those staff in the Laboratory Craftsmen designations since the inclusion of staff with trade titles such as Fitter or Carpenter would invite objections to registration of the Association from Craft Unions. However, it is hoped that inclusion of such staff will be possible in the future.

New Appointees

Mr. A. J. Aasen has been appointed to the Division of Applied Chemistry where he will carry out research on the chemistry of natural products. Mr. Aasen graduated from the Norwegian Institute of Technology in 1964 and since then has been studying for his Ph.D.

Dr. M. J. Duggin has joined the Division of Physics where he will work on the transport and thermal properties of metals. Dr. Duggin graduated B.Sc. from the University of Melbourne in 1959 and Ph.D.



Dr. M. J. DUGGIN

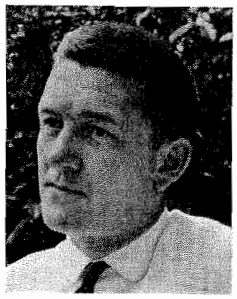
from Monash University in 1964. He has spent the last two years at the University of Pittsburgh.

Dr. G. N. Evans has been appointed to the Irrigation Research Laboratory at Griffith where he will carry out research on the total water balance of two irrigation areas. Dr. Evans graduated M.Sc.Agr. from the University of Sydney in 1961 and Ph.D. from Cornell University in 1965. He has spent

Dr. G. N. EVANS

the last two years with the Soil Physics Unit of the Agricultural Research Council in Britain.

Mr. J. T. Franks has joined the Building Operations and Economics Section of the Division of Building Research. He will work on the conduct and management of building operations. Mr. Franks graduated in science from the University of Melbourne in 1952. After a number of years in industry, he joined a firm of management consultants in 1965.



Mr. J. T. FRANKS

Dr. R. L. N. Harris arrived in Australia recently to take up a fellowship in developmental chemistry at the Division of Plant Industry. He will work on the design and synthesis of biologically active compounds. Dr. Harris graduated B.Sc. with honours from the University of Adelaide in 1961 and Ph.D. from the same University in 1964. Dr. Harris spent from 1963 to 1965 at Nottingham University, Britain, and 1966 at Stanford University, California.

Dr. R. L. N. HARRIS

Mr. D. E. Roney has joined the Division of Mineral Chemistry where we will advise on the selection and planning of industrially-oriented research projects, help evaluate the economic significance of laboratory results, and liaise with industry on the effective application of research results. Mr. Roney obtained his Diploma of Applied Chemistry from the Royal Melbourne Institute of Technology in 1943 and his Diploma in Chemical Engineering from the Technological Institute of Great Britain in 1950. After lecturing in chemical engineering at R.M.I.T. for ten years, Mr. Roney joined Monsanto Chemicals in 1955 and was recently appointed Acting Director of Development.

Julee and Wendy O'Hoy have every reason to look happy. In the second year of their Information Processing course, they amassed between them fifteen credits and one pass out of nineteen subjects. The twins are working at the Division of Building Research during their vacation.

Mr. K. G. T. Hollands has been appointed to the Division of Mechanical Engineering where he will carry out research on engineering thermo-

Mr. K. G. T. HOLLANDS

dynamics. Mr. Hollands graduated in applied science from the University of Toronto in 1959. He was previously employed with the Division of Mechanical Engineering from 1961 to 1963. Since then he has been studying for his Ph.D. at McGill University.

Dr. I. D. Smith has joined the Division of Animal Physiology where he will carry out research on lamb nutrition and the effects of poor nutrition in early life on later productivity. Dr. Smith graduated B.V.Sc. from the University of Sydney in 1957 and Ph.D. from the University of Queensland in 1964. For the last three years he has been lecturer in tropical animal husbandry at Queensland University.

Dr. O. A. Weber, arrived in Australia last month to take up a post-graduate fellowship with the Division of Protein Chemistry. Dr. Weber graduated in chemical engineering from the University of Zagreb, Yugoslavia, in 1950. He was appointed Assistant Professor of Applied Biochemistry at Zagreb University in 1960 and more recently Associate Professor of Physical and Biophysical Chemistry.

Mr. J. A. Woodburn has been appointed to the Soil Mechanics Section and will take charge of the Section's Adelaide laboratory. Mr. Woodburn graduated in engineering with honours from the University

Mr. J. A. WOODBURN

of Adelaide in 1964 and since then has been working in the structural design section of the Commonwealth Department of Works.

"It's tragic really — an apple fell on his head."

OVERSEAS RESEARCH REPORT

Elastic Water

An elasticised kind of water that can climb uphill and over the edge of a glass beaker and whose flow can be stopped with a pair of scissors has been discovered by a graduate student of the California Institute of Technology.

The strange liquid is 99.5% pure water and 0.5% polyethylene oxide, a powdery resin polymer used in paints and hair spray.

Very small amounts of certain polymers are known to give water an elastic, molasses-like quality; however, this is the first time that anyone has come up with a liquid so elastic that it goes on running out of a beaker after the flow was begun and the beaker set upright.

It is thought that the long molecules of the polymer are probably intertwined in the solution so that there is an elastic quality which enables the liquid already spilled to pull more of the liquid out. The flow of the liquid acts as its own siphon.

Reports from Britain say that small quantities of polyethylene oxide "lubricate" water and reduce friction between flowing water and solid bodies by up to 40% — even though the proportion of additive is less than 100 parts per million.

Possible applications suggested include lubrication of torpedoes to increase their range and lubrication of water to allow the use of smaller pipes for central heating or faster circulation with smaller pumps.

Rabbits Get the Habit

Rabbits grow restless when their cigarettes are late, according to a recent report from Tass.

The official Soviet newsagency said the restless rabbits have been smoking for five years and are now up to nine cigarettes a day.

Scientists in Tblisi, capital of the Soviet Republic of Georgia, used special masks with cigarettes in them to get the rabbits into the smoking habit. The scientists are studying changes in the respiratory tracts of smokers.

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 96, MELBOURNE, MARCH 1967

Pugwash Conference

The first South-East Asian Regional Pugwash Conference was held at International House, University of Melbourne, from 23rd-27th January.

It was attended by participants from Australia, Ceylon, India, Indonesia, Malaysia, New Zealand, Pakistan, Singapore and the Continuing Committee, with observers from the United Nations and the Australian Department of External Affairs.

CSIRO participants included the Chairman, Sir Frederick White; Dr. W. Boas, Chief of the Division of Tribophysics; Mr. I. Langlands, Chief of the Division of Building Research; Dr. D. F. Martyn, Officer-in-Charge of the Upper Atmosphere Section; Sir Otto Frankel, Research Fellow in the Division of Plant Industry; and Dr. H. G. Higgins of the Division of Forest Products who is Chairman of the Australian Pugwash Committee.

There were three major areas of discussion:

- Definition of crucial areas in which the application of science and technology would most rapidly improve living standards.
- Problems of security and their effect on the development of science and technology.
- Education and training; the role of tertiary institutes; developing a technician force.

In a statement released at the end of the meeting, the Conference drew attention to the mutual advantages to be gained by both developed and less developed countries from a co-operative programme of regional development.

The Conference warned that in choosing development programmes, priority should only be given to short term projects if they were able to initiate a continuing process of development.

It should not be given simply because the projects appeared attractive in giving rapid results at a finite cost.

Projects which could add to the experience of the region as a whole, where continuous exchange of experience between countries in the region could lead to easy adjustment of the programmes, were preferred.

The Conference considered some general features of education in the region and emphasised the importance of stressing world-wide human values in education.

Past practices had sometimes made it difficult for children to cultivate attitudes appropriate to a shrinking and uniting world.

Greater attention should be given to the training of technicians.

The rapid creation of a technical class, intermediate in skill and function between the tradesmen and the professional or technologist, was essential to a country's development.

At least four such people were needed for each professionally trained one.

The Conference considered that the wastage and spoilage of food was as important a problem in feeding the world as the failure to produce high yields per acre.

The solution was seen in the establishment of a safe chain of food management from producer to consumer which was firmly rooted in the social habits and the cultural pattern of the population.

The Conference also discussed the effects of military security on development, the need for establishing institutes for peace research as distinct from those for the study of war, and the refugee problem in Vietnam.

It pointed out that the disastrous situation in Vietnam was a reminder that scientists must make greater efforts to bring about conditions in which scientific and technological developments lead to world peace rather than world war.

Scientists of the whole world must be concerned about the increasing use of science for the destruction of human lives and vital resources.

Of special and immediate concern was the plight of Vietnamese refugees and the devastation of once-fertile areas.

Every effort should be made to extend aid for the rehabilitation and care of the civilian population.

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER (EO1/2) — COTTON ENTOMOLOGIST — Division of Land Research — 620/56 (3/3/67).

SCIENTIFIC SERVICES OFFICER (SSO1/2) — INFORMATION OFFICER — Division of Building Research — 390/361 (3/3/67).

EXPERIMENTAL OFFICER (EO1/2) — Division of Plant Industry — 130/831 (10/3/67).

EXPERIMENTAL OFFICER (EO1/2) — Division of Plant Industry — 130/835 (10/3/67).

RESEARCH SCIENTIST (RS/SRS) — PHYSIOLOGIST — Division of Fisheries and Oceanography — 320/356 (10/3/67).

RESEARCH SCIENTIST (RS/SRS) — Division of Plant Industry — 130/834 (10/3/67).

RESEARCH SCIENTIST (RS/SRS/PRS) — FELLOWSHIPS IN WOOD SCIENCE — Division of Forest Products — 290/795 (17/3/67).

EXPERIMENTAL OFFICER (EO1/2) — Division of Fisheries and Oceanography — 320/357 (17/3/67).

RESEARCH SCIENTIST (RS/SRS) — RESEARCH FELLOWSHIP IN AGRICULTURAL METEOROLOGY — Division of Meteorological Physics — 420/221 (17/3/67).

RESEARCH SCIENTIST (RS/SRS) — BIOCHEMIST — Division of Nutritional Biochemistry — 250/162 (17/3/67).

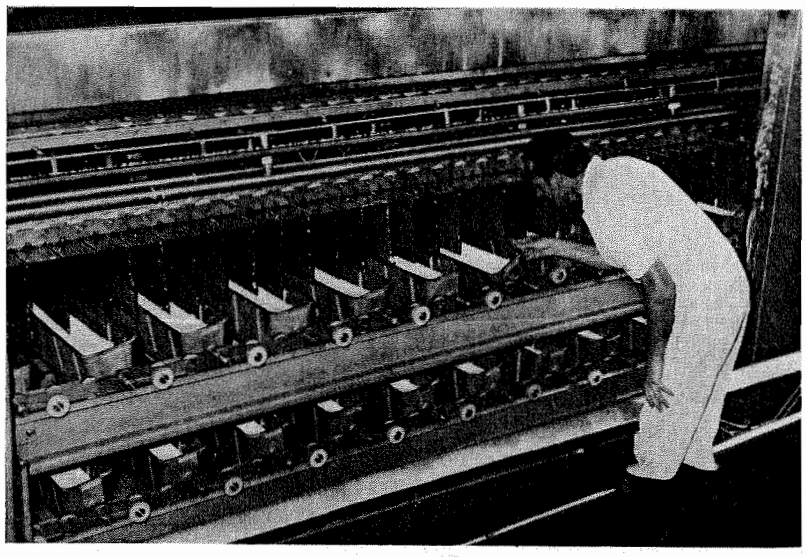
RESEARCH SCIENTIST (RS) — SOIL ZOOLOGIST — Division of Soils — 270/337 (24/3/67).

RESEARCH SCIENTIST (RS/SRS/PRS) — RESEARCH ENGINEERS AND SCIENTISTS — Division of Mechanical Engineering — 430/253 (24/3/67).

CHIEF RESEARCH SCIENTIST — CHIEF — Division of Food Preservation — 300/448 (30/3/67).

EXPERIMENTAL OFFICER (EO2/3) — PARASITOLOGIST — Division of Animal Health — 202/298 (7/4/67).

RESEARCH SCIENTIST (RS/SRS) — BIOCHEMIST — Division of Entomology — 180/401 (14/4/67).



NEW CHEESEMAKER ON DISPLAY

New equipment which completely mechanizes the manufacture of cheddar cheese and cuts labour costs by up to 60% was demonstrated to industry representatives for the first time last month at the Division of Dairy Research, Highett, Melbourne.

This equipment is the culmination of thirteen years of research and development by the Division in collaboration with the machinery manufacturing firm of Bell Bryant.

Work on mechanized cheesemaking first began in the Division in 1954 under Mr. J. Czulak.

At that time cheese was made in very much the same way as it was 3,000 years ago.

In making cheddar cheese, bacterial "starters" and rennet are added to warm milk; the rennet coagulates the milk and the bacteria convert the sugar present to lactic acid.

The curd is then cut into small particles and whey expelled by heating or "cooking".

After separating the whey, the curd particles are fused into a smooth mass or "cheddared".

Finally, the cheddared curd is sliced into finger sized pieces, salted, placed in bottomless tins called hoops, and pressed into blocks.

Mr. Czulak realized that the traditional cheese-making process was far too slow to be mechanized successfully and so he looked at ways of speeding it up.

He found that by dispensing with certain stages of the traditional cheese-making method, the manufacturing time could be reduced to a point where mechanization was possible without in any way affecting the quality of the cheese.

Two pilot-scale machines were developed: one for cheddaring, and one for salting, milling and hooping, and in 1958 cheddar cheese was made for the first time without being touched by hand.

Manufacturers were then invited to submit offers of collaboration in the development of commercial equipment and an offer from the Melbourne firm of Bell Bryant was accepted.

It was decided to concentrate first of all on the salting, milling, and hooping machine, since the possible savings in labour appeared greatest during this stage.

As a result the Bell-Siro "Cheesemaker 3" was introduced in 1960 and is now widely used in Australia and other cheese producing countries.

The equipment demonstrated by the Division of Dairy Research last month features two further developments.

The first of these is a control system for the initial stages of manufacture.

This control system keeps a continuous record of conditions in the vat and automatically controls the "cooking" of the curd, the draining of free whey at set levels of acidity, and the discharge of the curd and whey from the vat.

The other new development is the Bell-Siro "Cheesemaker 2" continuous cheddaring machine which has a capacity of 6,000 lb. an hour.

This machine converts the curd from separate particles into solid slabs which are then discharged into the mill of the Bell-Siro "Cheesemaker 3".

Our picture above shows Mr. V. Mackie of the Division of Dairy Research inspecting one of the conveyors of the "Cheesemaker 2".

Death of Dr. Franklin

One of Australia's best known livestock scientists, Dr. M. C. Franklin, died in Sydney on Friday, 27th January.

Dr. Franklin was born in New Zealand and graduated M.Sc. from Auckland University in 1927.

Dr. M. C. FRANKLIN

He obtained his Ph.D. from the University of Cambridge in 1933 and joined CSIRO in 1939.

Until 1960 he worked on a wide range of problems concerned with animal nutrition.

In 1953, Dr. Franklin became the first McIlrath Fellow in Animal Husbandry.

He was later appointed Director of the Meat Research Laboratory at the Camden Animal Husbandry Farm of the University of Sydney; in 1961 this was named the M. C. Franklin Laboratory by the Senate of the University.

In 1961 he moved to Brisbane to lead a newly created section of the Division of Animal Physiology to work on problems of beef production in northern Australia.

Dr. Franklin was seconded to the Australian Meat Board in 1964 as Executive Officer of the Australian Cattle and Beef Research Committee.

Dr. Franklin's research in animal nutrition has contributed materially to the sheep and cattle industry of Australia.

For twenty years he lectured in animal nutrition at the University of Sydney and thereby influenced many scientists now working in this field.

He played a leading part in the formation of the Australian Society of Animal Production and was its first Federal President.

SCIENCE IN GHANA

Before the establishment in recent years of the universities and the Ghana Academy of Sciences, practically all scientific research in Ghana was carried out in the various Government departments.

Most of these departments have now given up their research to the Academy.

Following the coup early last year, the organization of scientific research in Ghana has been under review by the National Liberation Council; however, at present it is centralised in the Academy.

The Ghana Academy of Sciences was founded in 1959 and was reconstituted in 1963. Its aims are:

- to organize and co-ordinate all scientific research, both pure and applied, in all branches of knowledge
- to promote the study of all sciences and learning
- to establish and maintain proper standards in all fields of science and learning in Ghana
- to recognize outstanding contributions to the advancement of science and learning in Ghana
- and to discharge any other functions which may be assigned to it by the government of Ghana.

The Academy is not only a national research organization like CSIRO but also has within its structure the highest learned society in Ghana.

Its governing body is the Praesidium, consisting of a President, two Vice-Presidents, the Chairman of the academic sections of the Academy, and from four to seven elected Fellows of the Academy. The General Secretary of the Academy is the Secretary of the Praesidium.

The Academy is divided into a research division and an academic division. The latter, which is rather like the Australian Academy of Science, is concerned with the academic advancement of all disciplines.

This division comprises only Fellows of the Academy. They are grouped into a humanities section, a physical sciences section and a biological section.

Unlike the academic division the research division is not under the sole control of Fellows of the Academy but is a broad based national division. It has a professional staff of about 200 people.

The research committee of the division is responsible for planning, directing and co-ordinating the research carried out in the various institutes of the Academy. It is assisted by a number of technical advisory committees, which cover such fields as agricultural and medical research.

The institutes correspond roughly to CSIRO divisions. There are separate institutes for research on cocoa, crops, animals, food, soils, geology and geological surveys, aquatic biology, health and medicine, forest products, industrial standards and buildings and roads.

The Academy is also engaged in projects on alkaloidal herbs and uses of radio-isotopes and a marine fisheries research institute is planned.

Ghana has four main institutions of higher learning; the University of Ghana, the Ghana Medical School, the University of Science and Technology and the University College of Science Education.

University education is free and all the universities are fully residential, at least at the undergraduate level.

The University of Ghana at Legon, just outside Accra, was established as the University College of Ghana in 1948 and raised to university status in 1961. It has an academic staff of about 300 and 2,000 students.

Faculties include agriculture, arts, law, science and zoology, physics, chemistry, mathematics and geology.

The Ghana Medical School was established in 1964 to train students to the degree level. It is regarded as part of the University of Ghana.

The University of Science and Technology at Kumasi was founded in 1951 as the College of Technology. It was raised to university status in 1961 and has an academic staff of about 200 and 1,100 students.

Although the main emphasis is on engineering and architecture there are also faculties of agriculture, arts and pharmacy.

The University College of Science Education was founded in 1962 as the University College of Cape Coast and was given its present title in 1964.

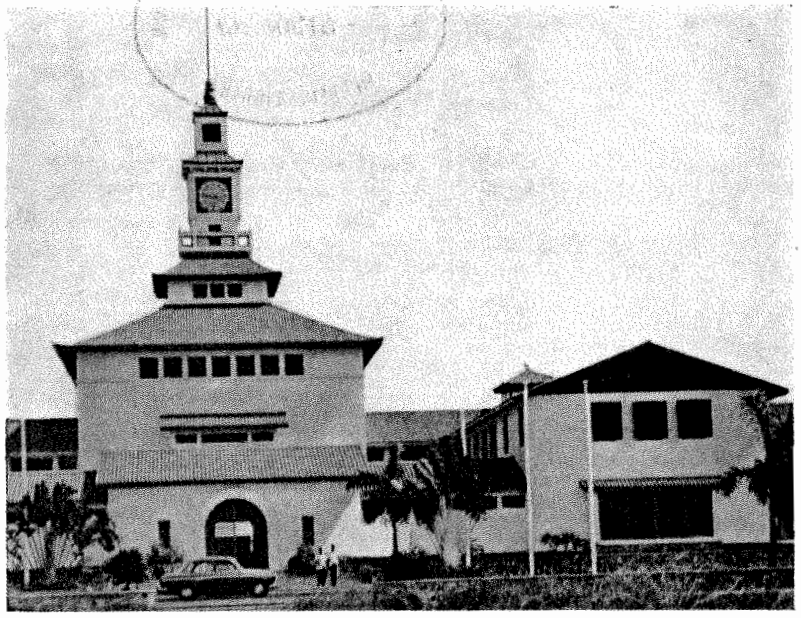
It provides courses leading to the B.A. (education) and B.Sc. (education) degrees of the University of Ghana with which it is linked.

The College also provides courses for diplomas and advanced degrees in education. There is an academic staff of about 100 and 850 students.

One of the main problems facing scientific development in Ghana today is the shortage of scientific manpower.

The Universities still depend heavily on expatriate lecturers and it is not always easy for them to recruit scientific staff from abroad.

Ghana's own production of scientists is slow. Furthermore, there is a shortage of skilled technicians which means that in some cases highly qualified scientists are forced to do routine jobs which could be done by junior technicians.



Above: The University of Ghana library.

The Government is now trying to overcome the manpower problem in a number of ways. The University College of Science Education at Cape Coast has been given the task of producing and maintaining an adequate supply of suitably qualified science teachers.

Science students in the universities are being given bigger bursaries than their colleagues in other fields of study and the more promising students are granted awards and junior fellowships by the Academy to enable them to pursue post-graduate studies.

Salary differentials in favour of scientists, engineers and medical practitioners have been introduced so that new graduates receive higher starting salaries than their counterparts in arts or commerce.

Finally, the Academy is conducting a campaign to promote science among the lay public and to convince the public of the vital role of science and technology in building a strong and prosperous nation.

Visit from Foundation Adviser

Dr. F. F. Hill, consultant on agricultural programmes and formerly Vice-President of the Ford Foundation, arrived in Canberra early last month with his wife and Mr. H. Walker, Middle East representative of the Ford Foundation, to commence a four week visit of Australian agricultural research centres.

Dr. Hill's itinerary will take him to a number of CSIRO establishments including the Divisions of Plant Industry, Land Research, Animal Genetics, Animal Physiology, Radiophysics and Tropical Pastures.

It will also include visits to State Departments of Agriculture, universities, and the Waite Agricultural Research Institute.

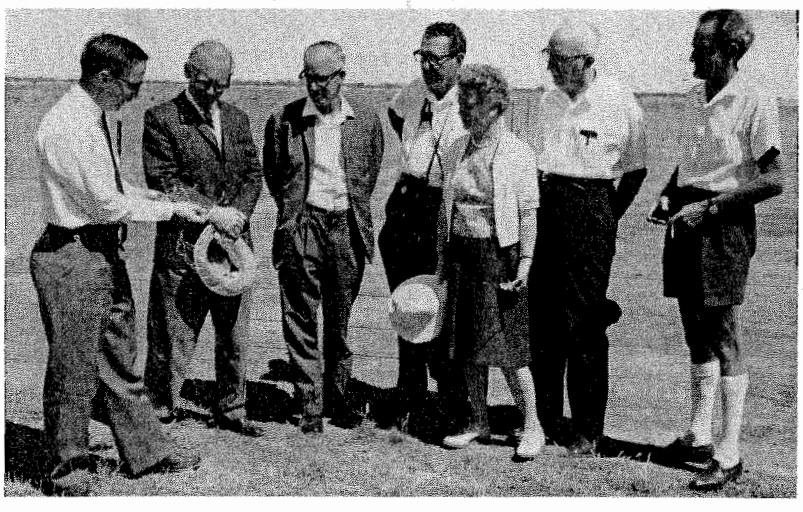
Trained originally as an agronomist, Dr. Hill was Professor of Agricultural Economics at Cornell University for nearly twenty years.

He has acted as adviser to a number of U.S. Government committees on the economics of agriculture and retired recently from a ten-year term as Vice-President of the Ford Foundation.

Both Dr. Hill and Mr. Walker are interested in examining agricultural research in Australia, particularly in the arid and semi-arid regions and in the humid tropics.

They feel that Australia's experience in agricultural research in these areas is applicable to a broad range of problems in developing countries and that Australian experts could make a significant contribution to these countries.

Below: Dr. J. Leigh (left) of the Riverina Laboratory discusses the effect of grazing pressure on different plants in dryland pastures with (from left to right) Dr. M. F. Day of the Executive, Dr. J. E. Falk, Chief of the Division of Plant Industry, Mr. Walker, Mrs. Hill, Dr. Hill, and Mr. G. A. Stewart, Chief of the Division of Land Research.



Overseas Visits

The Chairman, **Sir Frederick White; Mr. V. D. Burgmann,** Chief of the Division of Textile Physics; **Dr. F. G. Lennox,** Chief of the Division of Protein Chemistry; and **Dr. M. Lipson,** Chief of the Division of Textile Industry, returned recently from a two week visit to New Zealand where they attended the opening of the New Zealand Wool Research Laboratories at Christchurch and a meeting of the Technical Committee of the International Wool Secretariat.

Mr. E. G. Hall of the Division of Food Preservation leaves later this month on a three week visit to New Zealand where he will study development in the handling, storage and export of apples and pears.

Dr. T. A. Pressley of the Division of Protein Chemistry leaves shortly on a six month visit to wool research centres in New Zealand, North America, Britain, Europe, and South Africa.

Dr. C. H. B. Priestley, Chief of the Division of Meteorological Physics, left last month for Geneva where he will attend meetings of the UGGI Committee on Atmospheric Sciences and the WMO Advisory Committee. Dr. Priestley will return later this month.

SAFETY NOTES

Seat Belts in Casual Hire Vehicles

CSIRO has recently been informed by the Department of Supply that in future, all new cars, utilities, panel vans and landrover type vehicles will be supplied with seat belts as standard equipment.

Front seats will be fitted with lap-sash belts and rear seats with lap belts.

In addition, 25% of the existing Taxi Pool Fleet will be fitted out in the same way.

This means that in time, all Supply Department vehicles will be automatically fitted with seat belts, although until the existing fleet is replaced, we may still receive a casual hire vehicle without belts.

The position will steadily improve over the next 2-3 years.

Although not completely satisfactory, it is felt that the above is a positive step in the right direction.

These belts are being provided for your protection. Use them — you have this responsibility to yourself and family.

J. W. Hallam, Safety Officer.

News In Brief

President

Dr. A. Walsh, Assistant Chief of the Division of Chemical Physics, has been elected President of the Executive Council of the Australian Institute of Physics.

Forum Member

Sir Frederick White has been appointed a member of the recently formed Science and Industry Forum of the Australian Academy of Science.

Visitor

Professor A. Frey-Wyssling of the Department of General Botany, Swiss Federal Institute of Technology, is spending seven weeks with the Horticultural Research Section.

Professor Frey-Wyssling is a world authority on ultrastructural plant cytology and will give a series of seminars on this subject while in Australia. He plans to visit Canberra and Armidale before returning to Switzerland.

Golf Day

A CSIRO Golf Day will be held on 16th April, at Rosanna Public Golf Course, Melbourne, commencing at 10.00 a.m. Members of Head Office and Divisional Staff wishing to play should advise either Mr. H. C. Crozier or Mr. E. French at Head Office as soon as possible. Entrance fee is one dollar.

Screen News

The Food Preservation Film Society will screen "The L-Shaped Room", a British drama starring Leslie Caron, at 7.30 p.m., Tuesday, March 14, in the Hicks Meeting Room, North Ryde.

The 314 Film Society will screen the 1932 crime classic "Scarface" at 8.00 p.m. on Thursday, March 16, at Head Office. Starring George Raft, Boris Karloff, and Paul Muni, "Scarface" has been described as the best and most brutal gangster film ever made.

MISS AUSTRALIA QUEST

Last year at least two girls on the CSIRO staff entered the Miss Australia Quest. Each of them raised more than $1,000 for the Australian Cerebral Palsy Association.

A child suffering from cerebral palsy is called a spastic. His muscular control is impaired because of brain damage before, during or after birth. The child may not be able to walk, talk or use his hands, but his intelligence is not necessarily affected.

There is no known cure. However, early training and treatment over many years can help most spastics. With long, patient training they can learn to walk, talk and use their hands with varying degrees of normality.

The Association is a non-profit registered charitable organization which provides medical treatment, training, education and transport for children and adults. It receives no Government subsidy: it is supported entirely by public donation.

It provides medical treatment and as much formal education as each child or adult can put to use. It trains them in practical knowledge and social skills to help them become independent, self-respecting members of the community.

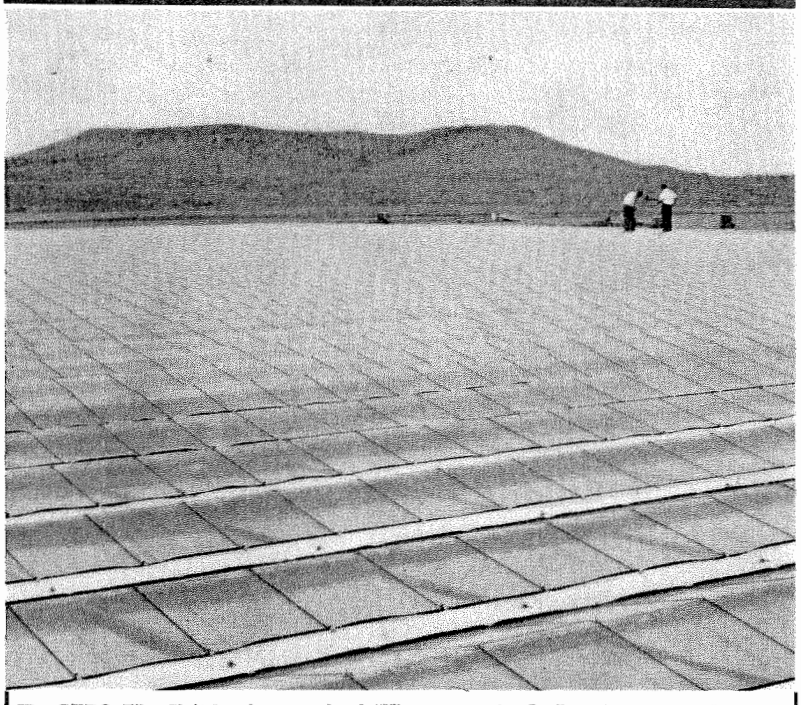
The organizers of the Miss Australia Quest are once again seeking candidates. Entrants should be of Australian nationality and over 17 on September 1st, 1967. In addition, each candidates needs a sponsor (such as one of CSIRO's Social Clubs) and she must raise at least $100 to be eligible for judging.

Further information on the Quest can be obtained from the Editor of "Coresearch". Any contestant wishing to enter as "Miss CSIRO" should seek the prior approval of the Secretary (Administration).

"Unless you're a Ph.D., scram."

Courtesy "New Yorker".

WATER FROM THE SUN



The CSIRO Film Unit has just completed "Water from the Sun", a 15 minute colour film which shows the construction of a solar distillation plant at the little opal-mining town of Coober Pedy, halfway between Adelaide and Alice Springs.

The still, which covers an area of almost two acres, is based on a design by the Division of Mechanical Engineering. It was installed last year by the Engineering and Water Supply Department of South Australia and is now distilling the brackish water, which is plentiful in the area, into a reliable supply of domestic fresh water.

In showing the construction of the still, the film explains how a solar still works.

Finance Scheme for Home Builders

The A.M.P. Society has a special housing finance scheme for CSIRO officers. This has been in operation for 11 years and during that period a total sum of $992,260 has been lent to 119 officers for domestic housing.

The main features of the scheme are:—

Amount of Loan: Loans are granted towards the purchase or erection of suitable homes in approved localities. In the case of CSIRO officers the A.M.P. Society will approve loans up to 80% of the Society's valuation of the property. There is no formal limit on the amount of the loan — this depends on the value of the security.

Duration: The usual period of the loan is for 20 or 25 years but this is varied according to the age of the applicant. Repayment is made by fixed uniform monthly instalments for the duration of the loan.

Interest: Current interest rates are 6¼% per annum for loans up to $8,000, 6¾% for loans over $8,000 but not exceeding $12,000, and 7% for loans exceeding $12,000 but not exceeding $16,000. In all cases the interest rate is applicable to the total of the loan.

Locality: Loans are generally restricted to capital cities and to large provincial towns where the A.M.P. Society has its own branch offices.

Life Assurance Protection: All participants in the A.M.P. Society's home finance scheme are required to take out full life assurance cover for a sum at least equal to the amount of the loan. Existing life policies with the A.M.P. Society are acceptable collateral but the "mortgage" or "reducing cover" type of policy is not regarded as adequate by the Society for this purpose. In short, the assurance policy must be a permanent one based on the life of the member — not temporary assurance cover which reduces year by year

Valuations: A nominal charge is made for valuations of properties offered as security under the scheme. For existing homes the fee is $10 and for new building loans it is $16. It has been the experience of CSIRO officers that the Society's valuations are realistic and follow closely the market conditions operating at the time of the valuation.

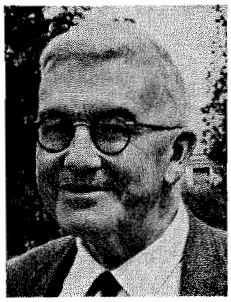
Confidential nature: In accordance with the agreement between the A.M.P. Society and CSIRO, Mr. R. W. Viney, Finance Manager, Head Office, provides the Society with background information on each applicant and supports the application in general terms. All transactions are kept strictly confidential.

Last January, the Division of Plant Industry farewelled two of its members, Mr. A. Lambert, who is retiring, and Mr. W. Goodwin, who is transferring to the Division of Tropical Pastures. Mr. Lambert joined the central carpenters' shop at Black Mountain, Canberra, in 1951. In 1955, he transferred to the Division when it established its own carpenters' shop. Mr. Goodwin joined Plant Industry from National Mapping in 1952 to set up and run an Illustrating Section. His move to Tropical Pastures will enable him to return to his favourite work — cartography and photo interpretation. Our picture shows the Chief of the Division, Dr. J. Falk (right), presenting Mr. Goodwin with a watch. Mr. Lambert (left) was presented with a wallet of notes.

New Appointees

Dr. C. C. Curtain has joined the Division of Animal Health where he will study the biochemical characterization of animal viruses. Dr. Curtain graduated Ph.D. from the University of Melbourne in 1953 and D.Sc. from the same University in 1965. He has worked at the Baker Medical Research Institute, Melbourne, for the last twelve years, on the biochemistry of proteins and related macromolecules. Dr Curtain was elected a Fellow of the Royal Australian Chemical Institute in 1961.

Mr. J. P. Hamilton has joined the Division of Mechanical Engineering where he will work on equipment for



Mr. J. P. HAMILTON

comfort cooling and the utilisation of solar energy. Mr. Hamilton graduated B.E.E. from the University of Melbourne in 1932 and has worked as a design engineer with Maize Products Pty. Ltd. since 1943.

Mr. R. K. Hill has been appointed to the Division of Building Research where he will study ceramic raw materials and the properties of finished products and work on

Mr. R. K. HILL

the development of new ceramic materials. Mr. Hill obtained his Diploma of Applied Chemistry from R.M.I.T. in 1952 and has spent the last fourteen years with various ceramic firms.

Mr. R. W. Hinde has been appointed an Assistant Secretary in the Industrial and Physical Sciences Branch at Head Office. He will be concerned with the Branch's responsibilities for Divisional estimates and for research associations and other bodies

Mr. R. W. HINDE

receiving grants from CSIRO. After graduating B.Sc. with honours from the University of Sydney in 1950, Mr. Hinde joined Monsanto Chemicals (Aust.) Ltd. where he has been Research Manager (Chemicals) for the last four years.

Miss Jan R. Hurley has joined the Leather Research Section of the Division of Protein Chemistry where she will study the interaction between metal ions and proteins. Since

Miss J. R. HURLEY

graduating B.Sc. with honours from the University of Sydney in 1965, Miss Hurley has been working for an M.Sc. degree in physical organic chemistry.

Dr. G. R. Jago has joined the Division of Dairy Research where he will carry out research on the enzymology of dairy products. Dr. Jago graduated B.Sc. from the University of Sydney in 1951 and Ph.D. from the University of Melbourne in 1957. Except for three and a half years overseas, he has been with the Biochemistry Department at the University of Melbourne since 1954.

The O'Hoy twins have turned from sweet to sour. They managed 15 credits and a pass out of 16 subjects, but in last month's issue our printer's devil turned 16 into 19.

Mr. R. Jones has been appointed to the Division of Plant Industry and will work at the Riverina Laboratory, Deniliquin, on physiological plant ecology. Mr. Jones graduated M.Sc. from the University of Queensland in 1963 and has spent the last three years with the Botany Department at the University of Melbourne.

Dr. J. K. Marshall will arrive in Australia shortly from Britain to join the Division of Plant Industry. He will carry out research on micrometeorology at the Riverina Laboratory, Deniliquin. Dr. Marshall graduated B.Sc. from St. Andrew's University in 1959 and Ph.D. from Cambridge University in 1962. After lecturing for two years at Edinburgh University he joined the Agricultural Research Council in 1964.

Miss Dianne H. Nicol has joined the Division of Animal Physiology where she will study the role of circulation in wool growth, temperature regulation, reproduction and renal function. Miss Nicol graduated B.Sc. from the University of Sydney in 1965 and Dip.Ed. from Sydney Teachers' College in 1966.

Miss Tana J. Oxborrow, who graduated B.Sc. last year from the University of Sydney, has been appointed to the Division of Animal Physiology. Miss Oxborrow will work on the endocrine control of intermediary metabolism.

Dr. G. C. Ramsay has been appointed to the Division of Protein Chemistry where he will work on the synthesis of brightening agents suitable for use on woollen fabrics. Dr. Ramsay graduated B.Sc. with honours from the University of Adelaide in 1960 and Ph.D. from the same University in 1963. He has spent the last

Dr. G. C. RAMSAY

four years carrying out research in organic chemistry at the Imperial College of Science and Technology, London, and at Brandeis University, Massachusetts.

Mrs. Elisabeth Schiller has joined the Division of Protein Chemistry where she will work on the production of films

Mrs. E. E. SCHILLER

from solubilized keratin. Since graduating B.Sc. from Monash University in 1965, Mrs. Schiller has been working at Monash in the Biochemistry Department.

Mr. M. G. Richards, who graduated B.Sc. with honours last year from the University of Tasmania, has been appointed to the Division of Applied Chemistry. Mr. Richards will work on laboratory scale methods for separating the components of mixtures of organic compounds.

Mr. B. H. Smith has joined the Division of Soils where he will undertake research on soil sub-microstructure. Mr. Smith

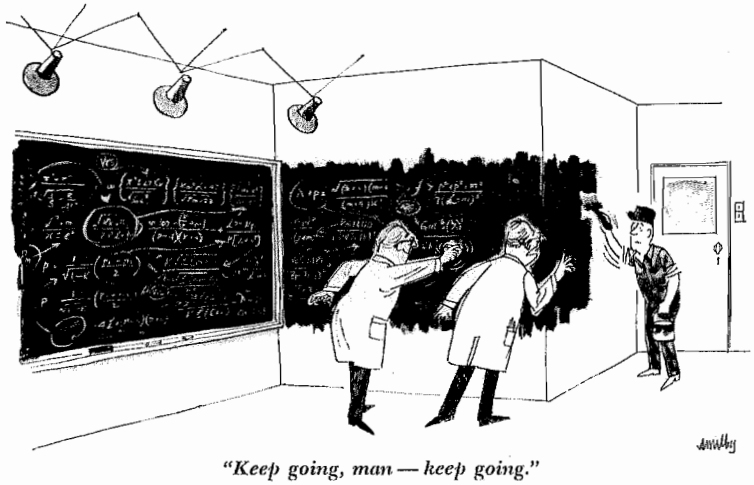
Mr. B. H. SMITH

graduated B.Agr.Sc. from the University of Melbourne in 1961 and has just completed a Ph.D. thesis on the chemistry of molybdenum in the soil.

Mr. B. R. Smith has been appointed to the Division of Chemical Engineering where he will carry out research on diffusion and surface chemistry. Since graduating M.Sc. from the University of Auckland in 1963, Mr. Smith has been studying for a Ph.D. degree at the University of Sydney.

Mr. A. L. Walker has joined the Division of Mineral Chemistry where he will work on the development of new processes for mineral treatment. Since graduating B.Sc. with honours from the University of Melbourne in 1961, he has been working for his Ph.D. degree in geochemistry.

Mr. E. R. Wishart, a recent science graduate from the University of Melbourne, has joined the Cloud Physics Group at the Division of Radiophysics. Mr. Wishart spent three years on the staff of A.N.A.R.E. and served for a year as glaciologist at Mawson. From 1960 to 1962 he was a technical officer at the John Curtin School of Medical Research, A.N.U.



"Keep going, man — keep going."

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 97, MELBOURNE, APRIL 1967

NORTH HAS BIG FUTURE

Beef Production Could Outstrip Wool

There was little doubt that within fifty years northern Australia would have a population and export income approaching that of the south, Dr. E. M. Hutton, Assistant Chief of the Division of Tropical Pastures, told members of the Australian Institute of Agricultural Science last month.

Dr. Hutton was delivering his Presidential address to the Institute in Melbourne. He said that Australia could ultimately have 370 million acres of improved pasture, of which 110 million acres would be in the south and 260 million in the north.

This gave tremendous scope for more intensive animal production, and with increased emphasis on beef it could finally result in about 25 million cattle in the south and 60 million in the north.

The achievement of these cattle numbers would increase export income from beef and veal almost six times, and beef production would replace wool as Australia's most important agricultural industry.

Dr. Hutton said that it had been estimated that Australia had an area of 430 million acres available for intensive agricultural and pastoral development.

Of this, 150 million acres were in the southern zone with a rainfall of more than 15 inches and 280 million in the north with over 20 inches of rainfall.

Of this land about 43 per cent. had been developed in the south, but only 2½ per cent. in the north.

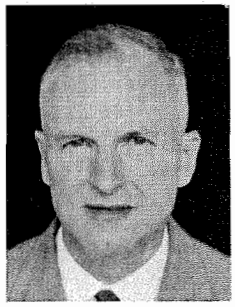
Disadvantages in the north were offset to a large extent by the availability of extensive areas of relatively cheap land.

This has been recognised by both American and Australian cattle interests, but the Americans had taken the initiative in some areas because of their willingness to make investments large enough to sustain intensive development.

In view of the northern potential unfolded by recent research, it could be asked why southern financial institutions still disregarded the north.

There could be little complaint if outside people like the Americans were enterprising enough to invest heavily in favourable but neglected areas after sizing up the situation and negotiating suitable conditions of land tenure.

Far from doing Australia a disservice, they were assuming a role no one else was prepared to fill.



Dr. E. M. HUTTON

"The infusion of their capital will make a most significant contribution to northern development and will put us at least ten years ahead," Dr. Hutton said.

At present approximately 2,560 agricultural scientists, working in various organisations, were concerned with research and extension on soils, crops, pastures and animals.

Of these only about 20 per cent. were living and working in the north, though southern workers often produced results of interest in the north, where some also had projects in existence.

With three times the amount of land awaiting intensive development in the north, compared with the south, it was apparent that there should be more scientists living and working in the north, if northern Australia was going to make its full contribution to the nation's prosperity.

The north now presented a greater challenge to agricultural science than the south, and the results being obtained there were followed eagerly by the rest of the tropical world.

"It is not unrealistic to forecast that over 6,000 agricultural scientists will be required by government and private organisations in Australia at the turn of the century," Dr. Hutton said.

"In spite of the acknowledged value of its mining industries, the greatest long-term asset in the north is its vast areas of underdeveloped land, which research is now showing to be capable of much higher production," Dr. Hutton added.

"Thus beef will take its place with minerals as a potent force in northern development and also in Australia's overall prosperity.

"Southern insurance firms and other financial institutions have been too conservative in their approach to northern development and are missing the opportunities being presented.

"There is little doubt that the north will have a population and export income approaching that of the south within 50 years and that manufacturing and agricultural pursuits, including irrigation, now regarded as uneconomic will become prosperous.

"The chain reaction started by minerals and beef in the north will ultimately prove to be vital to Australia's prosperity, stability and future security in spite of unrealistic predictions to the contrary."

Welding Research Grant

CSIRO will provide a grant of up to $40,000 a year over the next five years to the Australian Welding Research Association on the basis of $1 for every $1 subscribed by the Association's members.

The Australian Welding Research Association was established in December, 1964 to advance welding technology to enable it to keep pace with the increasing use of more sophisticated construction techniques. Members of the Association represent the four Australian groups directly concerned with welded construction—the steelmaker, manufacturers of welding materials and equipment, steel fabricators, and purchasers of welded structures.

Although much research on welding is being carried out overseas, it cannot supply the answers to peculiarly Australian problems which arise from the use of locally manufactured steels and welding materials.

Every year brings new problems to those concerned with welding as a result of the changed requirements in designs and the development of new alloys in both the ferrous and non-ferrous fields.

Sir William Hudson, Chairman of the Association's Council, said last month that the Association had no immediate plans for setting up research laboratories of its own but would make grants to existing laboratories at universities and elsewhere.

A research programme had already been started on the weldability of various types of steel, particularly one Australian-made high strength type which was expected to supersede, to some extent, mild steel in the structural steel industry.

This and similar investigational work had a direct bearing on the ability of Australia to maintain, and if possible to improve, its position in relation to other nations having a significant industrial output.

Sir William went on to say that, while the failure of major welded structures attracted the attention of the public, failures in the production engineering industries, though less spectacular, could be very expensive indeed.

There was no doubt, he said, that co-operative research supported by the Association's members and CSIRO would lead to significant national benefits.

Divisional Change

The Executive has appointed Mr. H. R. Brown, formerly Chief of the Division of Coal Research, consultant to the Executive on coal research and related matters.

Following this change, the Division of Coal Research has become the Coal Research Laboratory of the Division of Mineral Chemistry, under the leadership of Mr. I. E. Newnham, Chief of the Division. Dr. R. A. Durie has become an Assistant Chief of the Division of Mineral Chemistry.

HIGH HONOURS FOR TWO CHIEFS

Dr. C. H. B. Priestley, Chief of the Division of Meteorological Physics, and Dr. D. F. Waterhouse, Chief of the Division of Entomology, have been elected to the Fellowship of the Royal Society of London.

Dr. Priestley has worked on the physics of the lower atmosphere, particularly its turbulence, heat and water vapour transfer, and energy balance.

He graduated from the University of Cambridge taking the Maths Tripos with a Double First and the University Prize for Mathematics.

Dr. C. H. B. PRIESTLEY

During the war he engaged in co-operative research for the British Defence Services in both Britain and Canada.

In 1946 he was invited to Australia by the Executive of the C.S.I.R. to start up a meteorological physics section.

Now the Division of Meteorological Physics, it is one of the world's most active research groups in the field of dynamic meteorology.

In 1950, the Royal Meteorological Society awarded Dr. Priestley the Buchan Prize for his important and original contributions to meteorology.

He was elected to a Fellowship of the Australian Academy of Science in 1954.

Last month he was elected Chairman of the Advisory Committee of the World Meteorological Organization of the United Nations (W.M.O.).

Dr. Waterhouse has carried out research over the last 30 years on insect physiology and biochemistry.

In particular, he has worked on digestion in the sheep blowfly and the digestion of wool by the clothes moth and other insects.

The Division of Entomology, which Dr. Waterhouse has led for the last seven years, has been one of the pioneers in investigating ways of controlling insects which reduce or remove the need to rely on insecticides.

Dr. Waterhouse graduated B.Sc. with first class honours and the University Medal from the University of Sydney in 1937.

During the war he held the rank of Captain in the Australian Army Medical Corps.

He was awarded the degree of D.Sc. from his university in 1952 and in the following year shared the David Syme Research Prize.

Dr. D. F. WATERHOUSE

He was elected to a Fellowship of the Australian Academy of Science in 1954 and was Biological Secretary of the Academy from 1961 to 1966.

Dr. Waterhouse has served on a number of expert advisory panels of the World Health Organisation and the Food and Agricultural Organisation of the United Nations.

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER (EO2/3) — Division of Physics — 770/343 (7/4/67).

EXPERIMENTAL OFFICER (EO2/3) — RADIOASTRONOMY — Division of Radiophysics — 780/425 (7/4/67).

EXPERIMENTAL OFFICER (EO1/2) — Soil Fertility Section — Division of Plant Industry — 130/844 (14/4/67).

EXPERIMENTAL OFFICER (EO2/3) — Division of Dairy Research — 410/169 (14/4/67).

RESEARCH SCIENTIST (RS) — STATISTICIAN — Division of Mathematical Statistics — 440/194 (14/4/67).

RESEARCH SCIENTIST (RS) — STATISTICIAN — Division of Mathematical Statistics — 440/195 (14/4/67).

RESEARCH SCIENTIST (RS/SRS) — GEOMORPHOLOGIST — Division of Land Research — 618/217 (14/4/67).

EXPERIMENTAL OFFICER (EO1/2) — MECHANICAL OR CHEMICAL ENGINEER — Division of Food Preservation —305/97 (5/5/67).

EXPERIMENTAL OFFICER (EO1/2) — BOTANIST — Division of Plant Industry — Riverina Laboratory — 132/165 (5/5/67).

SCIENTIFIC SERVICES OFFICER (SSO2/3) — LIAISON OFFICER — Division of Textile Industry — 464/404 (5/6/67).

RESEARCH SCIENTIST (RS/SRS/PRS) AND EXPERIMENTAL OFFICER (EO2/3) — Division of Textile Industry — 1164/405 (5/6/67).

RESEARCH SCIENTIST (RS/SRS/PRS) and EXPERIMENTAL OFFICER (EO1/2) — RESEARCH ENGINEERS AND SCIENTISTS — Division of Mechanical Engineering — 430/255 (23/6/67).

JOURNEY TO INDIA

Last January, during the course of a 3,000-mile journey through India with a C.A.A. travel group, I was able to visit all three of the CAA projects adopted by CSIRO.

by May Guthridge

Miss Guthridge, who is Secretary of the CSIRO Community Aid Abroad Group for Head Office and the Divisions of Forest Products and Textile Industry, visited India last January with a CAA travel group. In this article she reports on the projects supported by the CSIRO group of CAA.

The acute drought conditions in the State of Bihar at the present time are aggravated by the lack of means for irrigation.

The region depends on the monsoon rains and a good river system for water, and even if the rains do fail in one year the resources are sufficient for the following year.

For the first time in a hundred years the monsoons have failed for two seasons running and the rivers have dried up.

The digging of wells has become an urgent necessity, but only a few drilling rigs are available in the whole of India.

Even though they are being sent into the drought areas most of the villages have little hope of obtaining this type of assistance.

We watched some villagers digging their own wells, by the traditional method which, though effective, is extremely laborious.

Two or three men at the bottom of the well shaft, some 12 to 15 feet in diameter, attack the hard earth and rock with small picks. Another puts the loosened soil into a round shallow basket and helps to hoist it on to the head of the first member of a relay team which carries it to the surface.

Each of the men and women in the team carry the basket up three or four yards of a narrow, steep ramp which has been left in a spiral up the wall of the shaft.

The empty basket is passed down again from hand to hand as a full basket comes up.

The first CSIRO-CAA project we saw was the well at the village of Rupabad, in the State of Bihar.

After travelling by jeep through miles and miles of dried up countryside and stirring up an unbelievable amount of dust, we first sighted Rupabad as a huddle of terracotta tiled roofs against a distant jagged blue mountain.

The CAA leader, who had visited the village about two years previously, said he could hardly believe it was the same place.

The houses had been so extremely dilapidated and now they were beautifully restored.

Leaving the jeeps, we approached the village on foot and passed under a ceremonial arch erected in our honour.

The whole population of Rupabad, about one hundred people in all, welcomed us with garlands of fresh flowers.

We were taken to wooden benches set out for us under the shade of an awning trimmed with little pennants, and served with tea and fruit.

A group of male musicians, seated on the ground in the midst of us, sang a long devotional song about Lord Krishna, accompanying themselves with drums and kind of small harmonium.

Then some of the women sang from the sidelines outside the shelter.

This time it was a marriage song about a bride saying farewell to her parents, but the performance was somewhat confused by the enthusiasm of an elderly woman who kept singing the wrong words and had to be kept in order by the others, everybody laughing good humouredly.

At length we were taken to inspect the well, the biggest we had seen. It was about 18 feet in diameter, with water fairly near the surface.

A plaque set in the surrounding wall proclaimed to those who could read the language that:

"This huge well has been constructed through kind assistance from Community Aid Abroad (CAA) and by support of the Bihar government. The villagers contributed the physical labour and completed it the year 1966. This plaque has been donated by the village reconstruction group, Koraia."

Water could be pumped from the well into irrigation channels and a group of young men staged a desperate battle with a pump engine to give a demonstration, but it refused to start. The sun was setting rapidly when they finally gave up, but the greenness round about was ample evidence that the pump did work at other times.

The second CSIRO-CAA project, a poultry unit at Madras Christian College, was unfortunately not fully operational.

At present, the drought has forced the price of poultry feed so high that egg production is no longer an economic proposition.

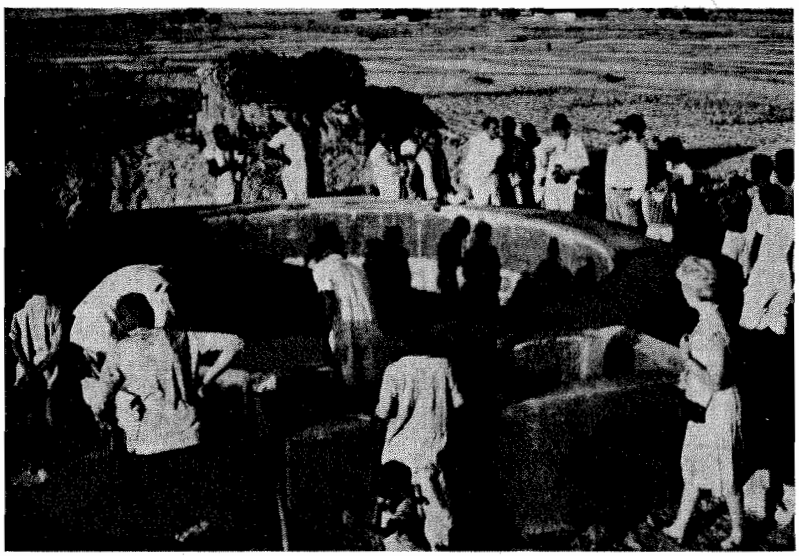
However, when conditions return to normal it is planned to use the unit for training students and villagers in poultry husbandry as well as providing a reliable source of better quality food.

The current CSIRO project for the formation of a farming co-operative for the Raval tribespeople appears to be well worth while.

The river lands they are at present cultivating could be seen only at the far side of a wide river bed of sand, which the jeeps did not attempt to cross.

A visit to some of the labourers' houses in a nearby village indicated just how poverty-stricken they were.

If a transformation such as that a Rupabad could be brought about here, our efforts would be well rewarded.



Above: This well at Rupabad was built with money donated by the CSIRO group of CAA, together with contributions from the Bihar Government.

Below: Scene in a Raval village.

Overseas Visits

Dr. B. A. Bolto, of the Division of Applied Chemistry, leaves this month on a two-month visit of North America, Europe, Israel, Britain and Japan where he will visit research centres concerned with water desalination and ion exchange. He will also take part in a symposium in Athens on desalination and an IUPAC symposium in Brussels on macromolecular chemistry.

Mr. A. L. Dyce, of the Division of Animal Health, leaves shortly for Africa, Israel, Britain and North America, where he will visit research centres concerned with vectors of the sheep disease "blue tongue". He will return at the end of July.

Mr. D. E. Henshaw, of the Division of Textile Industry, will leave later this month for Britain, Europe, the United States and Japan to obtain information on the potential of a new technique developed in the Division for spinning wool. He will return early next June.

Mr. R. S. T. Kingston, of the Division of Forest Products, leaves later this month for Japan, Russia, Europe, and Britain on a five-month visit of laboratories concerned with the physical properties of wood.

Dr. A. L. G. Rees, Chairman of the Chemical Research Laboratories, left recently for Holland where he will attend an IUPAC Executive Meeting at the Hague. Dr. Rees will also attend the Royal Society Commonwealth Conference at Oxford before returning to Australia later this month via the United States and Japan.

Mr. K. Spencer, of the Division of Plant Industry, left Canberra last month on a ten-month visit to the United States and Europe. He will spend some time at the University of California studying the latest procedures for diagnosing mineral deficiencies, particularly deficiencies of sulphur, potassium and molybdenum.

SAFETY NOTES

Compressed Gases

Considering the manner in which compressed gases are used and handled in some laboratories, it is surprising that there are not more serious accidents.

In one of our laboratories, a gas cylinder broke loose from its cradle and shot down a flight of stairs. Fortunately, no one was using the stairs at the time.

In another Division, a cylinder fell off a truck, the bronze valve snapped at the neck of the cylinder, and the contents discharged unrestrictedly into the atmosphere — there was no way of stopping it. Fortunately, the cylinder contained acetylene, which discharges slowly, but had it been compressed air, the cylinder would have taken off like a rocket.

In the laboratory, observe the following precautions:

- Never connect a gas cylinder directly to glass apparatus; always use a safety bottle or valve.
- Always use the correct gas regulator and adaptor.
- Never use lubricants on gas regulators or fittings.
- Always open a cylinder slowly and release a little gas before connecting to the apparatus.
- Support cylinders in trolleys or stands or strap them securely to the bench. Remember, if a cylinder is knocked over, it will probably pull over the equipment to which it is connected.
- If a rapid gas stream is used, earth the cylinder against static electricity.
- Do not assume that a cylinder is empty because no more gas comes out of it. With gases such as sulphur dioxide, ammonia and carbon dioxide, ice formation can seal the outlet and release more gas later. Valves on these cylinders can also ice-up and prevent proper closing.
- Always turn the gas off at the cylinder valve, not the regulator valve.
- In the workshop, compressed air is sometimes used to remove metal chips and so on from machinery. Make sure you do not blow these chips at someone else. Watch your eyes!
- Never direct a stream of compressed gas at any part of the body. It can be forced through the skin and produce "deep-sea divers' bends", an excrutiatingly painful condition which can lead to death.

Compressed gases are safe to use if handled properly. Take care and think.

J. W. Hallam, Safety Officer.

News In Brief

Medal

Dr. D. Martin of the Division of Plant Industry was awarded the Australian Medal of Agricultural Science last month by the Australian Institute of Agricultural Science.

Dr. Martin, who is Officer-in-Charge of the Tasmanian Regional Laboratory, received the award for his research on the effect of mineral uptake by apple trees on the occurrence of the disease, Bitter Pit.

Assistant Chief

Dr. A. D. Wadsley has been appointed an Assistant Chief of the Division of Mineral Chemistry.

Opening

The Governor-General, **Lord Casey**, will open the new Western Australian Laboratories at Floreat Park, Perth, on Saturday, 8th April.

Film Award

The CSIRO film "Birth of the Red Kangaroo" was awarded the Grand Prix in the recent 4th International Festival of Scientific and Technical Films, Brussels. Another CSIRO film "Window Into Space" was awarded first prize in the astronomy section. Some 500 films were shown at the Festival.

Ornithologist

Dr. D. L. Serventy of the Division of Wildlife Research has been elected a Corresponding Member of the British Ornithologists Union.

Concrete Symposium

The Institution of Engineers, Australia, will hold a Symposium on Concrete Structures at the Hotel Astra, Bondi Beach, Sydney, on 22nd and 23rd May, 1967. There will be six technical sessions covering columns and compression members, composite construction, plates and slabs, shear in concrete members, flexure and torsion of beams, and material properties.

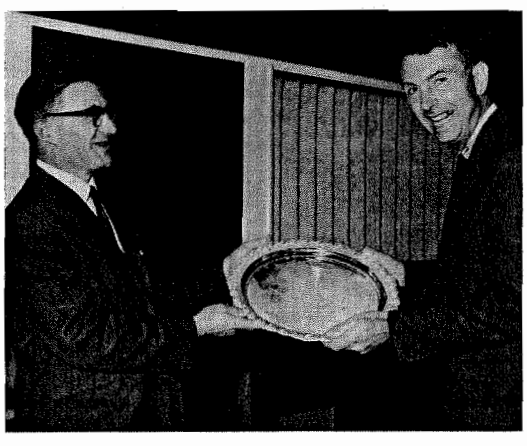
Further particulars may be obtained from the Secretary, the Institution of Engineers, Australia, 157 Gloucester Street, Sydney.

Professors

Dr. D. W. Goodall of the Division of Mathematical Statistics has been appointed Professor of Population Ecology at the University of California.

Dr. J. D. Morrison of the Division of Chemical Physics has been appointed to the Foundation Chair of Physical Chemistry at La Trobe University.

Our picture below shows the Chief of the Division, Dr. A. L. G. Rees (left), making a presentation to Dr. Morrison at a farewell ceremony last month.



Marquis Breaks Record

A three-year-old Brahman bull, "Belmont Marquis de Manso", bred by the Division of Animal Genetics at "Belmont" near Rockhampton, Queensland, has been sold for $13,500 — an Australian record for the breed. This is $750 more than the previous record set in 1962.

The bull, a grandson of stud animals imported by the Division in 1953 to inaugurate the "Belmont" research programme, was sold last month at an auction of surplus stud animals.

All together 17 animals were sold in one hour. Gross proceeds were $70,100.

Applied Mechanics Conference

The Institution of Engineers, Australia, will hold its 1967 Applied Mechanics Conference in Adelaide on 1st and 2nd June, 1967. The Conference will cover the following fields: dynamics and vibrations, control, mechanisms, and materials.

Further particulars may be obtained from the Secretary, the Institution of Engineers, Australia, 157 Gloucester Street, Sydney.

Visitor

Mr. V. Navaratnarajah of the University of Malaysia is spending six months sabbatical leave with the Structures and Concrete Technology Section of the Division of Building

Mr. V. NAVARATNARAJAH

Research where he is working on problems associated with steam curing of prestressed concrete.

Golf Day

The Amenities Committee of the Division of Forest Products, is conducting a golf day on Wednesday, 12th April, at Patterson River Country Club, Carrum.

The aim is to provide members of the Division with a pleasant day's golfing with their friends from other Divisions and from forestry, paper, timber and allied industry organizations with whom they may have a lot of professional contact, but little chance to mix socially.

Further information can be obtained from the Chairman of the Amenities Committee, Mr. A. Stashevski, Division of Forest Products.

Screen News

The Food Preservation Film Society will screen the Russian screen adaption of Chekhov's great love story "The Lady with the Little Dog" at 7.30 p.m., Tuesday, April 11, in the Hicks Meeting Room, North Ryde.

Credit Society Who's Who

In response to a number of enquiries we are publishing an up-to-date list of directors, associate directors, and office-bearers of the CSIRO Co-operative Credit Society Limited.

Any of the people listed below will be happy to answer any enquiries concerning investment of money in the Society or obtaining loans from the Society.

Directors

Mr. W. Ives, Chairman (Head Office); Mr. R. C. McVilly (H.O.); Mr. M. F. Combe (H.O.); Mr. A. Patterson (H.O.); Mr. L. A. Bennett (Editorial Section); Mr. K. J. Fogarty (Chemical Research Laboratories); Mr. J. A. Pattison (Forest Products).

Associate Directors

Mr. A. Eyles (Tropical Pastures); Mr. S. Ryan (Regional Administrative Office, Sydney); Mr. P. Brown (Plant Industry); Mr. R. Birtwistle (Building Research); Mr. P. Knuckey (H.O.); Mr. F. Blanksby (Soils); Mr. J. Brophy (Western Australian Laboratories).

Office Bearers

Mr. I. F. Carrucan, Secretary (H.O.); Mr. W. Hosking, Assistant Secretary (H.O.); Mr. J. H. Stodart, Assistant Secretary (H.O.); Mr. J. Bourne, Treasurer (H.O.); Mr. J. Belkin, Manager (H.O.).

Thoughts for the Month

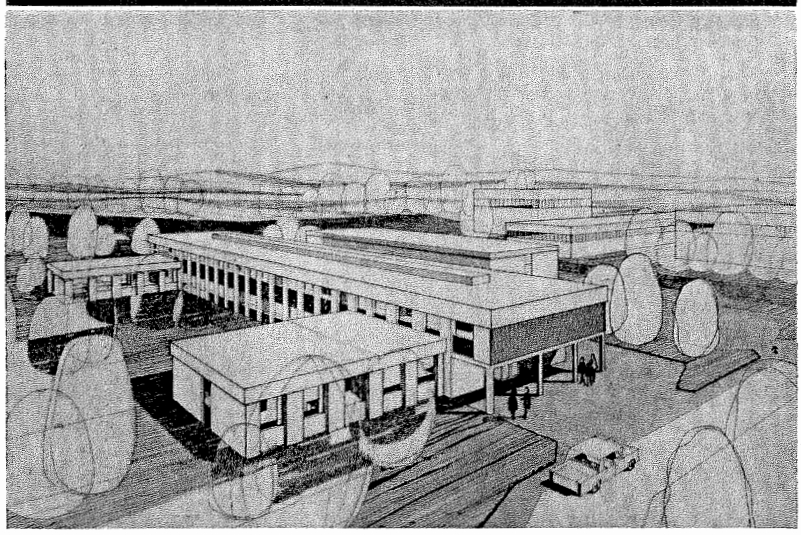
If a circus is half as good as it smells, it's a great show.

Fred Allen (1894-).

A reasonable amount of fleas is good for a dog; it keeps him from brooding over being a dog.

E. N. Westcott (1846-1898).

NEW HOME FOR CHEMICAL ENGINEERING



Above is an architect's impression of the proposed new laboratories for the Division of Chemical Engineering at Clayton, Melbourne. Tenders are expected to be called at the end of the year. The main building will contain offices, laboratories, and the library. Immediately behind it is the light technical laboratory, and behind this, from left to right, the process bay, workshop, and heavy technical laboratory. Chemical Engineering will be the second Division of the Chemical Research Laboratories to move to Clayton from Fishermen's Bend; Chemical Physics already has its laboratories there. Eventually it is planned to transfer all of the Chemical Research Laboratories to Clayton.

Executive Visits Griffith

On Monday, 13th March, the Chairman, Sir Frederick White, and Mr. C. S. Christian and Dr. M. F. Day of the Executive flew from Canberra to Griffith on a two-day visit to the Irrigation Research Laboratory and the Murrumbidgee Irrigation Area (M.I.A.).

They were accompanied by Mr. A. F. Gurnett-Smith and Mr. B. F. McKeon, Secretary and Assistant Secretary respectively of the Agricultural and Biological Sciences Branch, and Professor H. Highkin, Professor of Plant Physiology at San Fernando Valley State College, California.

The party's aircraft was joined at Narrandera on Monday morning by the Officer-in-Charge of the Irrigation Research Laboratory, Mr. E. R. Hoare, and flew over Colleambally and the M.I.A.

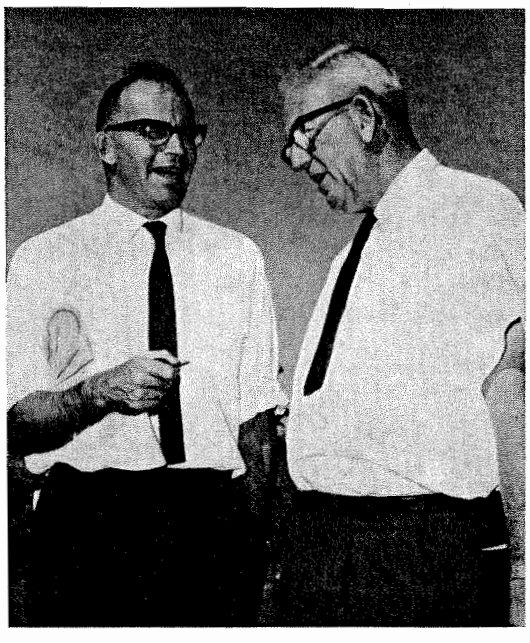
At Griffith the party heard brief talks from the scientific staff of the Irrigation Research Laboratory and saw fruit and vegetables being handled at the Griffith Producers Co-operative.

A barbecue dinner was held for them in the evening at the Research Laboratory to enable them to meet local industry leaders.

The following day they were shown experimental cotton trials at Benerembah; cotton, maize and soya beans at Kooba Station; and a large tomato growing project at Bonnie Doon.

They also visited the fruit farm of Mr. R. Sainty, Chairman of the Irrigation Research and Extension Committee, and McWilliams vineyard and winery at Hanwood.

Below: Dr. H. Greenway of the Irrigation Research Laboratory at Griffith discusses his research with the Chairman, Sir Frederick White.



New Appointees

Mr. P. A. Caldwell has been appointed to the Division of Physics and will work at the Division's solar observatory at Culgoora, near Narrabri. Since

Mr. P. A. CALDWELL

graduating B.Sc. from the University of Melbourne in 1964, Mr. Caldwell has been working for an M.Sc. degree in astronomy.

Mr. D. Curzon has been appointed to the Industrial and Physical Sciences branch at Head Office where he will assist with the Branch's responsibilities for handling estimates and general administration. After graduating B.Sc. from the University of Melbourne in 1962 Mr. Curzon spent a year at the University carrying out research in biophysics. He

Mr. D. CURZON

obtained an M.A. in economics at Syracuse University, New York, last year and spent a short period conducting marketing research surveys for A.C.I.

Dr. R. D. Hughes has rejoined the Division of Entomology where he will carry out research on the bushfly. Dr. Hughes graduated B.Sc. with honours from the University of London in 1951 and Ph.D. from the same University in 1959. He joined the Division of Entomology in 1959 and spent three years studying biological control of the cabbage aphid. Since 1962 he has been senior lecturer in the Department of Zoology at the Australian National University.

Mr. E. R. Leard has been appointed to the Division of Textile Physics where he will be concerned with the development and maintenance of temperature and humidity control equipment and with the supervision of research equipment and experimental textile mill machinery. Mr. Leard graduated in Engineering from the University of Sydney in 1945 and has been with A.E.I. for the last twenty years.

Miss Jill Paterson has joined the Division of Soils where she will study the organic phosphorus components of pine litter and their absorption by mycorrhizal fungi and by Pinus radiata. Miss Paterson graduated B.Sc. with honours last year from the University of Queensland.

Miss JILL PATERSON

Dr. F. MacRitchie has been appointed to the Wheat Research Unit where he will study lipoproteins in wheat. After graduating B.Sc. with honours from the University of Western Australia in 1958 and Ph.D. from the University of Sydney in 1962, Dr. MacRitchie worked for two years at the Unilever Research Laboratory in Britain. Since 1964 he has been with the Department of Physical Chemistry at the University of Chile.

Miss Nola Powles, a recent science graduate from the University of Sydney, has been appointed to the Division of Animal Genetics where she will carry out research on molecular genetics, particularly molecular mechanisms of mutation.

Mr. N. A. Pyliotis has joined the Electron Microscope Unit of the Division of Plant Industry where he will be responsible for the operation and maintenance of the electron microscope and associated equipment. Mr. Pyliotis graduated B.Sc. from the University of Melbourne last year.

Mr. R. S. Trayford has been appointed to the Engineering Development Section of the Division of Mechanical Engineering where he will work on comfort cooling and utilization of solar energy. Mr. Trayford obtained his Diploma in Aeronautical Engineering from R.M.I.T. in 1958 while working at the Aeronautical Research

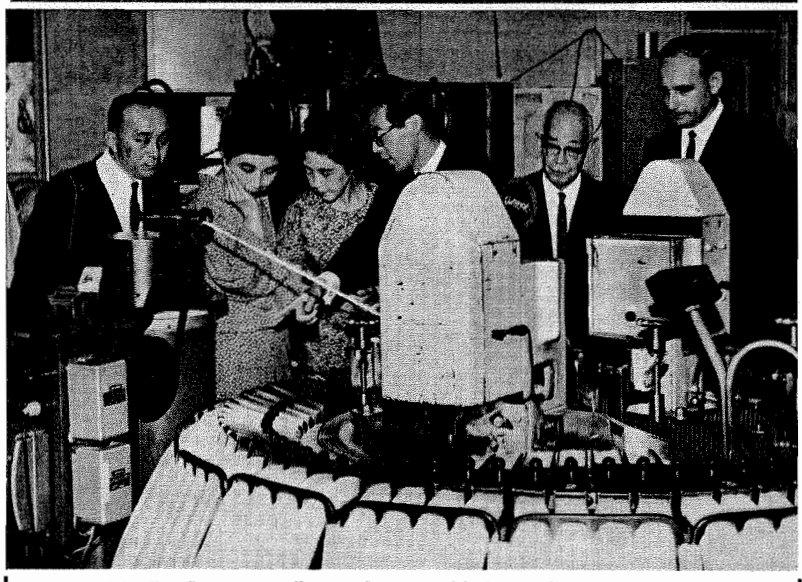
Mr. R. S. TRAYFORD

Laboratories of the Department of Supply. After spending two years at the Cranfield College of Aeronautics in Britain, he returned to A.R.L. in 1964.

Mr. W. G. Warne has joined the Division of Radiophysics as a computer programmer. Mr. Warne graduated B.Sc. from the University of Sydney in 1961 and obtained his Diploma in Numerical Analysis and Automatic Computing from the same University in 1962. Mr. Warne has spent the last two years at the Computing Centre of the University of Tasmania.

Dr. C. P. Whittle has been appointed to the Developmental Chemistry Group of the Division of Plant Industry where he will work on the design and synthesis of compounds of potential biological activity. After graduating B.Sc. with honours from the University of Adelaide in 1959 and Ph.D. from the same University in 1962, Dr. Whittle spent two years at Arizona State University. He has been with the Department of Chemistry at the Australian National University since 1965.

JAPANESE WOOLMEN AT GEELONG



A group of leading Japanese textile manufacturers visited the Division of Textile Industry at Geelong last February during a goodwill study tour of Australia. The tour was arranged by a director of the Japan Wool Spinners' Association and the International Wool Secretariat. Our picture shows several members of the party inspecting a Noble comb fitted with an automatic control unit developed by the Division. The Divisional Administrative Officer, Mr. G. Watson, is on the right. The mission also visited wool stores, clothing factories, sheep properties, and woollen mills, as well as several other CSIRO laboratories.

WASHINGTON REPORT

The Science Information Exchange, which is attached to the Smithsonian Institution, is a somewhat unique body in that it aims to maintain and make available information on current research projects, at least insofar as these are sponsored by the various U.S. grant-giving agencies.

Established seventeen years ago, it has expanded greatly in recent years since its activities have been extended to cover part of the physical and social sciences as well as the biological sciences.

S.I.E. now receives some 100,000 records of research projects a year.

William Hartley, Scientific Attaché at the Australian Embassy, Washington, reports on the Science Information Exchange.

This information is made available, not only to grant-giving agencies, but also, where appropriate, to individual scientists.

Information can be supplied on work in progress in any particular field and it is also possible to group this in various ways so as, for instance, to attempt some assessment of the total support given to "basic" science as against "applied" science.

A major problem is that the project reports received by S.I.E. do not have a uniform format. Further, it is difficult to determine with certainty whether a particular project is still current.

Nevertheless the records are of considerable value and much more use could be made of them.

S.I.E. would be happy to supply information about current work in any particular field in response to enquiries from outside the United States as well as from American organizations and scientists.

This could be helpful in planning visits by Australian scientists who may not be fully aware of current work in their field in the United States.

S.I.E. does not maintain records of current research work in progress outside the U.S. except where it is supported by American grant-giving agencies.

It is, however, always pleased to have information about such current research and, where appropriate, this information is placed on record.

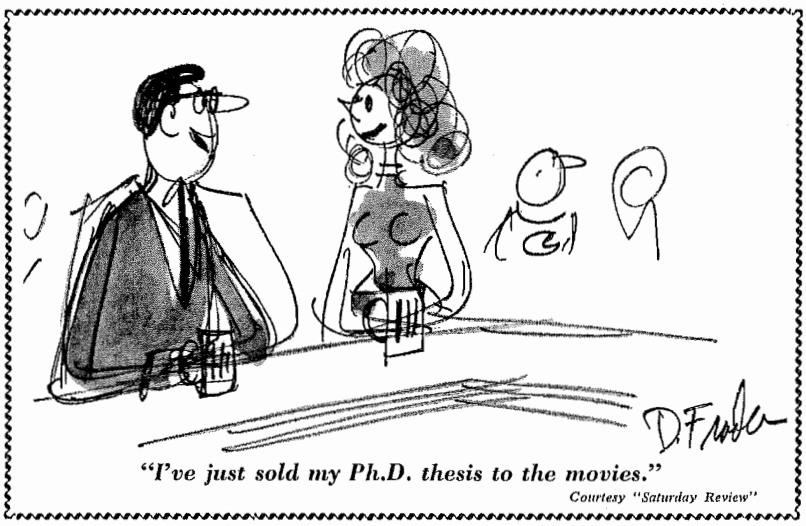
I was able to obtain from S.I.E. copies of their record sheets covering research work in Australia.

There were 110 of these record sheets, each covering a single project, but they were not necessarily all "active". These records covered mainly Australian research which was supported financially by American agencies.

NIH was the largest grant-giving agency concerned, and 47 of the 110 projects were supported by NIH.

The other American agencies concerned covered a wide range, including the U.S. Army and Air Force, and Atomic Energy Commission, the Departments of Agriculture and the Interior, NASA, the National Science Foundation, the American Chemical Society and a number of private foundations and smaller bodies.

The Australian recipients were mainly the universities but also included hospitals and other groups.



"I've just sold my Ph.D. thesis to the movies."

Courtesy "Saturday Review"

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 98, MELBOURNE, MAY 1967

LORD CASEY OPENS WESTERN AUSTRALIAN LABORATORIES

The new Western Australian Laboratories of CSIRO at Floreat Park, Perth, were opened on Saturday, April 8th, by the Governor General, Lord Casey.

At the opening ceremony, Lord Casey said that the recent remarkable mineral discoveries in Western Australia had blanketed the almost equally important, if less popularly spectacular, extension of primary production in the State.

"The clearing of about a million acres a year over the last five years by the Western Australian Government to make way for increased agricultural and pastoral extension," Lord Casey said, "must represent an all-Australian record and possibly a world record."

"This is reflected in the fact that this new building will accommodate strong groups of scientists from the Divisions of Plant Industry, Soils, Entomology and Mathematical Statistics."

"It also houses the more recently arrived new group from the Division of Applied Mineralogy."

Lord Casey went on to say that most achievements of importance were the result of team work.

"This is certainly true of CSIRO," he said. "The scientific team here has worked in close contact with the Western Australian State Departments, the Institute of Agriculture at the University, and the State Committee under the leadership of Mr. Lee-Steere."

"The Institute of Agriculture provided a home for the CSIRO team for about sixteen years, until 1954 when they moved into a building of their own on the campus of the University at Nedlands, until this new site was made available by the University and the State Government in 1962.

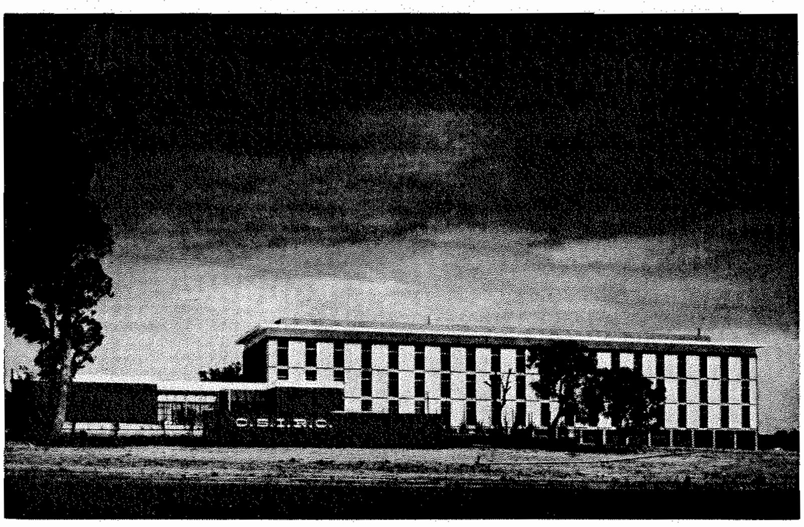
"However propinquity and the tradition of cooperation will ensure the continued close relationship between CSIRO and the University and the Institute of Agriculture."

Lord Casey said that it was fitting that Professor Underwood, who for twenty-one years had so ably directed research at the Institute, should have been appointed, a short time ago, as a member of the Executive of CSIRO.

Lord Casey concluded by saying that CSIRO's research was a very successful investment of government funds.

Pushing back the frontiers of knowledge was an expensive business, but on the whole the results were eminently worthwhile, sometimes in quite unexpected directions.

The main laboratory building is of four storeys and has a total floor area of 38,000 square feet.



It was designed by the Commonwealth Department of Works and cost $1,245,000.

The ground floor contains the library and administrative accommodation, while the lower ground floor is occupied by the Division of Applied Mineralogy, the first floor by the Division of Plant Industry, and the second floor by the Division of Soils.

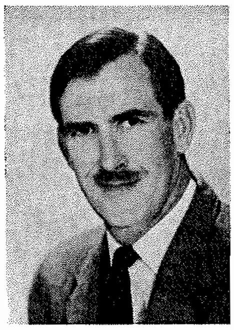
There are also small groups from the Divisions of Entomology and Mathematical Statistics in the building.

Provision has been made for the future addition of another large wing to the east.

In addition to the main building there is a pot culture house, services building, animal house, three glasshouses, and a caretaker's cottage. A workshop is now in the course of construction.

Medallist

Dr. R. H. Wharton of the Division of Entomology has been awarded the Chalmers Medal of the Royal Society of Tropical Medicine and Hygiene, London, for his outstanding contribution to problems of tropical medicine.



Dr. R. H. WHARTON

Dr. Wharton, who is in charge of the entomology section of the Veterinary Parasitology Laboratory at Yeerongpilly, Brisbane, received the award for 15 years' work with the Institute for Medical Research, Kuala Lumpur, where he helped uncover the part played by mosquitoes in infecting humans with malaria strains and parasitic diseases previously thought to have been carried only by animals such as monkeys.

He is the third Australian to be awarded the medal.

New Laboratory at Katherine

A new laboratory for the Division of Land Research was opened at Katherine on Tuesday, April 11, by the Administrator of the Northern Territory, Mr. R. L. Dean.

Mr. Dean said that while mining would bring big changes in the near future, development over most of the top end of the Territory would depend in the long run upon the pastoral and agricultural industry.

"Because of the importance of these primary industries in the Territory, we regard ourselves as fortunate to have the help of organizations such as CSIRO in carrying out research which will help our development," he said.

The opening was attended by Mr. C. S. Christian of the Executive who was formerly Chief of the Division of Land Research.

Mr. Christian said that surveys by the Division had shown that there were some 10,000 square miles in the top end of the Territory to which Katherine research results could be applied.

The research work of the new laboratory and its application in the field by the Northern Territory Administration should result in increased production and lower production costs.

He went on to say that during the war the Army had established a number of farms at Katherine to supply fruit and vegetables for servicemen.

One of these farms had been transferred to CSIRO in 1945 to establish a research station.

When research first started at Katherine, popular opinion had been that the harsh climate, apparently infertile soils and poor natural pasture had all been against development.

Mr. Christian said that the important lines of research had been, and remained today, the improvement of pastures for the cattle industry and the intensification of agriculture.

Considerable progress had been made with peanuts, grain sorghum and fodder crops but the most promising results came from townsville lucerne pastures for the cattle industry.

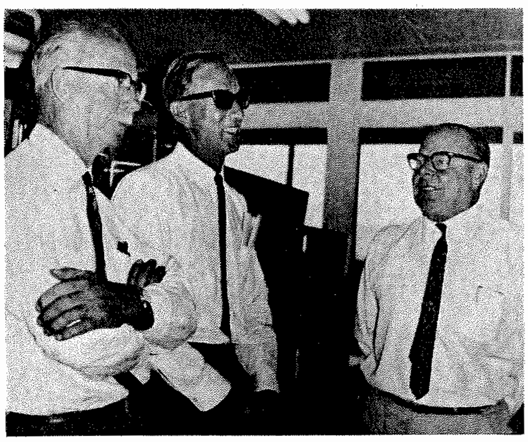
The work on townsville lucerne was complementary to research being carried out by the Division of Tropical Pastures in Queensland.

The new $100,000 laboratory is located on the Stuart Highway four miles south of Katherine.

It is a single storey building of concrete brick construction covering 35 squares and fully air-conditioned.

It provides laboratories, a controlled temperature room, library, and offices.

Below: Mr. C. S. Christian of the Executive (left), inspects the new laboratory with Dr. M. J. T. Norman of the Division of Land Research (centre) and the Administrator of the Northern Territory, Mr. R. L. Dean.



ANZAAS ON T.V.

At the ANZAAS Congress in Melbourne earlier this year, the A.B.C. televised four of the main lectures. The A.B.C. will show these programmes again as follows:

"Fossil Man in Australia" by Professor N. W. G. Macintosh: N.S.W. and Vic., May 17; Qld., May 31; Tas., June 14; S.A., June 21; W.A., June 28.

"Computer Botanist" by Dr. W. T. Williams: N.S.W. and Vic., May 24; Qld., June 7; Tas., June 21; S.A., June 28; W.A., July 5.

"The Expanding City" by Mr. J. J. Bayly. N.S.W. and Vic., May 31; Qld., June 14; Tas., June 28; S.A., July 5; W.A., July 12.

"Frontiers of Immunology" by Professor G. J. V. Nossal: N.S.W. and Vic., June 7; Qld., June 21; Tas., July 5; S.A., July 12; W.A. July 19.

The programmes will commence at 9.35 p.m. in Queensland and at 9.20 p.m. in all other States.

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER (EO1/2) — VETERINARIAN — Division of Food Preservation — 305/99 (12/5/67).

RESEARCH SCIENTIST (RS/SRS) — MAMMAL ECOLOGIST — Division of Wildlife Research — 560/223 (12/5/67).

RESEARCH SCIENTIST (RS/SRS) — IMMUNOLOGIST-PARASITOLOGIST — Division of Animal Health — 204/115 (19/5/67).

EXPERIMENTAL OFFICER (EO1/2) — ENGINEER — Division of Food Preservation — 300/457 (31/5/67).

EXPERIMENTAL OFFICER (EO1/2) — PARASITOLOGIST — Division of Animal Physiology — 245/387 (2/6/67).

RESEARCH SCIENTIST (SRS/PRS) — MICROBIOLOGIST-INNUMOLOGIST — Division of Animal Health — 201/286 (30/6/67).

RESEARCH GRANTS FOR INDUSTRY

Last month, the Minister for Trade and Industry, Mr. McEwen, announced further details of the scheme for Government grants for research and development mentioned in the Treasurer's Budget Speech of last August.

Mr. McEwen said that complete details will be contained in the legislation which would be introduced shortly.

The scheme will operate with effect as from 1st July, 1967, until 30th June, 1972. Before the latter date is reached the Government will review its operation.

Grants will be made to manufacturing and mining companies incorporated in Australia in respect of additional expenditure on research and development work undertaken during the currency of the scheme.

For these purposes "research and development" will be defined along the following lines:

"Systematic experimentation or analysis in the fields of science, engineering or technology to acquire new knowledge or to develop new or improved material products or processes associated with the production or use of such products."

The following activities will not be regarded as falling within the scope of the above definition: market research, sales promotion, feasibility studies, technical service to customers, management studies, labour efficiency surveys, methods engineering, operational research, routine quality control and routine materials testing, and mineral exploration and prospecting.

The full definition of research and development, which will be contained in the legislation, will exclude design work which arises from the need to meet the individual requirements of a particular user of the product or process, and design work which is primarily directed towards styling as distinct from an improvement in the functional characteristics (including the reduction of costs) of the product or process.

The scheme will apply only to companies which increase their research and development in Australia as compared with a base period which will be the financial year 1965/66.

Grants will be administered in two ways. A firm which satisfies the administering authority that it has increased its research and development work as defined, will automatically qualify for a percentage grant for eligible additional expenditure up to $50,000 a year.

A firm which wishes to receive a grant for eligible additional expenditure beyond $50,000 a year, will need to obtain individual approval on a selective basis in respect of the excess.

Applications will be assessed in the light of the extent to which the research and development appears likely to contribute to the following objectives:

- The development and use of Australian physical resources
- The expansion of exports
- Import saving and the ability to compete with imports
- Productivity and cost reduction
- Defence capability

The grants will be limited to expenditure on wages and salaries, plant and equipment, and contracted research and development.

Two of these components, expenditure on wages and salaries and expenditure on contracted research and development, will be treated together in estimating their eligibility for grant purposes.

The other component, expenditure on plant and equipment, will be treated separately.

Wages and salaries will qualify only in respect of professional and technical staff engaged in Australia wholly on research and development.

"Professional" staff will be those who have completed a university degree or technical college diploma in a branch of science or engineering which admits to membership of a professional institute.

"Technical" staff will be those who are directly assisting, in a technical capacity, the professional staff engaged on research and development.

The wages and salaries of certain other staff categories, such as secretarial staff, librarians and cleaners will not qualify for the grant, even where they are employed wholly in a research and development establishment.

Where appropriate, the administering authority will make an adjustment to the actual amount of increase in a firm's eligible expenditure on research and development salaries so as to offset the effect of inflation of salary levels.

For contracted research, firms will be eligible for grants in respect of increases (above the 1965/66 base) in payments made to "outside" organizations which have been approved by the administering authority.

Plant and equipment to be eligible must be used solely for research and development. The aggregate amount of this component of a firm's grant from the inception of the scheme may not exceed the net aggregate of the eligible wages and salaries and the contracted research and development components.

Subject to the above provisos, the method to be adopted in calculating grants for plant expenditure is as follows:

Purchases of new research and development plant and equipment will be eligible for grant purposes even if the firm's expenditure on this component is lower than in the base year. That is to say, expenditure on research and development plant and equipment is not tied to base year expenditure.

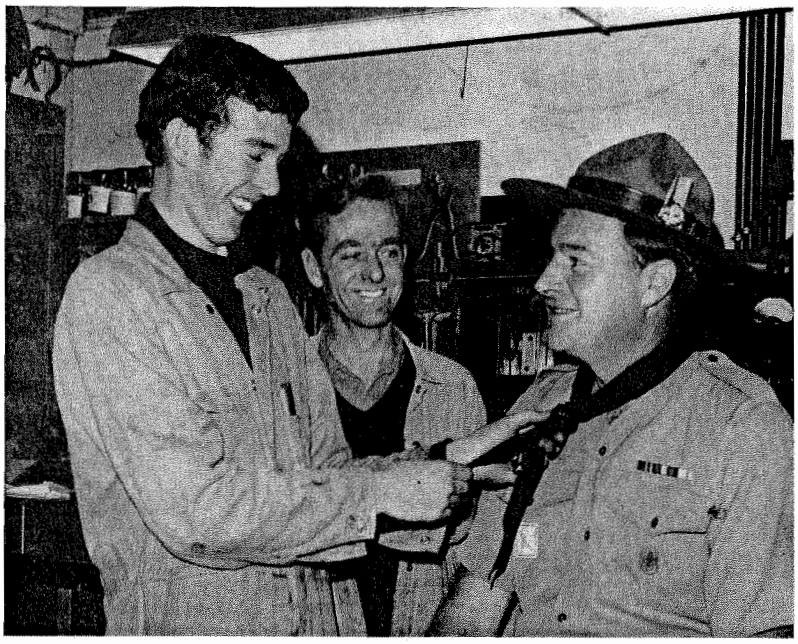
The plant and equipment eligible for research and development grant purposes is to be regarded as identical with that research and development plant and equipment which is allowed by the Taxation Commissioner as eligible for depreciation over three years as provided in Section 73A of the Income Tax Assessment Act. It is to be noted that although Section 73A refers to "scientific research" this term embraces many phases of product research and development.

The rate of grant applying in the automatic cases will, at least initially, be 50% of the increase in eligible expenditure. This rate will be the same for all companies.

The rate for selective grants will be determined in each case by the administering authority but will not exceed 50%. The rate may vary from one firm to another in the same year.

Mr. McEwen said that the Government intended to introduce the legislation during the current session of Parliament. No grants would be payable until after the legislation is enacted and the administering authority established.

The scheme will be administered by an authority responsible to the Minister for Trade and Industry.



Mr. P. Hume, senior electrician at the Division of Building Research, gets a dress inspection from his two colleagues, Mr. P. McCue (left) and Mr. B. Malo. Mr. Hume is an Assistant District Commissioner in the Boy Scouts and has been chosen to represent Australia next August at the 12th World Jamboree in Idaho.

Last month the Division of Protein Chemistry Safety Committee organized a display of fire-fighting drill with the assistance of the Metropolitan Fire Brigade. Here Miss Jill Coombe demonstrates her prowess with a fire extinguisher.

Overseas Visits

Mr. T. J. Birch of the Division of Chemical Engineering will leave later this month for North America, Europe and Britain where he will visit laboratories concerned with research on coal gasification. Mr. Birch will return next October.

Dr. D. F. A. Koch of the Division of Mineral Chemistry will leave shortly on a two-month visit to the United States, Britain and Europe to study overseas developments in research on fuel cells.

Mr. M. G. Kovarik of the Division of Mechanical Engineering left recently for the United States, Britain and Europe where he will visit research centres working on the use of computers in automatic control and design. Mr. Kovarik will return at the end of August.

Mr. G. A. Stewart, Chief of the Division of Land Research, left Australia last month for Europe, Britain, North America and South East Asia to see something of overseas work on surveying national resources. He will be away until the middle of June.

Dr. R. J. Tatchell of the Division of Entomology, left recently on a five-month visit of tick research centres in Africa, Europe, Britain, Russia, India and South East Asia.

SAFETY NOTES

Fire in Inflammable Liquids Stores

The following extract from a letter which I received from one of our divisions needs no explanation.

"We recently narrowly averted a serious incident involving our inflammable liquids store, the details of which I feel I should bring to your attention. The circumstances involved were briefly as follows.

"Due to overcrowding in our general store, and with a thought to safety in the store, the practice had developed of storing many of our acids along one side of the solvent store. This eventually included a small bottle of fuming nitric acid which was delivered to the store packed in shredded paper in a wooden box.

"On 27th February, two of our storemen entered the solvent store and, to obtain access to an item required, moved the box containing the nitric acid to one side. This apparently started a leakage of nitric acid from the bottle, which naturally led to violent reaction with the paper packing and the charring of the wooden box, with the production of dense fumes and smoke.

"As you are aware, fuming nitric acid is an extremely powerful oxidant which reacts violently with organic materials — indeed nitric acid/kerosene is a well proven rocket fuel combination.

"In the present incident, the consequences of the fuming nitric acid coming into contact with one of the many solvents in the store could have been very serious indeed. However, prompt action by Divisional staff and later the fire brigade prevented this.

"I feel this incident serves to emphasize the importance of instructing all storemen on the precautions that should be exercised in the storage of chemicals generally and the need to have chemical storage under the continual surveillance of a suitably qualified professional officer.

"Indeed, some form of manual on chemical compatabilities and the precautions that must be taken in storage should be supplied to storemen handling chemicals.

"We have taken precautions to ensure that such an incident does not occur again and hope to prepare some written instructions as well to guide our storemen on this matter."

J. W. Hallam, Safety Officer.

News In Brief

Medal

Dr. C. H. B. Priestley, Chief of the Division of Meteorological Physics, has been awarded the Symons Memorial Gold Medal of the Royal Meteorological Society for his distinguished contributions to meteorology.

Chairman to Speak

The Chairman, **Sir Frederick White,** will speak on "The organization of science in Australia and the future of CSIRO" at the Annual General Meeting of the Victorian Branch of the CSIRO Officers' Association on Wednesday, 24th May, at the Division of Forest Products.

Sir Frederick's address will begin at 7.45 p.m. and will be preceded by a buffet dinner starting at 6.00 p.m.

Advisory Council

The Advisory Council will meet in Adelaide on Tuesday, May 16, and Wednesday, May 17.

Golf Day

Last month teams from seven Melbourne divisions, industry, and the Victorian Forestry Commission took part in the Division of Forest Products golf day at Patterson River Country Club, Carrum.

The main event of the day, the D.F.P. Cup, was won by the Forest Products team. The cup was donated as a perpetual trophy by the Chief of the Division of Forest Products, **Mr. R. W. R. Muncey.**

Professor

Dr. S. S. Y. Young of the Division of Animal Genetics has been appointed Professor of Genetics in the Department of Zoology and Entomology at the University of Ohio.

Doctorate

Mr. C. Greenham of the Division of Plant Industry has been awarded the degree of Doctor of Science by the University of Queensland for his work on the impedance properties of the cell membrane in relation to disease and injury in plants.

David Rivett Lecture

Professor Maurice Ewing, Director of the Lamont Geological Observatory, Columbia University, will deliver the Third David Rivett Memorial Lecture at the University of New South Wales on Thursday, July 6.

Soil Conservation Colloquium

Dr. A. B. Costin, Assistant Chief of the Division of Plant Industry, and **Mr. J. E. Coaldrake** of the Division of Tropical Pastures, will be among the discussion leaders taking part in a colloquium on soil conservation to be held at the University of New England, Armidale, from Tuesday, May 23, to Sunday, May 28.

Mr. B. Burns (left) and Mr. R. Dorrington of the Division of Textile Industry demonstrated their musical talents at the Division's annual dinner dance in Geelong last March.

F.R.S.P.C.A.?

According to one newspaper report, **Dr. D. F. Waterhouse,** Chief of the Division of Entomology, was elected a Fellow of the Royal Society recently for "notable work of economic importance to the digestion of the sheep blowfly and clothes moth".

Laboratory Opening

The Chairman of the Australian Meat Board, **Mr. J. L. Shute,** will open the new meat research laboratory of the Division of Food Preservation at Cannon Hill, Brisbane, on Wednesday, May 31.

Art Show

Aspiring artists from Melbourne and Geelong Divisions took part in a CSIRO Art Exhibition at the Division of Protein Chemistry last March.

The seventy entries, ranging from paintings and sketches to woodcarvings and sculptures, drew favourable comment from Mr. W. A. Frater, the President of the Victorian Artists' Association, who opened the exhibition.

Technical Association

The annual general meeting of the Victorian branch of the CSIRO Technical Association wil be held in the Division of Forest Products Conference Room on Monday, May 22, at 7.00 p.m.

It wll be followed by the annual general meeting of the Association, during which the transfer of Central Council to Victoria will be discussed.

A buffet dinner will be served at 6.00 p.m. Anyone wishing to attend should advise his divisional representative as soon as possible.

Foundation President

Dr. J. R. Vickery, Chief of the Division of Food Preservation, has been elected Foundation President of the newly formed Australian Institute of Food Science and Technology.

Aboriginal Referendum

Two members of CSIRO have a special interest in the outcome of the forthcoming referendum on Aborigines. They are **Dr. E. T. Linacre** of the Irrigation Research Laboratory at Griffith and **Dr. A. B. Pittock** of the Division of Meteorological Physics.

Dr. Linacre has been actively involved in the Griffith Aboriginal Advancement Organization for several years, and his wife Helen, a qualified kindergarten teacher, runs the Save the Children Fund Kindergarten on the Three Ways Aboriginal settlement at Griffith.

Dr. Pittock is on the executive of the Federal Council for the Advancement of Aborigines, having first become involved through "Abschol" in his university days.

On May 27, Australians will be asked to vote in the referendum for the deletion of Section 127 of the Constitution, which prevents Aborigines from being counted in reckoning the population of Australia, and also for the deletion of part of Section 52 (xxvi) which at present prevents the Federal Government from making laws relating to Aborigines in the States.

While Parliament voted unanimously for the deletion of both parts, and there is no organized opposition, many people fear that apathy and traditional opposition to referendums make the result uncertain.

Dr. Pittock said that Section 127 was originally included in the Constitution because Aborigines were largely nomadic and illiterate, and did not have the franchise. These reasons were now outdated.

Section 52 (xxvi) which was included to enable the Federal Government to make special laws relating to other races, excluded Aborigines in order to prevent discrimination against them. Today, Dr. Pittock said it prevented the Federal Government from discriminating in favour of Aborigines.

Dr. Pittock and Dr. Linacre believe that Aborigines need special facilities designed to overcome their historical and social disadvantages, and that some such facilities, for example an Aboriginal Arts and Crafts Board or an Aboriginal Education Foundation, would be best set up on a Federal basis.

One crucial question, now that the referendum is upon us, says Dr. Pittock, is what would be the effect on world opinion of an Australian decision against the Aboriginal question.

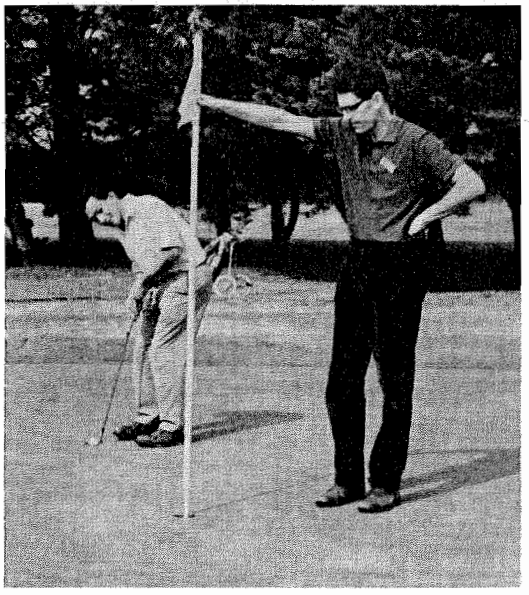
Branch President

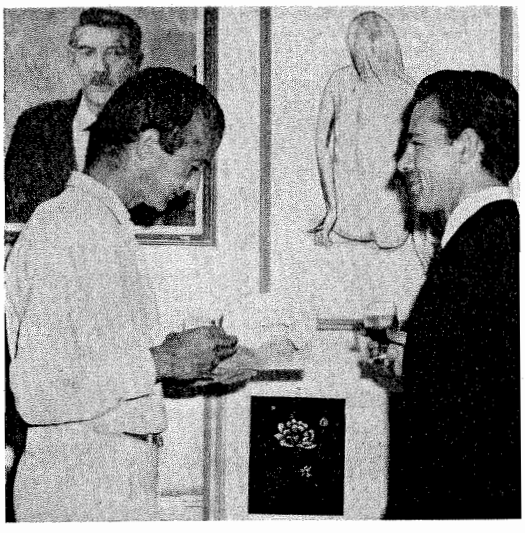
Mr. C. S. Andrew of the Division of Tropical Pastures has been elected president of the Queensland Branch of the Australian Institute of Agricultural Science for 1967.

Campaign Chairman

Dr. J. E. Falk, Chief of the Division of Plant Industry, has been elected chairman of the A.C.T. division of the Freedom from Hunger Campaign. He succeeds Sir Mark Oliphant.

Below: Dr. M. Anson, of the Division of Building Research, holds the pin as his team-mate, Mr. S. J. Way, lines up a putt.



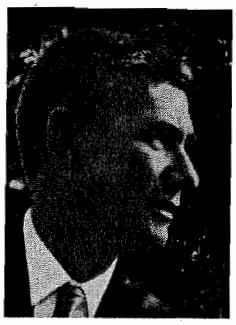


Bottom left: This nude by Dr. F. L. Miller of the Agricultural Liaison Unit, caught the eye of Mr. L. M. Dowling and Dr. I. W. Stapleton of the Division of Protein Chemistry.

Bottom right: Dr. M. A. Jermyn of the Division of Protein Chemistry examines a landscape.

New Appointees

Mr. T. B. Brealey has joined the Division of Building Research where he will prepare designs of typical buildings for northern Australia and New Guinea which incorporate the results of the Division's re-



Mr. T. B. BREALEY

search on tropical and semi-tropical buildings. Mr. Brealey worked as an architect with the Public Works Department of Western Australia from 1951 to 1961, then with the Department of Public Works, Territory of Papua and New Guinea, from 1961 to 1967.

Mr. R. J. Carter has been appointed to the Division of Chemical Physics where he will study methods of replicating optical components including

Mr. R. J. CARTER

optical diffraction gratings produced on the Division's ruling engine. Mr. Carter obtained his Diploma of Applied Physics last year from the Royal Melbourne Institute of Technology.

Mr. N. A. Campbell, who graduated B.Sc. from the University of Western Australia recently, has been appointed to the Division of Mathematical Statistics. Mr. Campbell will assist with the design and analysis of experiments at the Western Australian Laboratories.

Mr. R. J. T. Caney has joined the Division of Mineral Chemistry where he will work on the development of a new process for upgrading ilmenite, and for recovering tin from low grade ores. Mr. Caney obtained his Diploma of Metallurgy from the Royal School of Mines, London, in 1931 and came to Australia two years later. He worked as a metallurgist with ICIANZ from 1944 to 1957. For the last nine years he has been Works General Manager with the Sydney Smelting Company.

Dr. C. J. Downes has joined the Division of Applied Mineralogy and will work at the Baas-Becking Geobiology Laboratory in Canberra on factors

Dr. C. J. DOWNES

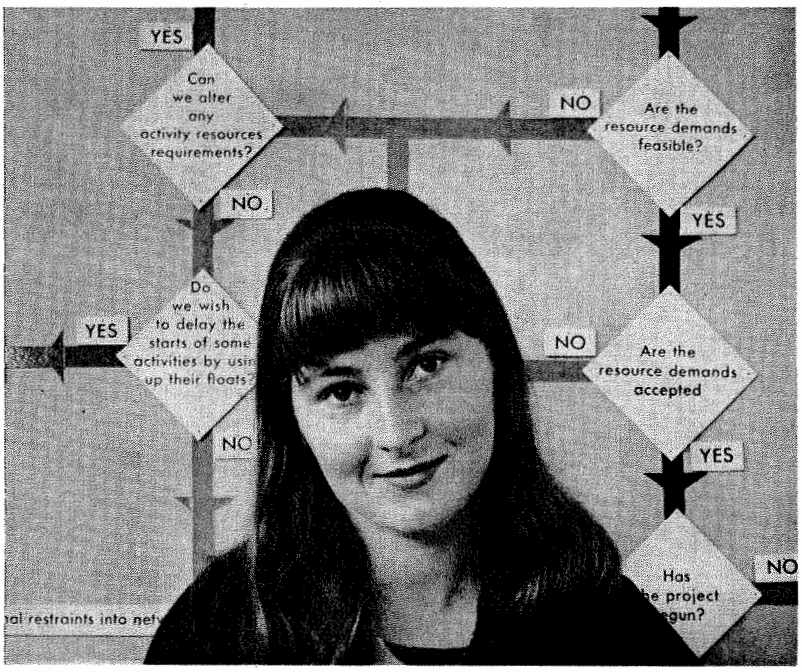
influencing the deposition of syngenetic ore bodies, and stratiform sulphide deposits. Dr. Downes graduated B.Sc. with honours from the University of Otago, New Zealand, in 1952. He recently obtained his Ph.D. from the same University for his work on the thermodynamics of mixed electroytes.

Mr. J. V. Happ has been appointed to the Division of Chemical Engineering where he will work on the production and refining of base metals.

Mr. J. V. HAPP

Mr. Happ graduated B.Sc. with honours last year from the University of Newcastle.

Mr. G. D. Lodwick has been appointed to the Soil Mechanics Section where he will work on data processing and on information storage and retrieval. Mr. Lodwick graduated B.Sc. from the University of Queensland in 1962 and has spent the last four years as a geophysicist with the Bureau of Mineral Resources.



Miss Jo-anne Clarke has just joined the Division of Building Research, where she will work with the building operations and economics section. Jo-anne is the first woman to graduate in mechanical engineering from the University of Sydney.

Mr. G. J. C. Irving, who graduated B.Sc with honours from the University of New South Wales recently, has joined the Division of Plant Industry where he will carry out research on the metabolism and

Mr. G. J. C. IRVING

chemical nature of the phosphorus-containing components of soil organic matter.

Dr. C. K. Pallaghy has joined the Division of Land Research where he will undertake biophysical studies of volume changes in stomatal quard cells. Dr. Pallaghy graduated B.Sc.

Dr. C. K. PALLAGHY

with honours from the University of Melbourne in 1962 and obtained his Ph.D. recently from the University of Tasmania for work on salt uptake by the roots of bean seedlings.

Dr. D. A. Thomas has been appointed to the Division of Land Research where he will carry out biochemical studies of volume changes in stomatal quard cells. Dr. Thomas graduated M.Agr.Sc. from the University of Melbourne in 1958

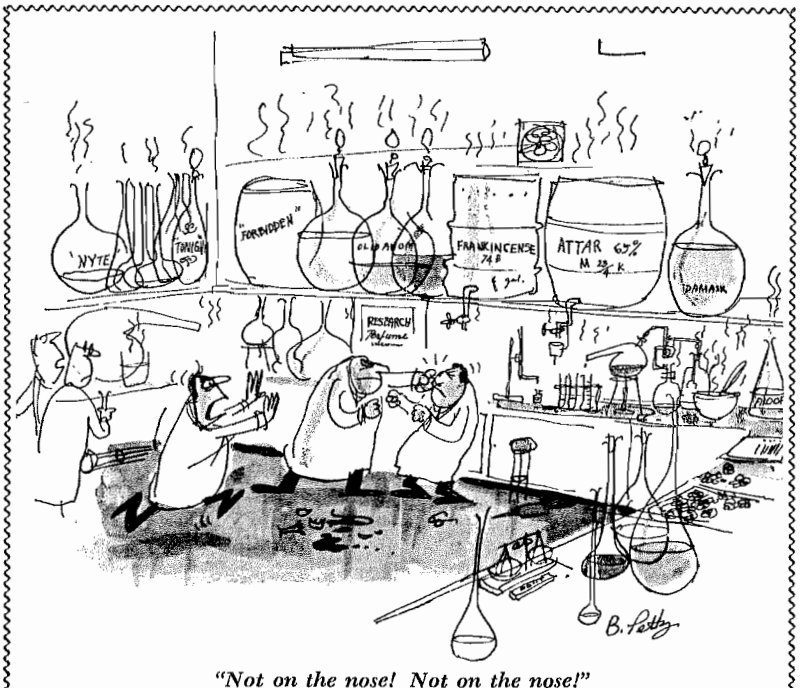
Dr. D. A. THOMAS

and has spent the last eight years at the Universities of Tasmania and Adelaide. He obtained his Ph.D. from the University of Tasmania last year.

Mr. C. F. Vaskess has joined the Division of Land Research where he will be concerned with the design and development of equipment for studying

Mr. C. F. VASKESS

membrane and ion exchange phenomena in plant cells. Mr. Vaskess graduated in engineering from the University of Sydney in 1952 and worked firstly with the Weapons Research Establishment of the Department of Supply and then with the British Aircraft Corporation. He recently obtained his B.Sc. from the University of Adelaide.



"Not on the nose! Not on the nose!"

Courtesy "New Yorker".

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 99, MELBOURNE, JUNE 1967

MEAT RESEARCH LABORATORY OPENED IN BRISBANE

Stage one of a new meat research laboratory for the Division of Food Preservation was opened at Cannon Hill, Brisbane, on Wednesday, May 31, by the Chairman of the Australian Meat Board, Mr. J. L. Shute.

Mr. Shute said that Australian meat exports were likely to be in the form of packaged, frozen, boneless cuts of beef and mutton for some time to come; however, standards of preparation and presentation needed to keep pace with the requirements of our customers if we were to maintain our premier position in the face of considerable competition from other countries.

Scientific research could do much to help bring about improvements in the quality and appearance of our export meat and to provide overseas processors with a product which was tailored to their requirements.

Mr. Shute added that on the home market the trend, as in many countries overseas, was towards pre-cut, pre-packaged meats.

The maintenance of good quality and appearance of packaged meats created new problems and these would be receiving close attention from the scientists of the Meat Research Laboratory.

The stage one laboratory, which will be used for research on beef, cost $580,000.

Of this sum, $528,000 was provided by the Australian Cattle and Beef Research Committee.

Last year, the Committee was reconstituted as the Australian Meat Research Committee to bring mutton and lamb producers into the contributory scheme.

The new Committee has agreed to join with the Australian Meat Board and CSIRO to provide finance for the construction of stage two of the meat research laboratory.

When completed this will provide facilities for work on meats other than beef and for work on meat processing.

Dr. W. J. Scott, Officer-in-Charge of the Meat Research Laboratory, said that he and his colleagues were interested in the physical and chemical properties of meat and the changes which took place when meat was stored or processed.

They were also interested in the factors which determined the quality of the meat.

The consumer was interested in tenderness, colour, juiciness, and flavour, in that order.

Some of these characteristics depended on such factors as the age, sex, breed, and rate of growth of the animal, and these were largely under the control of the farmer.

But quality could also be affected by the treatment which the animal received during the few days between the farm and the meat-works.

After slaughter, the eating quality of meat could be greatly influenced by events taking place as rigor mortis developed in the muscle.

The effect of temperature at this stage was particularly important.

Dr. Scott said that fresh meat was subject to attack by bacteria, yeasts and moulds.

The meat microbiologists were concerned with many problems ranging from general meat-works hygiene and contamination of meat by organisms causing food-borne diseases to the physiology and biochemistry of various bacteria.

Meat could be preserved by chilling, freezing, dehydration and canning or it could be processed into a wide range of products; each technique had its own range of difficult problems which continued to interest the meat scientist.

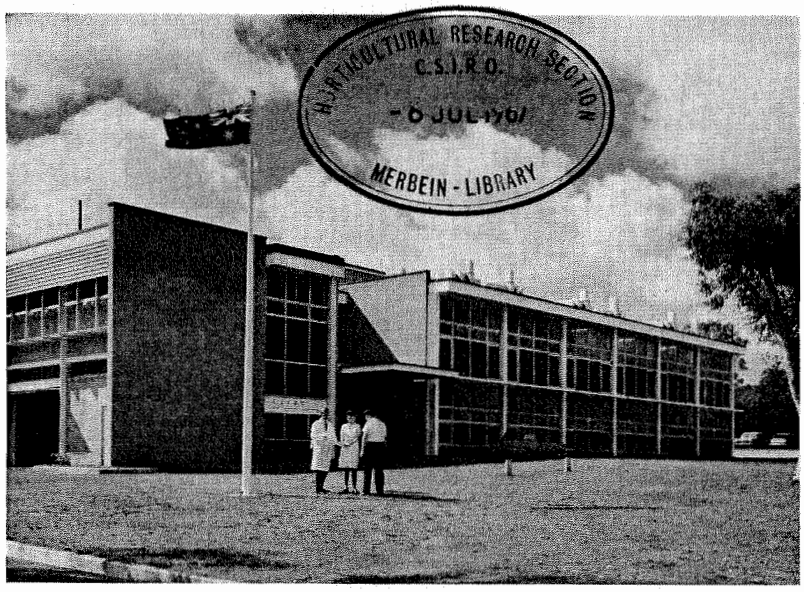
Dr. Scott added that the physicist and the engineer also had an important part to play in the solution of problems in meat science and technology.

For example it was quite a complex exercise to predict with reasonable accuracy the rates of cooling and loss of moisture from meat for any specified set of cooling conditions.

There was also a need for more studies of the design and performance of a range of meat processing machinery.

Dr. J. R. Vickery, Chief of the Division of Food Preservation, outlined the history of meat research in CSIRO.

He said that CSIRO first began its research on meat in 1932 when it established a laboratory at the Brisbane Abattoir, Cannon Hill, to study the preservation of chilled beef. Dr. Vickery was the first Officer-in-Charge.



In 1938 the headquarters of the Food Preservation Section, as it was then known, were transferred to Homebush, Sydney, where there were expanded facilities for work on an increased range of foodstuffs.

Dr. Vickery and most of his staff transferred to Sydney, but a small group continued on at Cannon Hill.

The work on chilled beef stopped with the outbreak of World War II in 1939.

After the War, the work of the Brisbane Laboratory swung over to a study of meat quality and to a more detailed investigation of frozen meat as well as to various problems of meat bacteriology.

Academy Fellows

Four members of CSIRO were among the seven new Fellows elected to the Australian Academy of Science at its annual general meeting in Canberra last April. They are:

Dr. J. A. Barker of the Division of Applied Chemistry — elected for work on the molecular behaviour of liquids.

Dr. A. McL. Mathieson of the Division of Chemical Physics for X-ray studies of the nature of molecules.

Dr. J. R. Philip, Assistant Chief of the Division of Plant Industry — for analyses of the movement of water through soils.

Dr. R. O. Slatyer, Associate Chief of the Division of Land Research — for contributions to knowledge of the behaviour of plants and their use of water.

Obituary

Mr. A. B. Hackwell, a former officer of CSIRO, died in England last March.

A graduate in agricultural science from the University of Melbourne, Mr. Hackwell joined CSIRO in 1948 after twenty-three years with the Victorian Department of Agriculture.

He served in the Australian Scientific Liaison Office, London, until 1958, when he returned to Australia to take up a position as Assistant Divisional Secretary with the Division of Animal Genetics. He retired in 1963.

COUNCIL MEETING

The thirty-fifth meeting of the Advisory Council was held at Police Headquarters, Adelaide, on Tuesday, 16th, and Wednesday, 17th May.

Topics discussed included CSIRO and the universities, soil microbiology, patenting of CSIRO inventions, and water research in Australia.

The Council visited Flinders University, Bedford Park, on the Tuesday afternoon and in the evening attended a buffet dinner with members of the South Australian State Committee.

Further details of the meeting may be found on page 2.

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER (E01/2) — Tobacco Research Institute, Division of Plant Industry — 185/73 (2/6/67).
EXPERIMENTAL OFFICER (E01/2) — X-RAY SPECTROGRAPHER — Division of Plant Industry — 130/858 (2/6/67).
EXPERIMENTAL OFFICER (E01/2) — CRYSTALLOGRAPHER — Division of Soils — 270/341 (2/6/67).
RESEARCH SCIENTIST (RS/SRS) — Riverina Laboratory, Division of Plant Industry — 132/166 (9/6/67).

113 Years of Service

Three people with one hundred and thirteen years of service between them retired from CSIRO last month.

Mr. P. G. Domec-Carre holds the record for the longest period of service with CSIRO.

He joined the clerical staff of the Advisory Council of Science and Industry in 1918, when he was a boy of sixteen, at a starting salary of 2/6 a day.

Shortly after the C.S.I.R. was established in 1926 he was placed in charge of correspondence, records and despatch, a position he filled with distinction for many years.

Miss Peggy Sprague is well known to all members of CSIRO who have passed through the Australian Scientific Liaison Office, London.

Miss Sprague joined the staff at Australia House in 1929 and came to A.S.L.O. when it was established in 1941.

Miss PEGGY SPRAGUE

She visited Australia in 1949 on her long service leave and hopes to make another visit here early next year to renew her many CSIRO acquaintances.

Dr. C. G. Stephens, Head of the Pedology and Survey Section of the Division of Soils, retired last month and will take up a position as Director of Research with Southern Australia Perpetual Forests, a company concerned with the growing and utilization of pine forests in the lower south-east of South Australia and in nearby western Victoria.

Dr. Stephens graduated B.Sc. from the University of Tasmania in 1929 and joined the C.S.I.R. Division of Soils.

Under Professor J. A. Prescott, the first Chief of the Division, his interest turned increasingly to the classification and genesis of soils.

Dr. C. G. STEPHENS

Over the years he has built up an unequalled knowledge of Australian soils and an excellent understanding of land use problems associated with them.

He has contributed more than any other single Australian to this subject and is an authority of standing in both Australian and international soil circles.

Dr. Stephens has been president of the South Australian branches of the Australian Institute of Agricultural Science and the Australian Society of Soil Science.

He has also been president of the Royal Society of South Australia and of Commission V of the International Society of Soil Science in 1954.

He was awarded the degree of Doctor of Science by the University of Adelaide in 1950 and the Verco Medal of the Royal Society of South Australia in 1959.

CSIRO AND THE UNIVERSITIES

The contribution of the universities and of CSIRO to the enrichment of Australian life would be enhanced by closer collaboration between these institutions, Sir Frederick White told the Advisory Council in Adelaide last month during discussion of a report on the relationship between CSIRO and the universities.

The report was prepared by a special Advisory Council committee which included representatives from both CSIRO and the universities.

Sir Frederick said that although a few of the report's recommendations were already being implemented, the present collaboration between CSIRO and the universities needed to be extended in a planned way if Australia was to make the best use of its limited resources of finance and manpower.

One of Australia's great needs today was imaginative scientific research in:

- The development of new mineral discoveries.
- The revolution in agriculture.
- The rapid growth on the industrial front.

The strength of this research would depend in increasing measure upon a ready response to the challenge on the part of graduate scientists from our universities.

In the past, however, the research needs of industry and of government institutions had fallen largely on the ears of students accustomed to think only in terms of an academic career.

A clearer recognition of the opportunities in these fields would come from the graduate's involvement in practical research projects carried out in institutions such as CSIRO.

It would be a valuable experience for students to come into contact with some of the problems of agriculture and industry during their studies.

Sir Frederick went on to say that, although CSIRO and the universities had their own distinct responsibilities, many of their activities were on common ground, offering scope for planned collaboration in teaching and research on a wider scale.

The sharing of facilities and other fruitful co-operation had taken place on many levels in the past, he said, but there was a strong case for a more personal collaboration on the level of the student and the individual scientist.

Creative thinking was a key factor in the effectiveness of the scientist in both the free research of the universities and the committed research of CSIRO.

This quality could be greatly enhanced by contact and discussion with scientists in other institutions.

He was sure that the responsibilities of teaching would prove stimulating to many CSIRO scientists, and would benefit their research work.

In addition, he said, CSIRO had people working in fields not at present covered by the universities and they could be used to extend the areas of scholarship available to students in Australia.

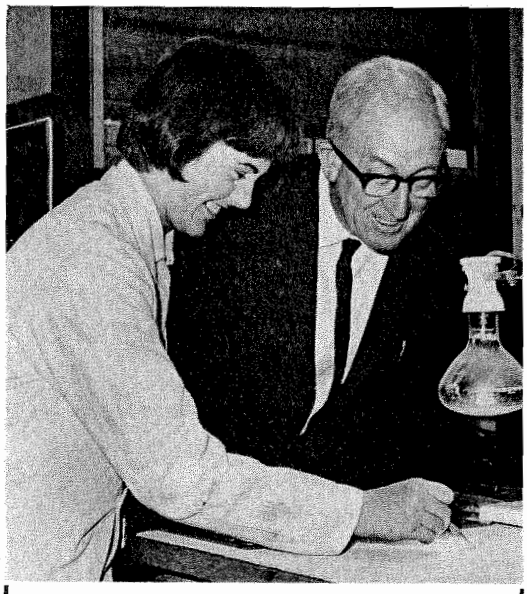
The report made it clear that any teaching assistance given by CSIRO staff could not be extensive and would not influence the need of the universities for more staff to cope with the present flood of students.

Sir Frederick said that one of the factors which had limited co-operation between CSIRO and the universities in the past had been the lack of transferability of superannuation rights.

It was extremely encouraging, therefore, to see that the Government had now decided to explore the possibility of making reciprocal arrangements with the universities and other government authorities to facilitate the movement of scientists and other staff.

The report to the Advisory Council recommended consideration of the following proposals:

- Encouragement of CSIRO scientists to accept invitations to lecture and supervise practical classes in the universities.
- Exchanges between universities and CSIRO staff, on study leave and other bases.
- Joint CSIRO-university research units.
- CSIRO laboratory accommodation and assistance for post graduate research students, where university regulations allow.
- Cooperation in the purchase and use of expensive equipment and facilities.
- Vacation schools, staffed both by university and CSIRO staff.



Mrs. R. T. Errington of the Biophysics Department, School of Biological Sciences, discusses her work with Sir Frederick White during a visit of the Advisory Council to Flinders University last month.

Soil Microbes Boost Crop Yields

Wheat farmers might soon be able to increase yields by coating their seed with bacteria before sowing, Dr. R. J. Swaby of the Division of Soils told members of the Advisory Council.

He said that increases in yield of from 5% to 10% had been obtained in field trials when seed was treated with specially selected bacteria.

This effect was most marked in drier areas and in South Australia increases of this order could be expected one year in every three.

An increase of only 5% in South Australia alone would mean an extra $2 million a year in our export earnings.

Dr. Swaby explained that the bacteria developed on the roots of the young wheat seedling and stimulated the hormones which initiate flowering so that flowering occurred a fortnight earlier.

In a country like Australia, where droughts were common, earlier flowering and grain formation could mean the difference between having a crop or none at all.

There were many other microbes living in the soil which could be exploited to help the farmer, said Dr. Swaby, but a good deal more research on them was still needed.

Other possibilities being looked at by the Division included:

Biological Superphosphate

Plants cannot use sulphur as such; it must first be converted into sulphate.

In many soils there are bacteria which can convert sulphur into sulphuric acid which acts as a source of sulphate.

If low grade rock phosphate mixed with sulphur is added to these soils, the bacteria convert the sulphur into sulphuric acid.

This acts on the rock phosphate converting it into a soluble product resembling superphosphate which provides both phosphorus and sulphate for plant growth.

Sulphur-rock phosphate mixtures could be a cheap fertilizer for under-developed areas such as Northern Australia where there are already supplies of rock phosphate and where the cost of bringing in superphosphate is high.

Although some soils lack suitable bacteria, it is a simple matter to incorporate the bacteria in the fertilizer granules during manufacture.

Improving Pine Tree Nutrition

Pine trees grow much better if there are certain fungi, called mycorrhizas, growing around their roots.

These mycorrhizas extract plant nutrients from the soil and make them available to the growing tree.

Some strains of mycorrhizas are more efficient at this than others and so the Division is selecting the most efficient strains and trying to establish them in pine plantations.

PATENTING CSIRO INVENTIONS

CSIRO was now patenting inventions at a rate of one a week and about one licence a week was being issued for the use of CSIRO inventions, said Mr. L. Lewis, Associate Member of the Executive, during a discussion on CSIRO's patents policy.

Mr. Lewis said that CSIRO patented its inventions to protect the taxpayers' investment in research and to promote the use in industry of CSIRO discoveries.

Experience had shown that publication of research results was no guarantee of their adoption by industry; CSIRO had to play an active part in bringing about industrial application of its inventions.

If it were not for patents, important research results would, in many cases, not have been used by industry and the research effort would have been largely wasted.

For example, the Division of Dairy Research had been collaborating with an Australian manufacturer in the development of equipment for mechanising the production of cheddar cheese.

Because the market for this equipment was necessarily limited, the manufacturer was granted sole rights to provide him with sufficient incentive to make the substantial investment involved in development.

Mr. Lewis said that patenting of CSIRO inventions had been a major factor in the establishment of a scientific instrument manufacturing industry in Australia.

One local firm, which manufactured atomic absorption apparatus developed by the Division of Chemical Physics, was now exporting well over $1 million worth of instruments a year.

Other reasons for patenting, which Mr. Lewis mentioned, were:

- **To enable CSIRO to maintain an interest in the quality and technical efficiency of production.**

Without proper technical supervision in the early stages, some industrial processes could be applied incorrectly and become discredited.

- **To assist in maintaining or extending the use of Australian products overseas.**

For example, since less than 10% of the Australian wool clip was processed in Australia, it was essential to make sure that CSIRO's advances in wool technology were put into use not only in Australia but in all countries where wool was used.

- **To earn substantial royalties, particularly from industry overseas.**

In most cases, CSIRO did not impose large royalties in Australia as this could delay the application of new and more efficient technology. But in licencing overseas, CSIRO usually tried to obtain as much royalty income as it could. The main exception to this was the licencing of overseas patents from the wool research programme, since they were meant to be used as promotional aids for wool.

SAFETY NOTES

Injured Innocents

"Car accidents remain the most common cause of child deaths. They result in many serious injuries and disabilities which could have been prevented easily with a little more thought and care," says the Medical Director of the Royal Children's Hospital, Melbourne, Dr. L. E. G. Sloan.

And as most of today's children spend a good deal of their time in the family car, they face considerable danger.

No one would suggest that parents deliberately expose their children to risks in a car. It is purely a case of either not realising the dangers, or just not thinking about them.

But whatever the reason, this would be small consolation to parents whose children are killed or injured as a result of their negligence — unwittingly or otherwise.

How often do you see a car on the highway where parents are wearing lap-sash belts, and have junior standing between them on the front seat, completely unrestrained?

Or, almost as bad, one parent nursing an infant on their lap in the front passenger seat, which is the most dangerous position in the car.

Children should never be permitted to stand unrestrained in a vehicle, or to be placed in a seat belt with another person because of possible crushing.

The safest place for children in a motor vehicle is on the rear seat, where there are no protruding knobs such as on the instrument panel. As well, they are away from the adults in the front seat, who could crush them in a collision.

Think before you drive off, it may be too late when you are on the road.

J. W. Hallam, Safety Officer.

News In Brief

Officer-in-Charge

Dr. J. H. Leigh of the Division of Plant Industry has been appointed Officer-in-Charge of the Division's Riverina Laboratory, Deniliquin.

Doctorate

Mr. D. E. Bland of the Division of Forest Products has been awarded the degree of Doctor of Science by the University of Melbourne for his work on the lignins of *Eucalyptus* species, reaction woods, and model systems.

President

Dr. H. Higgins of the Division of Forest Products has been elected President of Appita, the Australian and New Zealand Pulp and Paper Industry Technical Association.

Masters of Science

Mr. V. Balodis of the Division of Forest Products has been awarded an M.Sc. by the University of Queensland for his work on the behaviour of sawn timber during seasoning in relation to the physical properties of wood.

Mr. L. W. Braithwaite of the Division of Wildlife Research has been awarded an M.Sc. by the University of Sydney for his work on the ecology of the black swan.

Award

Mr. H. Kobler of the Division of Physics has been awarded the Oswald Mingay Award of the Institution of Radio and Electronics Engineers for a paper on the design of a servo-system for guiding a solar telescope.

David Rivett Lecture

Professor Maurice Ewing, Director of the Lamont Geological Observatory, Columbia University, will deliver the Third David Rivett Memorial Lecture at the University of New South Wales on Thursday, July 6.

Exhibition

CSIRO will have two displays in the "Science in the Development of Australia Exhibition" which will be held in the Exhibition Buildings, Melbourne, from Monday, June 26, to Saturday, July 1.

One display will be the exhibition which was staged in Parliament House, Canberra, last September to commemorate the establishment of the Advisory Council of Science and Industry in 1916.

The second display will include exhibits from the Divisions of Applied Chemistry, Mechanical Engineering, Meteorological Physics, Protein Chemistry, and Textile Industry, and from the Ore Dressing Section.

Screen News

The Food Preservation Film Society, North Ryde, will screen the Brazilian film "The Violent Land" at 7.30 p.m., Tuesday, June 6. This film tells of a peasant family's trek from their impoverished farmland to find work in the city.

The Forest Products Film Society will screen three Australian films, "Australia — Room Down Under", "Follow the Sun" and "Triumph of the Telegraph", at 8.00 p.m., Tuesday, June 27, in the Division's theatrette, South Melbourne.

Organization Jargon

Expresses himself well—Speaks English.

Demonstrates qualities of leadership—Has loud voice.

Keen sense of humor—Has vast repertoire of dirty jokes.

A very fine officer of great value to the service—Usually gets to work on time.

Exceptionally well qualified—Has committed no major blunders to date.

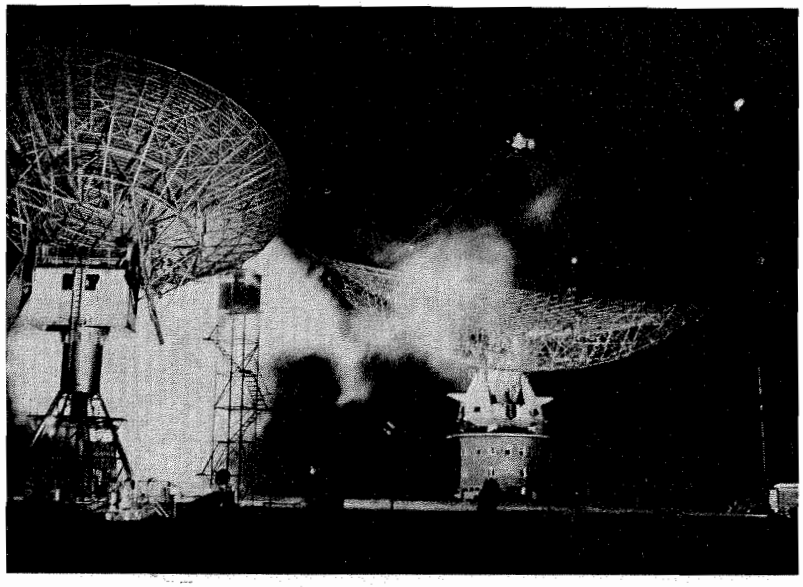
Active socially — Drinks heavily.

Quick thinking—Offers plausible excuses for errors.

Indifferent to instructions—Knows more than his superiors.

Approaches difficult problems with zest—Finds someone else to do the job.

Takes advantage of every opportunity to progress—Buys drinks for the boss.



500 MILLION WILL SEE US ON TV

An estimated audience of at least 500 million people will see the Parkes radiotelescope and the Canberra phytotron when the television programme, "Our World", spans the globe on Monday, June 26.

At 5.00 a.m., Eastern Standard Time, on that day, a maze of satellites, co-axial cables, land lines, cameras and transmitters will begin a two-hour programme.

It will include live telecasts from 17 countries and will be seen simultaneously in 30 countries.

Total cost of the two-hour production is estimated at $2 million. Each country will bear its own production cost and will take a share of the fees for hiring satellites and co-axial cables.

For Australia, the A.B.C. is the originating network. It will get the programme through a transmitter-receiver near Toowoomba, Queensland, which will be linked to a satellite over the Pacific.

From Toowoomba, the programme will go through the A.B.C. network to all States except Western Australia, between 5.00 and 7.00 a.m. It will be recorded for later replaying.

Control point for the global telecast will be in Studio 1 of the B.B.C., London.

The network begins at Vladivostok. From there, the picture will jump across the U.S.S.R. to Moscow through a Russian satellite.

From Moscow it will go to other Iron Curtain countries, the Mediterranean, Tunisia, France, West Germany, Britain and Sweden through co-axial cables.

From Britain, the signal will jump the Atlantic via the Early Bird satellite. It will cross North America via co-axial cable, shooting off to Canada and Mexico along the way.

It will cross the Pacific via two satellites — Intelsat II for Japan and a National Aeronautics and Space Administration satellite for Australia.

The time for a picture to make its way from Vladivostok to Sydney will be between one and two seconds.

The technical difficulties are immense. Sound will travel partly by satellite, partly by landline and under-sea cable. Sound will thus travel more slowly than the picture but in-built adjustments will synchronise the two.

Translations will present problems as programme segments are fed from 17 countries.

From London, translations will go out in French, German and possibly Russian to the earphones of local comperes everywhere. They will then relay information in local languages.

Australia will be the only country in the Southern Hemisphere to take part in "Our World". There will be two Australian segments in the programme.

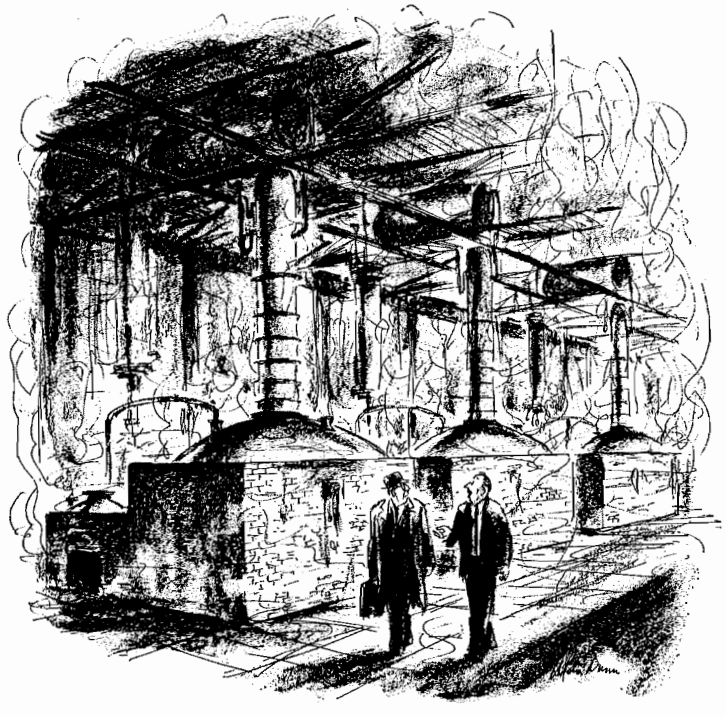
One will show scientists from the Division of Plant Industry at work in "Ceres", the Controlled Environment Research Laboratory in Canberra.

The other will show radio-astronomers from the Division of Radiophysics operating the 210 ft. radiotelescope at Parkes.

Dr. Peter Pockley of the A.B.C. is the executive producer for Australia's contribution.

Above: The radiotelescope site at Parkes resembled a battlefield last month when an A.B.C. television team carried out lighting tests in the early hours of the morning.

The team tried supplementing the battery of 5 kilowatt spotlights with magnesium flares, but this resulted in almost as much smoke as light.



"Nothing is wasted on basic research. We just plough all the profits back into more booze."

Courtesy "New Yorker".

Overseas Visits

Mr. E. G. Bendit of the Division of Textile Physics left last month on a ten week visit of research centres in Israel, Britain, Europe, Russia and the United States.

Dr. K. J. Cathro of the Division of Mineral Chemistry left recently for Britain where he will spend five months working on fuel cells at the Admiralty Materials Laboratory. He will also visit fuel cell research laboratories in Europe and the United States before returning to Australia in December.

Mr. W. W. Mansfield of the Division of Applied Chemistry will return shortly from Washington where he has been attending the "Water for Peace Conference".

Mr. N. H. Shaw of the Division of Tropical Pastures left last month on a four month visit of pasture research centres in Britain, Europe, and the United States.

Dr. P. A. Trudinger of the Division of Plant Industry's Baas Becking Geobiological Laboratory left last month on a four month visit of microbiological and biochemical laboratories in Britain, Europe, North America and Japan.

Dr. A. Walsh, Assistant Chief of the Division of Chemical Physics, left recently for Japan, North America, Britain and South Africa where he will visit licensees of atomic absorption patents. He will return in mid-July.

APPOINTMENTS TO STAFF

Mr. K. L. Biggs has been appointed to the Division of Building Research as Information Officer. After graduating B.Sc. from the University of Melbourne in 1955 Mr. Biggs

Mr. K. L. BIGGS

spent ten years with the Physics Department of the Cancer Institute. He recently spent eight months as an agricultural worker on a collective farm in Israel.

Dr. D. H. Blake has joined the Division of Land Research as a geomorphologist and will take part in land potentiality surveys of Australia and New Guinea. Dr. Blake obtained his Ph.D. from the University of London in 1964 and has spent the last three years with the Bureau of Mineral Resources on the geological mapping of north Queensland and New Guinea.

Mr. B. G. Cook has been appointed to the Division of Land Research where he will apply computer techniques to the work of the Survey

Mr. B. G. COOK

Methodology Group. Since graduating B.Sc. from the University of Sydney in 1953, Mr. Cook has worked as a geophysicist with the Bureau of Mineral Resources.

Mr. F. B. Roseby has been appointed to the Division of Animal Health where he will carry out research on the control of liver-fluke in sheep and cattle. Mr. Roseby graduated B.RuralSc. from the University of New England last year.

Miss Elizabeth Drechsler has joined the Editorial and Publications Section. Miss Drechsler graduated B.Sc. from the University of Melbourne in 1961. She obtained her Diploma of Education the following year and has been teaching in various secondary schools in Victoria.

Miss ELIZABETH DRESCHLER

Mr. P. Huppert has been appointed to the Division of Mineral Chemistry where he will work on the development and construction of electronic equipment for locating minerals by neutron techniques.

Mr. P. HUPPERT

Mr. Huppert obtained his Diploma of Radio Engineering from the Royal Melbourne Institute of Technology in 1960 and for the last nine years has been design engineer in the television laboratories of A. G. Healing Ltd.

Mr. B. P. McDowall has joined the Computing Research Section where he will develop and maintain programming and man-machine communication techniques and assist scientists in Adelaide with problems in numerical analysis. Mr. McDowall graduated B.Sc. with honours from the University of Adelaide in 1955 and has been with the Weapons Research Establishment of the Department of Supply at Salisbury since 1958.

Dr. J. V. Jacobsen has been appointed to the Division of Plant Industry where he will study the mode of action of plant growth substances and

Dr. J. V. JACOBSEN

their role in growth differentiation. After graduating B.Ag.Sc. from the University of Adelaide in 1959, Dr. Jacobsen spent two years with the South Australian Department of Agriculture. He obtained his Ph.D. from the University of California in 1965 and for the last year has been studying plant growth regulation at Michigan State University.

Dr. J. K. Marshall has joined the Division of Plant Industry. He will be stationed at the Division's Riverina Laboratory, Deniliquin, and will carry out research on micrometeorology. Dr. Marshall

Dr. J. K. MARSHALL

graduated B.Sc. with honours from St. Andrew's University, Scotland, in 1959 and Ph.D. from the University of Cambridge in 1962. Since then he has been at Edinburgh University, firstly with the Department of Botany and then with the Department of Forestry and Natural Resources.

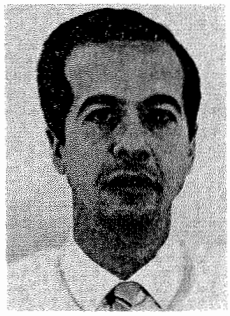
AQUATIC DAIRY MAIDS

Andrea Voigt (left) and Rita Shallies of the Division of Dairy Research enjoyed themselves at the CSIRO Swimming Sports in Melbourne last April, in spite of the fact that their Division failed to gain a place. For the second year in succession, the Division of Forest Products carried off the trophy (metaphorically speaking; the trophy was lost several years ago). Stars of the evening included the winner of the underwater race who swam more than two lengths of the pool and the gentleman from Building Research who had to stop when winning to cover his embarrassment.

Mrs. L. M. McCann has been appointed to the Division of Plant Industry where she will work on the chemical synthesis of compounds of potential biological activity. Mrs. McCann graduated B.Sc. from the University of Queensland in 1965.

Mrs. L. M. McCANN

Mr. F. J. Irani has joined the Division of Textile Physics where he will study the effect



Mr. F. J. IRANI

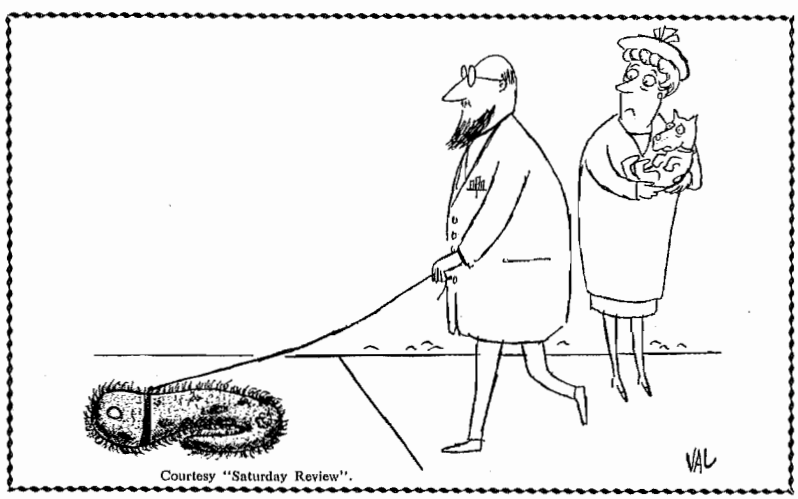
of chemical modifications on the mechanical properties of wool. Mr. Irani graduated B.Sc. with honours from the University of Bombay in 1952 and the University of Leeds in 1956. He came to Australia in 1963 and has been working as a chemist in private industry.

Dr. H. J. Rossell has been appointed to the Division of Tribophysics. He will carry out research on crystal defects and their effects on various physical properties of metals. Dr. Rossell graduated B.Sc. with honours from the University of Western Australia in 1957 and Ph.D. from the same University in 1965. He has spent the last year at the Inorganic Chemistry Laboratory, University of Oxford.

Mr. M. B. Wold has joined the Division of Forest Products where he will study the development of fracture in wood. Mr. Wold obtained his

Mr. M. B. WOLD

Diploma in Applied Physics from the Royal Melbourne Institute of Technology in 1965 and has been working in the Explosives Applied Research Group at the Defence Standards Laboratories of the Department of Supply.



Courtesy "Saturday Review".

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 100, MELBOURNE, JULY 1967

INDUSTRY GRANT

CSIRO will provide a grant of up to $850,000 over the next five years to the Sugar Research Institute for research on the milling of raw sugar.

The Sugar Research Institute was established at Mackay, Queensland, in 1949 by a group of 26 sugar mills which, between them, crush more than 80% of Australia's cane.

The grant will be on the basis of $1 for every $2 subscribed by member mills, with a maximum of $100,000 in the first year, $150,000 in the second year, and $200,000 in subsequent years.

It is the largest single grant yet made by CSIRO to an industrial research association.

CSIRO is currently making grants totalling more than $180,000 a year to five other industry associations for research on wine, bread, coal, leather and welding.

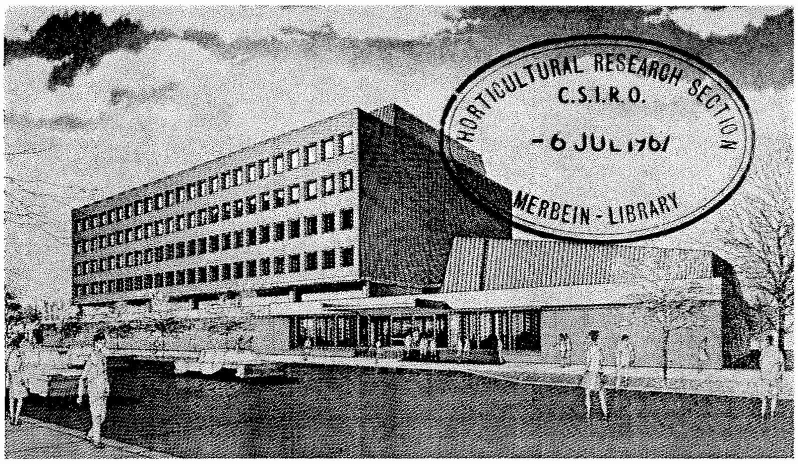
The Institute's Director, Dr. J. R. Allen, said that the CSIRO grant was particularly welcome as there was now an urgent need for a greatly expanded programme of research on sugar quality.

He pointed out that in recent years sugar quality had become of paramount importance in retaining export markets.

Overseas buyers were now demanding raw sugar with properties that were unheard of in trading circles a few years ago, he said.

This had posed many new problems, and further research was needed to enable the industry to overcome them and to strengthen its position in the face of low prices and severe competition.

The additional work will include investigations of carbohydrate chemistry, problems of cane deterioration due to mechanical harvesting and other causes, basic research on the growth of sugar crystals, development of continuous crystallization equipment, improvements in the electrical engineering aspects of mill operations, and the application of electronic computers to mill management and to the automatic control of mill operations.



Work Starts On Science Centre

Clunies-Ross House, which will be headquarters for about 50 Australian scientific and technological societies, will be opened in Melbourne in the middle of next year.

Total cost of the building in Royal Parade, Parkville, will be $1.3 million. Nearly $1 million has been subscribed to the Ian Clunies-Ross Memorial Foundation so far.

Last month the Chairman of the Foundation's board of governors, Sir Ian McLennan, announced the start of work on the project.

"This is a building with a difference," he said. *"Although being erected in Melbourne, it is a national project and represents Australian science.*

"In a way this project of a National Science Centre supplements the aims and objects of the Australian Academy of Science which is composed of about 150 of the most outstanding research scientists in Australia.

"Meetings within this building in the future will directly affect more than 40,000 scientists and technologists and shape this country's future scientific developments to an extent to which at this moment we can only guess."

The new science centre will contain a 500-seat auditorium, projection room, air-conditioned offices, banking services and off-street car parking.

The first floor will house the Sciences Club. Although an integral part of the Centre, the Club will be self-supporting.

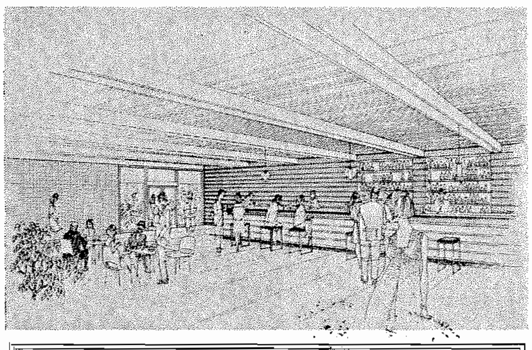
Its amenities will include full dining and a la carte service — able to cater for up to 500 people, a large lounge for private reading and informal discussion, a licensed bar and bar lounge, closed circuit T.V. to enable members to follow any activity in the auditorium, car parking space, and cloak room facilities.

The auditorium can be subdivided by sound proof partitions into three conference rooms.

The Club Committee is at present conducting a drive for new members to supplement the original 900 foundation members.

Information on membership can be obtained from the Committee's Chairman, Mr. J. E. Cummins at 314 Albert Street, East Melbourne, (phone 419-1333).

Below: An artist's impression of the Club Bar.



THIRD RIVETT LECTURE

Dr. Maurice Ewing, Director of the Lamont Geological Observatory, Columbia University, will deliver the third David Rivett Memorial Lecture at the University of New South Wales on Thursday, 6th July. He will speak on the sediment cover of the deep sea floor.

The David Rivett Memorial Lectures commemorate Sir David Rivett, who was Chief Executive Officer, and later Chairman, of the Council for Scientific and Industrial Research.

Previous Rivett Memorial Lecturers are Lord Florey and Lord Adrian.

Dr. Ewing is one of the world's leading geophysicists.

Early in his career, he became intrigued by the mystery of the ocean floor and this was to inspire him to a life largely devoted to marine research.

After obtaining his Ph.D. in 1931, Dr. Ewing concentrated on geophysical research, particularly the problems of the oceanic crust and its margins.

In 1935, he recorded the first seismic measurements in the open ocean and in 1939 he obtained the first photographs of the deep ocean floor.

His discovery in 1949 of the thin crust underlying the oceans was one of the most important geophysical discoveries ever made.

Dr. MAURICE EWING

Dr. Ewing's use of seismic surface waves to study the upper mantle opened a new chapter in seismology and his ice-age theory based on ocean circulation revitalised the study of palaeo-climatology.

In 1949, Dr. Ewing's work led to the establishment of the Lamont Geological Observatory at Columbia University. He was appointed the first Director.

The Observatory's main lines of research have been directed towards marine geophysical and geological exploration, seismology studies and isotope-geology for age determination of marine samples.

Retirement

Miss Bronnie Thomas retired from CSIRO last month after forty-four years of service with the Organization.

Miss Thomas joined the Institute of Science and Industry in 1923 when there were only half a dozen girls on the staff.

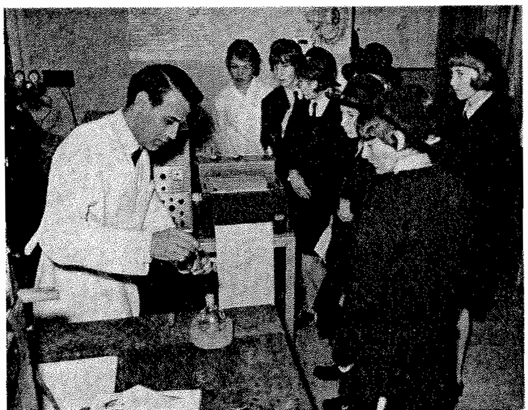
As a member of the typing pool she worked for Sir George Knibbs and Mr. Gerald Lightfoot.

She subsequently served as Secretary to Mr. Gerald Lightfoot, Mr. G. A. Cook, Dr. S. H. Bastow, Mr. L. G. Wilson and Mr. J. Coombe.

Miss Thomas has been a keen sportswoman. She was a good golfer and an A-grade tennis and badminton player.

She hopes to spend as much time on the bowling green as she can during her retirement.

At a farewell ceremony at Head Office last month Miss Thomas was presented with a set of bowls from her many friends in CSIRO.



Last month 5th and 6th Form pupils from ten Canberra High Schools visited the Division of Plant Industry. Our picture shows Dr. C. Whittle demonstrating the use of gas chromatography in the identification of eucalypt oil compounds. The girls are from the Catholic Girls' High School, Braddon.

CANBERRA MOVE

The major part of Head Office will tranfer from Melbourne to Canberra in the financial year 1970-71.

This follows a recent decision by Federal Cabinet.

The move is expected to take place about January 1971.

POSITIONS VACANT

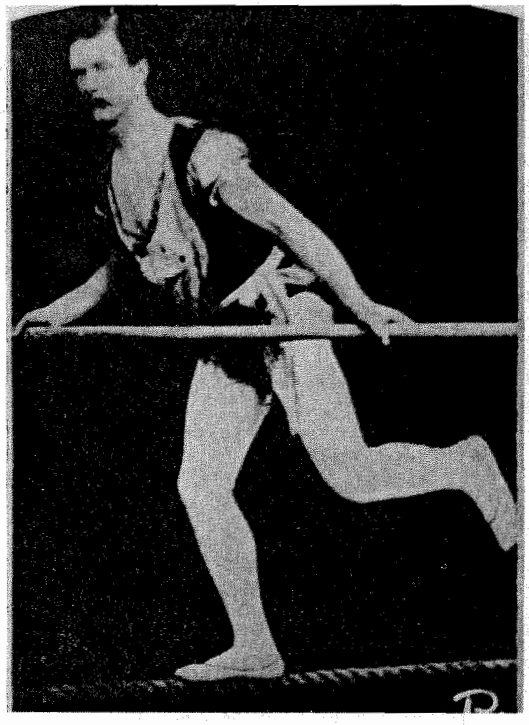
The following vacancies for professional appointments are current:

SCIENTIFIC SERVICES OFFICER (SSO1, 2 or 3) — Computing Research Section — 900/76 (7/7/67)

RESEARCH SCIENTIST (RS/SRS) — VETERINARY PARASITOLOGIST — Division of Animal Health — 201/288 (7/7/67)

RESEARCH SCIENTIST (RS/SRS) — SOIL SCIENTIST/PEDOLOGIST — Division of Soils — 270/348 (21/7/67)

EXPERIMENTAL OFFICER (EO1/2) — PETROLOGIST OR MINERALOGIST — Division of Mineral Chemistry — 480/546 (4/8/67)



CENTENARY CELEBRATION

With what trepidation, and yet with what pride we first presented to you, so long ago, our first Coresearch (top left). It was produced by one farsighted man, laboriously inscribed by hand on rolls surreptitiously removed from a paper towel dispenser. From those pioneering labours has grown the Coresearch that you all know, love, and respect; the journal that a dedicated team of workers lovingly produces every month for your edification and enjoyment. And now, to mark our one hundredth issue, we would like to introduce to you this happy little band.

As you can see, our Editor (top row, second from left) has to maintain a precarious balance between the demands of scientific sobriety and journalistic irreverence. This inner conflict lends him an air of melancholy, which is not helped by the difficulty of maintaining a pose like this for an exposure of thirteen seconds.

Happy Jack (top row, second from right) our Copy Boy (known sometimes as Poor John) is a simple soul of simple pleasures. Possessed of very little brain, he is nevertheless a fountain of humour. His store of funny stories and comic hats keep the editorial staff in a state of constant hilarity, and help greatly to lighten their heavy task.

Our Proof Reader, Mr. Van Gogh (top right) has difficulty in wearing spectacles in the conventional manner, and has to resort to this rather wearying posture. We plan to open a public subscription to purchase for him a plastic armrest.

Busy indeed are our Photographers (left centre) here seen ardently recording an image of nubile femininity for the adornment of page 4. Much as they enjoy this work, they say that it cannot compare with the delight they find in their more mundane tasks of depicting blue mould, liver-fluke, and blowfly strike.

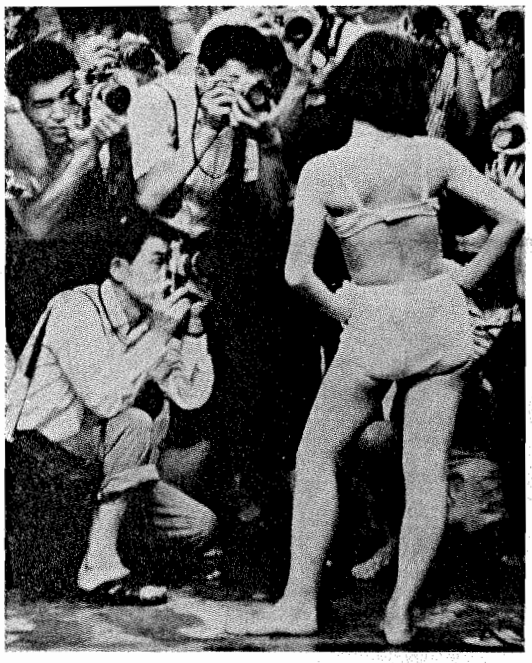
Unfortunately we are unable to give you a portrait of the Editor of our Safety Notes. While driving along the Princes Highway, he was so lost in admiration of this road sign (middle row, second from right) that he ran into a tree.

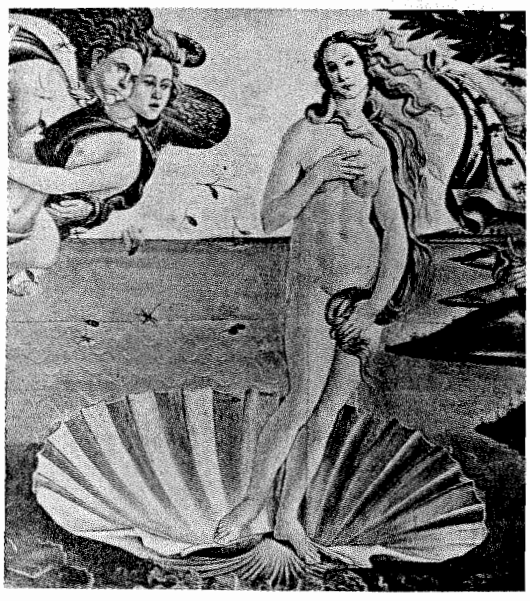
For news from all the far-flung branches of our great Organization, we rely heavily on our team of Local Reporters (right centre). These diligent workers (whom we jocularly call our "spies") leave no door unopened in their thirst for information. True to journalistic tradition, they refuse to take "NO" for an answer.

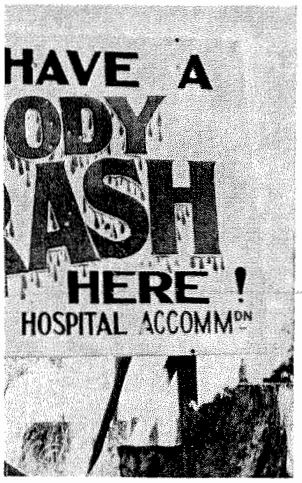
When we gave you our first issue, little did we dream that one day we would have our own Overseas Correspondent. But we have ever striven for greater things, and our dream is now a reality (bottom left). Due to a somewhat limited budget, we are forced to make certain economies in transport and wardrobe, but this in no way affects the warm and enthusiastic welcome that greets this lady everywhere in her travels.

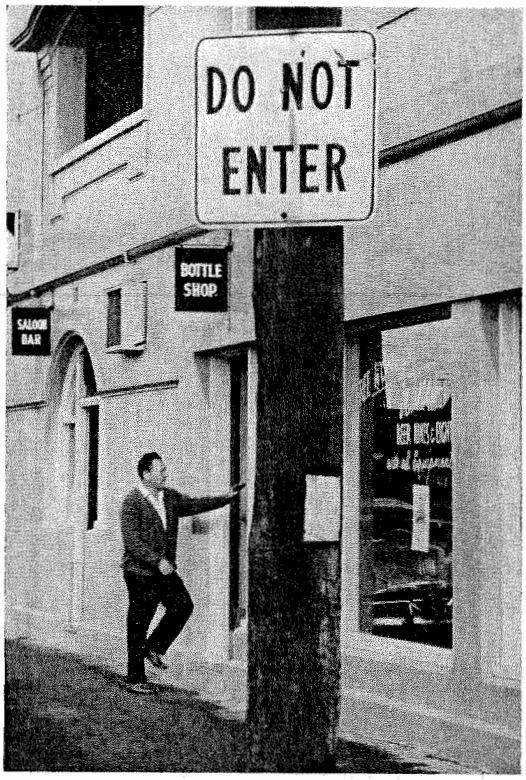
Our Sporting Writers (bottom row, second from right) are widely known for their sporting tips straight from the horse's mouth. A versatile and enterprising crew they are ever ready to lay aside their pens and help the fielding side retrieve a lost ball.

A great number of our readers are of the fair and gentle sex, and from our first issue our Editor has made it a cardinal rule that everything appearing in Coresearch must be of the highest moral standard. Before publication, a proof copy of each issue is carefully scrutinised by the Editor's wife and his mother (bottom right) who ensure that no unfortunate matter appears that could raise a blush on the delicate cheeks of our ladies.









News In Brief

O.B.E.

Dr. J. R. Vickery, Chief of the Division of Food Preservation, was awarded an O.B.E. in the Queen's Birthday Honours List.

Assistant Chief

Dr. W. G. Kauman has been appointed Assistant Chief of the Division of Forest Products.

Dr. W. G. KAUMAN

Officer-in-Charge

Mr. P. H. Durie of the Division of Animal Health has been appointed Officer-in-Charge of the Veterinary Parasitology Laboratory, Yeerongpilly, Brisbane.

Resignation

This hundredth issue of "Coresearch" records the departure from Head Office of **Mr. A. K. Klingender,** who has resigned to accept a senior appointment in industry. Mr. Klingender was the first Editor of "Coresearch", sole producer of some 55 issues and a contributor to many others.

Lecturer

Dr. R. Postle of the Division of Textile Physics has been appointed a lecturer in the School of Textile Technology, University of New South Wales.

Screen News

The Food Preservation Film Society will screen the Czech film, "No Return Ticket" and "Ninety Degrees South" a film of the Scott expedition to the South Pole, at 7.30 p.m., on Tuesday, July 4, at North Ryde.

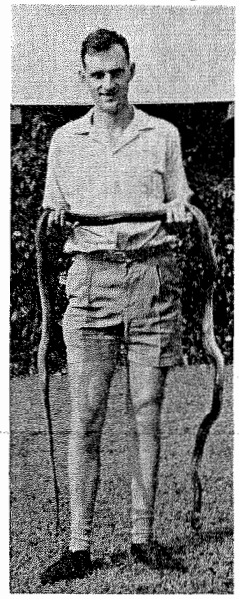
Bowls Champion

Mr. D. Neill of the Division of Physics was a member of the Regents Park Fours Team which was runner-up in the recent New South Wales Lawn Bowls Championship. More than 1,200 teams took part in the competition.

Some Snake

Mr. D. M. Lainchbury, below, of the Division of Plant Industry's Tobacco Research Institute, Mareeba, has mixed feelings about this 8 ft. 6 inch taipan which he killed near the Institute when he ran over it in his car.

Mr. Lainchbury arrived only recently from Britain and this is the first snake he has seen outside a zoo. Another member of the Institute ran over a taipan recently but it was only 6 ft. 8 inches long.



SAFETY NOTES

Injured Innocents

Last month we highlighted some of the hazards which children were exposed to when travelling in the family car. However, there are also serious hazards when the car is stationary.

One of the worst danger periods occurs during the mother's shopping trip, when one or more children may be left in the car "for a minute while mummy just buys a few things and will bring back a lolly if you're good".

While little Johnny or Susie may promise to be good (in order to get the promised sweet), waiting for mummy to return can become rather a boring matter.

The passing parade of people, dogs and cars outside may provide interest for a time, but even that wanes. And so does the promise to be good.

After all, the car and what is inside it can be most interesting to prying little hands. And most dangerous too.

Although it is best not to leave children unattended in cars, one cannot expect the harrassed housewife to drag little Johnny or Susie with her wherever she goes.

The alternative is to ensure that they are safe in the car by not leaving dangerous items such as matches lying about the car or in the glove-box.

Never leave the windows wound right up — make sure there is adequate ventilation, and with young children, do not leave the windows wound right down — junior may fall out.

Lock your car securely in the driveway or in the garage to prevent a child from entering it.

Before opening the car door and getting out, look backwards to make sure that a child has not walked or ridden up beside you on a bicycle or tricycle.

When driving, remember that small children have not learned to reason on the road, whether walking or riding. Always be prepared to expect the unexpected.

When backing out from your driveway, stop at the fenceline in case a mother is pushing a pram, or a child is walking, along the footpath.

Look for children before backing!

J. W. Hallam, Safety Officer.

Dr. K. Bischoff (second from right) of the German Standards Laboratory at Brunswick, returned home recently after spending three months at the National Standards Laboratory exchanging information on techniques used in optical radiometry. He is shown talking to, from left, Dr. R. G. Giovanelli, Mr. W. R. Blevin, and Dr. W. H. Steel of the Division of Physics at a farewell cocktail party.

Britannica Awards

Encyclopaedia Britannica Inc. makes annual awards in Australia in recognition of outstanding contributions to art, education, literature, medicine and science.

The Award in each nominated field is made for a contribution or development of outstanding merit originating in Australia, or having direct connection with or benefit for Australia. Each Award consists of a gold medal, a diploma bearing a citation, and $A10,000.

The Committee for the Natural and Applied Sciences is concerned with the following disciplines—Mathematics, Physics, Chemistry, Biology, Geology and Applied Science, and invites nominations of persons who have made outstanding contributions of the kind described above and of contemporary importance.

The Award is open to scientists whose relevant work has been carried out mainly in Australia. It is also open to Australians whose relevant work has been done mainly abroad, provided that the work has special significance or value to Australia, or is connected with some aspect of Australian life.

Each nomination should be accompanied by a citation justifying the nominee's claim for consideration by the Committee with reference to his principal achievement or field of achievement. A list of the nominee's publications should also be included, with an indication of those specially relevant to the citation.

All nominations will remain open for a period of five years. The Committee would welcome any further information on candidates already nominated.

Twelve copies of each nomination and supporting material should be lodged with the Chairman of the Committee, The Australian National University, Box 4, G.P.O., Canberra, before 1 August 1967. The Committee will not consider nominations made by any person on his own behalf.

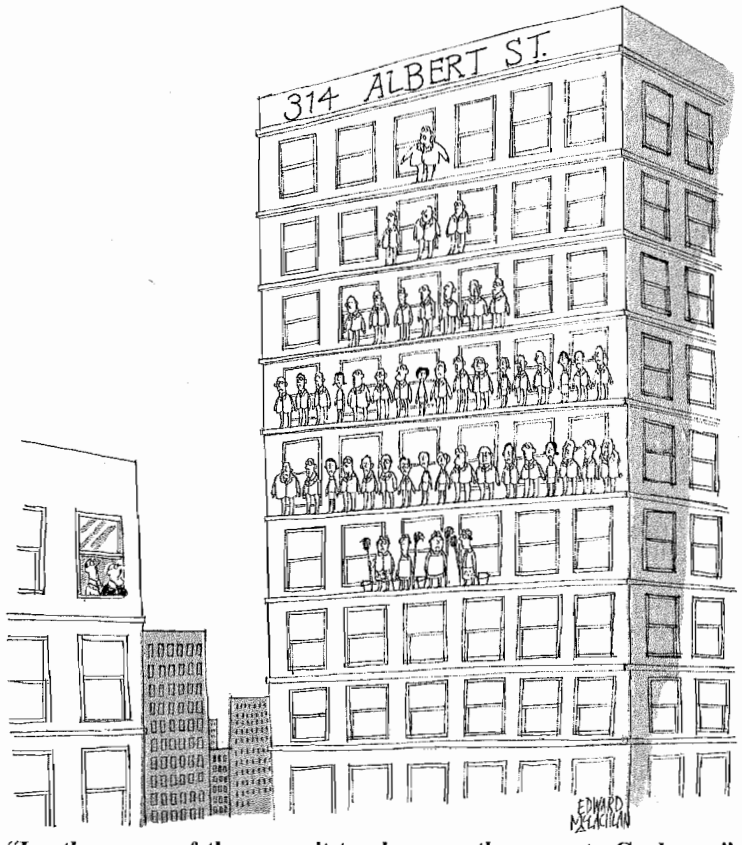
NEW STAFF

Mrs. Annette Diver has been appointed to the Division of Textile Industry where she will work on machine knitting of textiles and on the development of new fabric structures. Mrs. Diver graduated B.Sc. from the University of Strathclyde, Glasgow in 1960. She came to Australia four years later and has been teaching with the Victorian Education Department.

Mrs. ANNETTE DIVER

Dr. R. L. Darskus has been appointed to a post-doctoral fellowship with the Division of Protein Chemistry where he will study the proteins of the wool fibre. Dr. Darskus graduated B.Sc. with honours from the University of Adelaide in 1958 and Ph.D. from the same University in 1963. He worked at Mainz University, Germany, between 1962 and 1965 and since then has been on the editorial staff of the journal "Angewandte Chemie".

Printed by CSIRO, Melbourne



"I gather some of them aren't too keen on the move to Canberra."

With apologies to "London Punch"

MARINE SCHOOL

Last May, seventy-six final-year and post-graduate students from twelve universities attended the 21st Marine Science School of the Division of Fisheries and Oceanography at Cronulla.

The students were divided into ten project groups.

The projects covered many facets of marine science and some took the form of a combined survey of Gunnamatta Bay in Port Hacking.

One group carried out a study of the hydrological regime in the bay while others examined the physical chemistry and distribution of the sediments, the benthic fauna, the zooplankton population, and distribution of Foraminifera.

Laboratory work included algal physiology, the chromatographic separation of algal pigments, and interpretation of physical oceanographic data.

A fish study group surveyed the species composition, distribution, and population parameters of the fishes of Port Hacking.

We took this picture of Monique Scott with a plant of *Desmodium uncinatum* in one of the glass-houses at the Pasture Research Station of the Division of Tropical Pastures at Samford, near Brisbane. Actually Monique has nothing to do with the Division of Tropical Pastures; she works for the Division of Animal Physiology and knows very little about *Desmodium uncinatum*. Still she makes a nice picture.

Overseas Visits

Dr. H. D. Barrs, of the Irrigation Research Laboratory, Griffith, left recently on a visit of agricultural research centres in Britain and Europe. At the end of August he will go to Duke University where he will spend twelve months working on plant-water relations.

Dr. A. E. Pierce, Chief of the Division of Animal Health, left last month on a visit of veterinary research centres in the United States, Britain and Europe. He will return early next month.

Mr. W. J. Roulston of the Division of Entomology left last May on a five month visit of tick research centres in Japan, the United States, Britain, Europe and South America.

TECHNICAL ASSOCIATION NEWS

The Central Council of the CSIRO Technical Association has transferred back to Victoria after four years in New South Wales.

The transfer took place at the Annual General Meeting of the Association held in the lecture theatre at Forest Products on Monday, May 22nd.

The new Council comprises: Federal President, J. Little (Applied Chemistry); General Secretary, H. Heath (Forest Products); General Treasurer, R. Lewis (Building Research); Publicity Officer, B. Banks (Publishing); Past President, H. Gillett (Physics); and the State Chairmen: Victoria, G. Richards (Meteorological Physics); N.S.W., R. Gibson (Physics); Queensland, J. Elliott (Tropical Pastures); A.C.T., R. McInnes (Entomology); South Australia, J. Forrest (Soils); West Australia, J. Beresford (W.A. Regional Laboratory).

The interstate chairmen are represented by the following proxies: A.C.T., C. Hutton (Chemical Engineering); N.S.W., P. Dempsey (Forest Products); Queensland, G. Donovan (Animal Health); South Australia, R. Sutton (Publishing); West Australia, N. Freeman (Dairy Research).

The Victorian chairman was appointed vice-president at the inaugural meeting of the new Council.

Work is under way on the first Victorian "Gazette" which it is hoped will be published in August. Contributions to the Publicity Officer are due now.

Drafts are being prepared of a memorial to be presented to Head Office on a new salary scale for Technical Staff.

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 101, MELBOURNE, AUGUST 1967

FOOD CHIEF STEPS DOWN

Dr. J. R. Vickery retired from the Organization last month after twenty-eight years as Chief of the Division of Food Preservation.

Dr. Vickery has been regarded for many years as the leader in food science and technology in Australia and as an international authority in this field.

He has led food preservation research since its inception in CSIRO in 1931. In that time his original staff of four has grown to 200.

The work of Dr. Vickery and his team has left its mark in the food habits of a whole generation of Australians and has played an important role in the development of a number of Australia's valuable overseas meat and fruit markets.

His research on the quality of meat, eggs, fruit and vegetables and their preservation by refrigeration, canning and other processes has had a marked effect upon every Australian household.

In his earlier work, Dr. Vickery became well known for his methods of extending the storage life of chilled beef and improving the quality of frozen beef.

Further research into post-mortem meat changes showed the great dependency of meat quality upon the physical condition and treatment of the live animal at slaughter, leading to a general improvement in the quality of meat for the table.

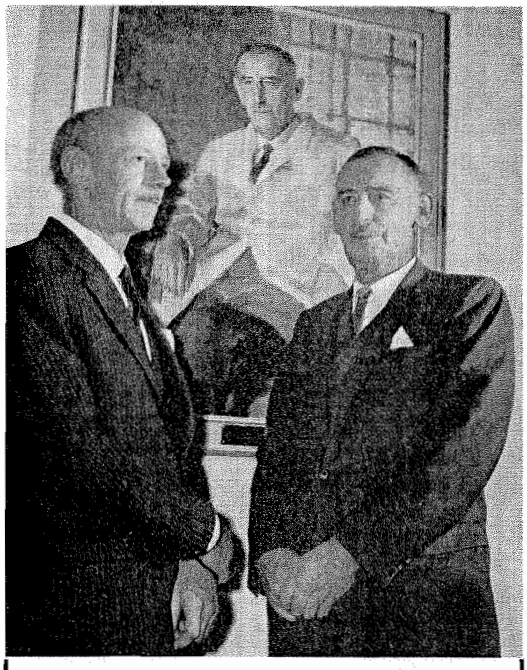
Dr. Vickery's development of precise control of temperature and atmospheric conditions for ships' refrigerated cargo spaces has virtually abolished wastage in the transport of meat, fruit and vegetable cargoes.

During the second world war, one of Dr. Vickery's tasks was the development of dehydrated meat for the Allied forces; in England it became known as "Vickery mutton".

In recent years his work has brought great advances in the fields of food flavours, food dehydration by improved use of hot air techniques, and freeze drying.

Dr. Vickery was born at Ballarat, Victoria, in 1902. He graduated M.Sc. from the University of Melbourne in 1926 and completed his Ph.D. degree at the University of Cambridge in 1929 at the Low Temperature Research Station of the British Food Investigation Board.

He then became a member of a team of British, Australian, and New Zealand scientists working on the freezing, storage and transport of lamb.



At a farewell ceremony at the Division of Food Preservation last month, Sir Frederick White unveiled a portrait of Dr. Vickery by Sydney artist, W. E. Pidgeon. Dr. Vickery is seen here in front with the artist of the portrait.

In 1931 he returned to Australia and was appointed Officer-in-Charge of the Food Preservation Section of C.S.I.R.

In 1940, the Section became a Division with Dr. Vickery as its Chief.

Dr. Vickery's work has been widely recognized overseas, particularly in the Commonwealth, and he has visited India, Pakistan and New Zealand to advise on the development of food preservation research in these countries.

In 1958 he was invited by the British Government to investigate meat research in Britain and to advise on the establishment of a meat research centre.

He has been a member of the World Health Organization's Food Additives Committee, and has been frequently consulted by F.A.O.

Last year he was chosen by the Food Group of the Society of Chemical Industry, London, to deliver its first international lecture.

Dr. Vickery was a foundation member and later Chairman of the original Australian Section of the International Institute of Food Technologists and has continued to be keenly active in I.F.T. affairs.

He received the I.F.T. International Award in 1960 and the Australian Award in 1966.

Earlier this year he was elected Foundation President of the Australian Institute of Food Science and Technology.

He was created an O.B.E. recently in the Queen's Birthday Honours.

Senior Retirements

Four senior officers with some 154 years of service between them retired from the Organization recently. They are Dr. W. E. Cohen, Assistant Chief, Division of Forest Products; Dr. A. W. Peirce, Division of Nutritional Biochemistry; Mr. L. A. Thomas, Division of Plant Industry; and Mr. W. L. Greenhill.

Dr. Cohen graduated B.Sc. with honours from the University of Western Australia in 1924.

He joined the Division of Forest Products in 1927 and in 1931 was appointed Officer-in-Charge of the Wood Chemistry Section, now the Paper Science Section.

Dr. W. E. COHEN

His main research has been on wood chemistry, pulping of wood, and production of paper, and in 1936 he was awarded the degree of Doctor of Science by the University of Western Australia for his work in these fields.

Mr. W. L. GREENHILL

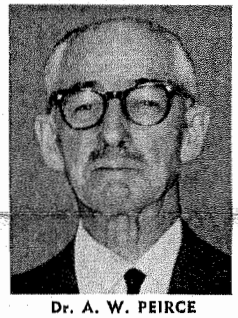
Mr. Greenhill, an engineering graduate from the University of Tasmania, joined the Division of Forest Products in 1931 after studying timber seasoning overseas.

In 1940 he was placed in charge of flax processing investigations and when the war ended was appointed Officer-in-Charge of the newly created Flax Research Laboratory.

This later became the Plant Fibres Section and then the Fodder Conservation Section.

In 1964 the Section was disbanded and Mr. Greenhill was seconded to the Thailand Applied Scientific Research Corporation as Plant Fibres Expert.

Dr. Peirce graduated B.Sc. from the University of Adelaide in 1924 and after three years as an assistant chemist at Roseworthy Agricultural College joined what was then the Division of Animal Nutrition.



Dr. A. W. PEIRCE

Dr. Peirce soon achieved an outstanding reputation for his work as an animal nutritionist, particularly in the fields of Vitamin A deficiency and chronic fluorosis in sheep.

He was awarded the degree of Doctor of Science by the University of Adelaide in 1946.

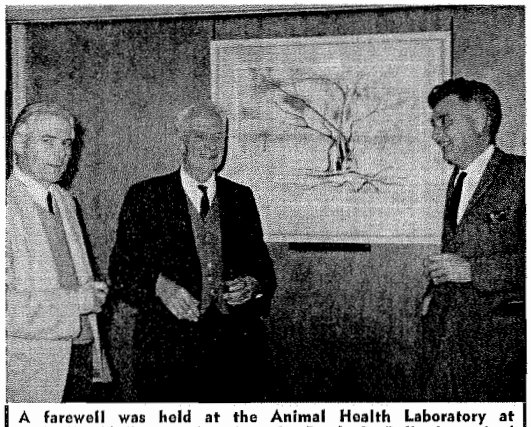
Mr. Thomas graduated M.Sc. from the University of Melbourne in 1932 and after a year at East Malling, Britain, joined the Division of Plant Industry.

His work at Applethorpe, Queensland, was concerned with discovering more productive rootstocks for Australian apple varieties.

Mr. L. A. THOMAS

He also studied the most profitable pruning and fertilizer treatments for selected stock-scion combinations of apples and for other deciduous fruits.

Following the successful completion of these investigations it was decided to transfer the Applethorpe Research Station to the Queensland Department of Primary Industries in 1962 and Mr. Thomas was seconded to that Department.



A farewell was held at the Animal Health Laboratory at Parkville, Melbourne, last June for Dr. L. B. Bull who retired from the Senior Research Fellowship he has held with the Division of Animal Health for the past fourteen years. Dr. Bull was Chief of the Division of Animal Health and Production from 1935 to 1954. A talented painter, he presented the staff with one of his paintings. Dr. Bull (centre) is seen here with the Officer-in-Charge of the Animal Health Laboratory, Mr. J. H. Whitten (right), and Mr. J. Bingley.

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER (EO1/2) — Division of Applied Chemistry — 586/43 (18/8/67).

EXPERIMENTAL OFFICER (EO1/2) — ELECTRONICS — Division of Entomology — 180/417 (18/8/67).

SCIENTIFIC SERVICES OFFICER (SSO1/2) — WOOL TECHNOLOGIST — Division of Textile Industry — 464/415 (25/8/67).

RESEARCH SCIENTIST (RS/SRS) — Division of Wildlife Research — 560/226 (25/8/67).

RESEARCH SCIENTIST (SRS/PRS) — 2 positions — Division of Textile Research — 464/416 (25/8/67).

RESEARCH SCIENTIST (SRS/PRS) — Division of Plant Industry — 130/870 (1/9/67).

THE SEDIMENT COVER OF THE DEEP SEA FLOOR

The Third David Rivett Lecture was delivered at the University of New South Wales on Thursday, 6th July, by Dr. Maurice Ewing, Director of the Lamont Geological Observatory, Columbia University.

Dr. Ewing, who spoke on the sediment cover of the deep sea floor, began by referring to some of the pioneering work in this field.

He said that the first study of deep sea sediment was made by "Challenger" during its great voyage of 1873 to 1876.

The "Challenger" work, supplemented by much later work of the same general character, established the general types of sediment and the area of ocean floor covered by each.

In the long interval following, the principal developments were the invention of the sonic method for determining depth of water from a vessel under way and of a means for measuring the acceleration of gravity at sea.

Also, the theory of the hydrodynamics of atmosphere and ocean on a rotating earth was greatly improved by the Scandinavians, while the Germans developed methods for measuring the density of seawater at all depths with reasonable accuracy.

The next great oceanographic voyage was that of the German research vessel "Meteor", which undertook a systematic survey of the South Atlantic in the late 1920's.

She made a network of precise determinations of temperature and salinity at all depths; from these observations, surfaces of equal pressure were determined and the circulation calculated.

"Meteor" also took cores of the sediment, usually less than 2 metres in length.

Some of these cores in the regions of foraminiferal ooze showed faunal changes with depth caused by warming of the surface waters at the close of the last Pleistocene glacial stage.

This observation marked the birth of stratigraphy of deep sea sediments and provided a great stimulus to ocean exploration of all types.

About the same time "Carnegie" made her pioneer voyage of world-wide measurements of the earth's magnetic field.

A few years later, in 1932-34, "Discovery II" began a systematic study of the circulation of water around Antarctica and the formation of the Antarctic bottom water.

About this time many submarine canyons were discovered. Improved core sampling techniques were developed which increased core lengths up to about 3 metres, and the shapes of oceanic ridges were gradually revealed by increased echo-sounding.

Studies of seismicity of the earth began to show that these oceanic ridges were the loci of marked earthquake activity, suggesting that whatever process formed the ridges was still operative.

The time was ripe for advance, and in the mid 1930's a committee on continents and ocean basins was formed by the American Geophysical Union.

Dr. Ewing said that at that time he was an instructor in physics; although he had some experience in the rather new field of geophysical exploration for oil, using magnetic, gravity and seismic methods of investigation, he had no geological background.

The committee made him a grant of $2,000 to apply the methods of geophysical prospecting to the study of the ocean.

Using some obsolete equipment from a prospecting company, he measured the thickness of sediments, by the seismic method, across the coastal plain in Virginia and out to the edge of the continental shelf.

The measurments showed that the steep slope, the edge of the shelf, resulted from upbuilding and outbuilding as in a delta, rather than from faulting.

In 1936 a small grant permitted Dr. Ewing and his colleagues to start work on the measurement of gravity at sea.

In 1937 and 1938 grants were obtained from the Geological Society of America and the National Geographic Society to construct a camera for photographing the ocean bottom and for adapting seismic refraction methods to measure the thickness of sediment on the deep sea floor.

Research was interrupted by the outbreak of hostilities in Europe and effort was diverted to work on anti-submarine problems.

This involved the use of techniques that later proved useful in exploring the ocean.

After the war Dr. Ewing and his team moved to Columbia University where they began to expand their operations under grants from the newly-created Office of Naval Research.

Soon after, an expedition supported by a grant from the National Geographic Society was organized.

It went to the mid-Atlantic Ridge and back and then to the Cape Verde Islands and back.

Above are three of the girls who acted as hostesses for the Third David Rivett Memorial Lecture. They are, from left to right, Robyn Ray, Jean Chaplin, and Margaret Pink. All three are from the Division of Applied Physics.

Last month, Dr. Ewing attended a screening of Orbit Award films at the Australian Academy of Science, Canberra. The screening was arranged by ANZAAS in association with the Royal Society of Canberra. Our picture shows Dr. Ewing (centre) discussing the films with Mr. L. Carron, Past President of the Society, and Mr. A. F. Gurnett-Smith, Secretary (Agricultural and Biological Sciences), who is A.C.T. Secretary of ANZAAS.

At that time the seismic refraction method was used to measure the thickness of the various strata at the bottom of the ocean.

This method required two ships and values had to be averaged over about 60 miles.

On this expedition there was only one ship and attempts to use a sailing whaleboat as a second ship were not very successful although some information was obtained on the thickness of the sediment on the sea floor.

The expedition was equipped with a magnetometer that could be towed behind the ship, clear of the influence of the hull, and a sediment coring apparatus that had been developed to give cores up to 20 metres in length.

Dr. Ewing and his team also developed a seismic reflection method that gave more accurate measurements of the depth of water than the echo sounders then available.

These accurate soundings revealed an incredibly flat region of the ocean bottom between New York and Bermuda, perhaps 200 miles wide, and of unknown length.

After studying sediment cores it was concluded that enormous landslides had occurred on the steep continental slope.

These began with a mass of sediment sliding down the slope; by the time the sediment reached the bottom it was completely in suspension.

There was then a mass of water, made heavy by the suspended sediment, which moved downhill until it reached the lowest place available where it deposited the sediment in the depressions, creating a smooth floor.

These turbidity currents, as they were called, provided a new and previously unknown means of transporting essentially continental sediment far out into the deep sea.

Another finding during the expedition was the discovery of a strong reflecting layer between the sea floor and the rock surface beneath.

This layer was later found to be quite extensive.

Studies of the sediments showed that it marked the end of the Cretaceous.

The sediments below were therefore much older than 70 million years and this placed some constraint on those people who advocated continental drift.

In 1949 two vessels became available and for the first time it was possible to apply the seismic refraction method successfully to determine the thickness of sediment between New York and Bermuda.

This work also showed that it was not very far below the sea floor to rocks in which the velocity of sound approached that in the mantle of the earth.

In 1952 Dr. Ewing's research group acquired its own vessel, the converted yacht "Vema".

Extensive refraction measurements were made in conjunction with vessels of many different navies, including the R.A.N.

It was shown conclusively that the earth's crust under the oceans was thin, probably basaltic in composition, and utterly unlike that on the continents.

Many sediment cores were collected and glacial and interglacial stages were mapped.

A big step forward in all these operations was taken when the International Geophysical Year provided support for a foreseeable period of time.

This made it possible to undertake round - the - world cruises and to attempt to make a reconnaissance of all the oceans.

In 1959 a revolutionary new technique known as profiling was evolved.

It was a method of continuous seismic reflection measurement which made it possible to record the sediment thickness every couple of minutes from a ship as it steamed along.

The detailed information made available by this new technique proved an invaluable guide as to where sample cores should be taken.

A short while later a second vessel, "Robert D. Conrad", became available and was used for a reconnaissance survey of the world's deep sea sedimentary deposits.

Dr. Ewing then referred to some of the findings which had emerged from the extensive survey programme which had been carried out.

He said it was a most impressive fact that in spite of all the information available to guide in coring, no deep sea core had ever been taken that was older than Lower Cretaceous.

Another interesting finding was the existence in the Pacific Ocean of a very conspicuous belt of sediment cover, almost a kilometre thick, accurately parallel to and a little bit displaced from the equator.

This indicated a long period of great stability of the sea floor and was difficult to reconcile with theories of continental drift.

SAFETY NOTES

Electrical Hazard

The following extract is taken from a memorandum from one of our larger Divisions.

"A member of our staff was holding a comparatively new erasing machine in his right hand, and as he switched on the power point (metal boxed, and therefore earthed) with his left hand he received an electric shock. The machine was immediately withdrawn from use and sent to our Workshop Supervisor who found the machine was incorrectly wired. The accident was then reported to the suppliers of the machine."

You can't trust anything these days. Please have all electrical equipment checked for correct wiring before it is brought into service. It may be too late afterwards.

Still Waters

The Andrew Thom Newsletter No. 35 carries the following warning from the Swiss firm of W. Buchi:

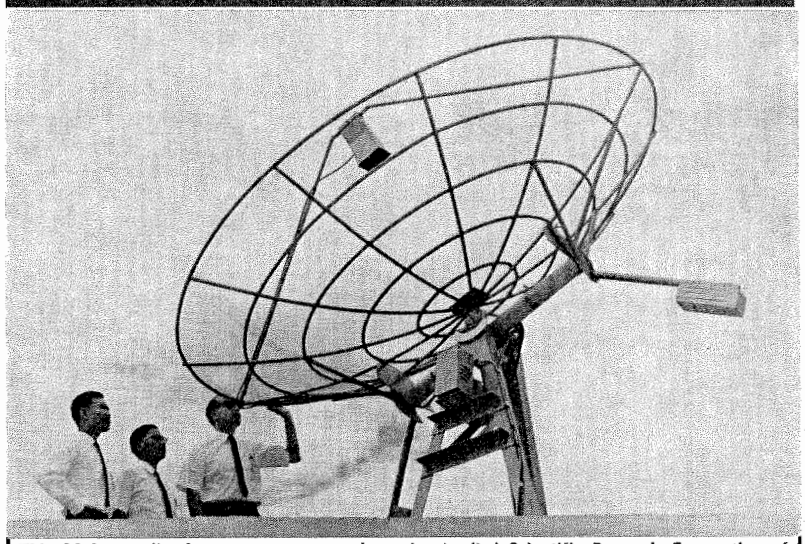
"Feeding of Minivapor and Fontavapor-61 with softened water. *Experience and test runs have shown that neither the Minivapor nor the Fontavapor-61 should be fed with softened or deionized water. Such water is more aggressive against glass and electrodes than ordinary tap water and it may be that explosions (resulting from reactions in such water and due to the development of chlorine) would destroy the apparatus.*

"Our Fontavapor-61 and Minivapor-Stills are designed to be fed with tap water and our clients must be warned not to feed these apparatus with demineralized or softened water."

J. W. Hallam, Safety Officer.

Mr. N. E. Sutton, Senior Animal Attendant at the Division of Nutritional Biochemistry retired last month after twenty-seven years service with the Division. Mr. Sutton is a keen euchre player and this sketch of him was drawn by the Division's draftsman, Mr. M. Childs.

RADIOTELESCOPE FOR THAILAND



This 10-foot radiotelescope was presented to the Applied Scientific Research Corporation of Thailand recently by the Australian Ambassador, Mr. L. Loomes. The telescope has been made available on indefinite loan from CSIRO through the Colombo Plan Technical Assistance Program and will be used for studying solar disturbances.

News In Brief

London Appointment

Mr. G. D. McLennan of Head Office left last month for London where he will take up the position of Scientific Liaison Officer. He will replace **Mr. J. I. Platt** who will return to the Division of Textile Physics.

Secretary

Following the recent retirement of **Dr. A. W. Peirce, Mr. D. W. Dewey** of the Division of Nutritional Biochemistry has been appointed Secretary of the South Australian State Committee.

Lecturer

Dr. R. J. McIntyre of the Division of Fisheries and Oceanography has been appointed Lecturer in Zoology at the University of New South Wales.

Book Review

During "Children's Book Week" last month, the Adelaide Advertiser asked a number of its young readers to review the award-winning books.

"The Golden Lamb", by Irene Gough (Heinemann in association with World's Work, Melbourne, $1.85), received the following review from six-years old Anna Medlin of Eden Hills, Adelaide.

"The lamb had a golden fleece. Murphy the stockman did not like youngsters. The golden lamb is a very rare lamb. It was in a flock of merinos who had never seen a golden lamb and would not play with him. Murphy wanted to kill the golden lamb because it was different. Julie the girl hid the golden lamb but it got away back into the flock. The CSIRO man took the lamb to live with other golden lambs. Julie was glad.

"I liked the story. It was most interesting."

Screen News

The Food Preservation Film Society will screen John Frankenheimer's film "Seven Days in May" at 7.30 p.m. on Tuesday, August 1, at Ryde. This film describes an attempt to overthrow the U.S. Government and stars Burt Lancaster, Kirk Douglas, and Frederick March.

The Forest Products Film Society will screen two Dutch films "Fiery Love" and "Silent Raid" at 8.00 p.m., Tuesday, August 22, at the Division's theatrette, South Melbourne.

The 314 Film Society will screen the British film "The L-Shaped Room", starring Leslie Caron, at 8.00 p.m. on Thursday, August 17, at Head Office.

Masters of Science

Mr. G. E. Melville of the Division of Plant Industry has been awarded the degree of M.Sc. by the University of Western Australia for his work on the extraction of organic sulphur compounds from the soil.

Mr. J. H. O'Keefe of the Division of Animal Genetics has been awarded the degree of M.Sc. by the University of New South Wales for his work on the isotopic hydrogen labelling of steroids and compounds of oestrogenic activity.

Mr. A. Sioumis of the Division of Applied Chemistry has been awarded the degree of M.Sc. by the University of Melbourne for his work on plant alkaloids.

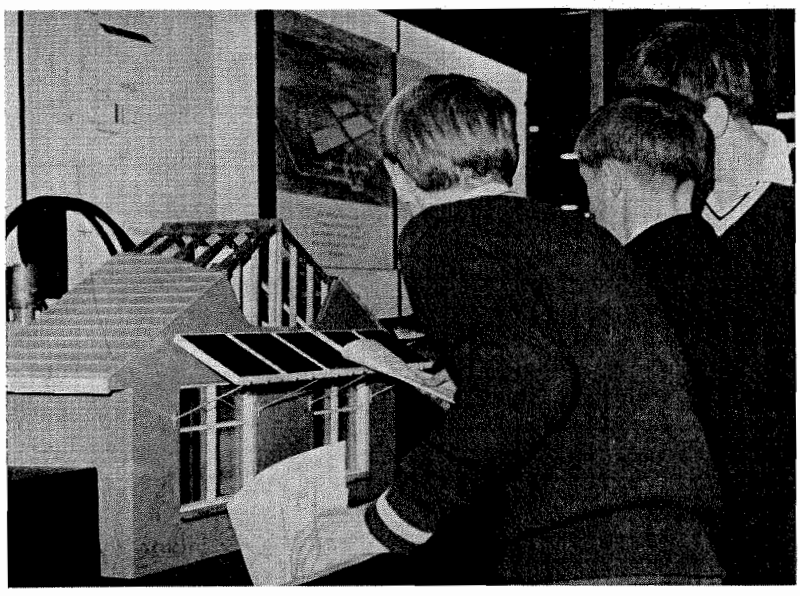
Exhibition

CSIRO was one of the main exhibitors in the "Science Exhibition" which was held in Melbourne from June 26 to July 1.

The exhibition, which was sponsored by the Science Teachers' Association of Victoria was attended by nearly 83,000 people, most of whom were Leaving and Matriculation science students.

The CSIRO stand occupied an area of 25 feet by 50 feet and featured displays by the Divisions of Applied Chemistry (bushfire research), Mechanical Engineering (utilization of solar energy), Meteorological Physics (measurement of ozone in the upper atmosphere), Protein Chemistry (leather research), and Textile Industry (textile research), and by the Ore Dressing Section (magnetic and electrostatic separation of beach sands).

Below: These schoolboys were intrigued by the Division of Mechanical Engineering display on solar heaters.



Adelaide Visit

On Friday, July 14, fifteen State and eight Federal Parliamentarians, together with eight members of the South Australian State Committee, visited the Adelaide laboratories of the Division of Soils and the Horticultural Research Section.

In the morning the visitors were told something of the research activities of the Horticultural Research Section.

They were also given talks on plant nematodes and on improving grape vine production through pruning and plant breeding.

Later in the morning they sampled kamaradin, a form of apricot pulp dried in thin sheets, which is being studied by the Section.

After lunch at the Division of Soils the visitors learnt about the Division's soil mapping activities and its research on water resources of shallow groundwater deposits, cobalt and manganese in the soil, and stimulation and inhibition of plants by soil microbes.

Above: Dr. M. G. Mullins (left) of the Horticultural Research Section discusses his work on regulating growth and development in the grape vine with Mr. G. O'H. Giles, M.H.R. (centre), and Mr. I. B. C. Wilson, M.H.R.

Below: Mr. P. J. Young (right) of the South Australian State Committee tries out a sample of kamaradin. His reactions are studied closely by Dr. J. V. Possingham, Officer-in-Charge of the Horticultural Research Section, and Miss Anne Potts.

APPOINTMENTS TO STAFF

Dr. J. A. Edgar has joined the Division of Applied Chemistry and will carry out research on pyrrolizidine alkaloids. Dr. Edgar graduated B.Sc. with honours from the University of Adelaide in 1962 and Ph.D. from the same university in 1964. He has spent the last three years at the University of Minnesota and the Massachusetts Institute of Technology.

Mr. B. N. CONDON

Mr. B. N. Condon has been appointed to the Division of Plant Industry where he will work on the development of electronic instruments for the Division. Since obtaining his Diploma of Radio Engineering from the University of New South Wales in 1963, Mr. Condon has been working at Pye Pty. Ltd.

Mr. P. Hannaford has been appointed to the Division of Chemical Physics where he will study the absorption of atomic vapours produced directly from solids. Mr. Hannaford graduated M.Sc. from the University of Melbourne in 1964. Since then he has been working for his Ph.D. at the University of Melbourne where he has been studying the use of Mossbauer spectroscopy to investigate different types of crystal defects.

Mrs. K. P. MacKinnon has been appointed to the Division of Mineral Chemistry where she will investigate new methods of mineral treatment. Mrs. MacKinnon graduated B.Sc. with honours from Monash University in 1964 and since then has been studying for her M.Sc. at the same University.

Mr. T. KAAR

Mr. T. Kaar has joined the Division of Fisheries and Oceanography to carry out research on population dynamics. Mr. Karr graduated B.Sc. with honours from the University of Sydney in 1963 and since then has been working with the Physics Division of the Australian Atomic Energy Commission.

Mr. T. R. North has joined the Building Operations and Economics Section of the Division of Building Research. After training as an engineer in Britain, Mr. North spent from 1930 to 1935 with a railway company in Brazil. He returned to Britain where he spent the next 17 years in heavy industry. Since coming to Australia in 1952 he has worked with the engineering firms of Constructors John Brown Pty. Ltd. and V.I.A. Ltd.

Mr. T. R. NORTH

Dr. M. Vendrell has been appointed to the Plant Physiology Unit of the Division of Food Preservation where he will work on the biochemistry of senescence in plant tissues. Dr. Vendrell obtained his D.Sc. from the University of Barcelona in 1964 and since then has been undertaking research on plant hormones at Yale University.

Mr. J. Walker has joined the Division of Tropical Pastures where he will study the ecology of woodlands and the factors concerned with the regeneration of woody species. Since graduating B.Sc. with honours from Queens University, Northern Ireland, in 1964, Mr. Walker has been working at the same University for his Ph.D.

Mr. B. G. WILSON

Mr. B. G. Wilson has been appointed to the Division of Building Research where he will work on the development of a system for computer-aided design and drafting of reinforced concrete structures. Mr. Wilson obtained his Diploma of Applied Physics from the Royal Melbourne Institute of Technology last year.

Mr. K. F. Wells has been appointed to the Division of Plant Industry where he will carry out ecological studies on the invasion of the pastoral areas of northern New South Wales by useless shrubs. A graduate of the Universities of Sydney and Oxford, Mr. Wells has spent the last two years at the University of California studying for his M.S.

SET FOR A BALL

The twenty-first annual ball for Melbourne Divisions and Sections will be held at the Royale Ballroom on Thursday, September 21. It will be the biggest and brightest yet with two bands, a sumptuous smorgasboard supper, and free champagne, and all this for the modest sum of $8.00 a double. To remind our readers of the event this happy quartet sprang out from behind a tree and posed for our camera. They are, from left to right, Faye Keam and Dorothy Thomas (Chemical Research Laboratories), Andrea Broad (Protein Chemistry) and Margaret Geraghty (Regional Administrative Office, Melb.).

Overseas Visits

Mr. R. V. Dunkle of the Division of Mechanical Engineering will attend the 12th International Congress of Refrigeration in Madrid later this month. He will also visit laboratories concerned with utilization of solar energy in Indonesia, India, Europe, Britain and North America before returning to Australia at the end of October.

Dr. S. D. Hamann, Chief of the Division of Applied Chemistry, will leave shortly on a five-week visit of research centres in New Zealand, the United States, Britain, Europe, Russia, India and Hong Kong. Dr. Hamann will also attend the 21st Congress of the International Union of Pure and Applied Chemistry in Prague next month.

Dr. W. E. Hillis of the Division of Forest Products leaves shortly on a three-month visit of Thailand, Israel, Europe, Britain and North America where he will study trends in forest products research and development. He will also attend an IUFRO Symposium on heartwood in Munich next month.

Mr. A. S. Inglis of the Division of Protein Chemistry will attend the International Congress of Biochemistry in Japan this month before flying to the United States where he will spend twelve months at the Brookhaven National Laboratory, Upton, New York, studying recent developments in techniques of amino acid determination.

Mr. M. W. Page of the Division of Forest Products left recently for South America where he will conduct a survey of the timber industry in Columbia, Ecuador, Peru and Chile for the Department of Trade. Mr. Page will also look at research centres and industrial plants in other South American countries and in Europe and the United States before returning to Australia in November.

Mr. I. M. Parsonson of the Division of Animal Health will leave shortly for the United States on a three-year divisional studentship to Cornell University. Mr. Parsonson will undertake research on pathology of the bovine reproductive tract.

Dr. A. L. G. Rees, Chairman of the Chemical Research Laboratories, leaves this month on a five-week visit of research centres in the United States, Britain, Europe and South America. He will also attend the 21st IUPAC Congress.

Dr. R. M. Smillie of the Division of Food Preservation will attend the International Congress of Biochemistry in Japan this month. He will also visit plant and physiology research laboratories in Japan, Britain, and North America before returning to Australia at the end of September.

L.S.D. FOR ALL

As a result of substantial investment in the CSIRO Co-operative Credit Society in recent weeks, the Society is now in a position where it would welcome applications for loans.

Such applications will be dealt with promptly and there should be little delay in granting loans.

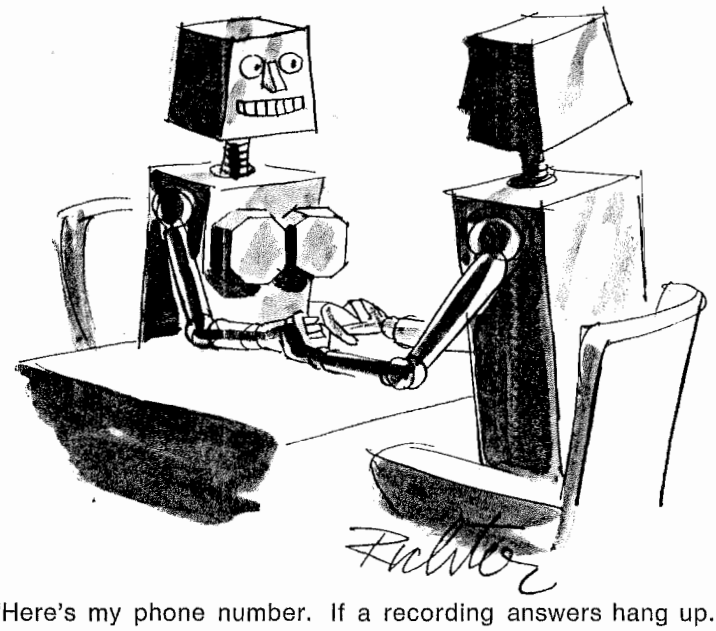
In the past few months a number of people have sent the Society large sums of money with requests that they be placed on deposit.

This has made it difficult for the Directors to plan the Society's financial affairs. The Directors would therefore appreciate it if anyone wishing to deposit a sum of $1,000 or more could let them know the amount in advance.

A "Request for Acceptance of Deposit" form should first be completed and forwarded, without the money, to Mr. J. Belkin, the Manager of the Society.

The request will then be reviewed in the light of the Society's current needs and the intending investor informed whether or not the Society can accept his deposit immediately.

This arrangement does not apply to those who deposit comparatively small amounts either fortnightly or at irregular intervals.



"Here's my phone number. If a recording answers hang up."

Courtesy "Saturday Review".

Printed by CSIRO, Melbourne

CO RESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 102, MELBOURNE, SEPTEMBER 1967

$46,363,400 FOR CSIRO

CSIRO will have a total budget for 1967-68 of $46,363,400 for capital and non-capital expenditure, of which $36,808,200 will be provided directly by the Government and $9,555,200 by Industry Committees and other contributors.

Treasury Funds

Of the amount of $36,808,200, provided under the Treasury appropriation, $31,700,000 is for salaries and general running expenses, $4,868,200 for capital expenditure and $240,000 for repairs to buildings.

The allocation for salaries and running expenses represents an increase of $2,788,797 over the actual expenditure for 1966-67.

Inescapable salary increases arising from increments, reclassifications, arbitration adjustments, and the recent "total wage" decision, will absorb $1,568,797 available for other purposes.

Of the latter amount $203,000 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 $569,000 to cover additional maintenance and $114,000 for additional travelling expenses.

Extra equipment allocations absorbed a further $165,000.

Having provided for the above increases, the Executive then decided to make available $203,000 for a number of projects which were started during the past two years and a further $61,000 to enable a new project on cotton spinning to be commenced.

Those projects started during 1965-66 and 1966-67 for which additional support has been approved are: biological control of insect pests ($30,000); pasture and animal research at Narayen cattle station, Queensland, ($24,000); extraction of minerals ($49,000); control of regrowth of shrubs and trees in summer rainfall areas ($10,000); tropical air-conditioning ($40,000); and developmental projects ($40,000).

The new budget includes provision for 201 new Treasury positions, including those required for the above activities.

Most of the new positions will be used to appoint supporting staff.

It was necessary to earmark 58 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 Departments of Works and Interior.

The first group will absorb $1,420,000. This will be spent mainly on developmental work at field stations ($420,000), scientific computing equipment ($234,500), the purchase of major items of equipment costing over $10,000 each ($623,500), and capital expenditure ($142,000) for the development of the new cattle station now being established near Mundubbera, Queensland, for the Division of Tropical Pastures.

Of the $3,258,000 provided for projects under the control of the Department of Works, $2,500,000 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 Chemical Engineering at an estimated cost of $1,400,000.

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 $6,314,210, comprising $3,325,210 for wool production research and $2,989,000 for wool textile research.

The wool production figure includes $2,226,183 for salaries, and $1,099,027 for other purposes, while the corresponding amounts for wool textile research are $1,722,668 and $1,266,332.

The wool textile estimates include provision for 15 new positions while there is a net reduction of 2 positions on the wool production side of the programme.

A new laboratory has been approved for the Agronomy Section of the Division of Plant Industry and $150,000 is included in the non-salary vote to cover the expenditure in the first year.

New buildings are also envisaged for each of the Wool Research Laboratories.

The Division of Protein Chemistry is planning extensions to the main laboratory building at Parkville and will submit details of the proposal to the Board later in the year.

Approval has been given for the expenditure of $140,000 during 1967-68 on building extensions for wool testing development at Ryde for the Division of Textile Physics.

Although funds have not yet been specifically approved for the wet processing laboratory, the Division of Textile Industry has been asked to prepare sketch plans for consideration by the Wool Board.

The Australian Meat Research Committee has agreed to provide a total sum of $906,100, comprising $528,940 for salaries, and $376,160 for other purposes.

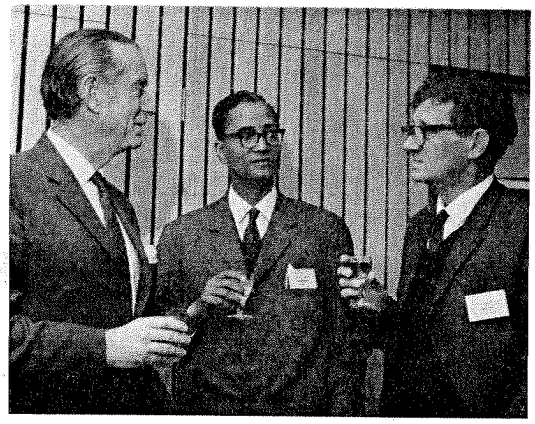
Because of a substantial reduction in income due to drought conditions, the Committee was obliged to restrict CSIRO's 1967-68 allocation to 90% of the approved figure for 1966-67.

This will have a detrimental effect on the research work. It has meant that inescapable salary increases 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 $261,519, $280,400 and $208,650, respectively, for research for their particular industries.

SUMMARY OF ESTIMATES OF EXPENDITURE FOR 1967-68

	Estimates 1967-68 $	Expenditure 1966-67 $	Increase or Decrease $
Under CSIRO control			
Salaries and running expenses	31,700,000	28,911,203	2,788,797
Buildings, works, plant and developmental items	1,420,000	1,295,147	124,853
Total under direct control of CSIRO	33,120,000	30,206,350	2,913,650
Under Department of Interior control			
Acquisition of sites and buildings	40,200	46,180	—5,980
Under Department of Works control			
Fittings and furniture	150,000	135,642	14,358
Repairs and maintenance of buildings	240,000	216,755	23,245
Buildings, works	3,258,000	2,248,514	1,009,486
Total CSIRO — Treasury Funds	36,808,200	32,853,441	3,954,759
Contributory Funds			
Investigations — salaries and general running expenses	8,789,300	8,157,514	631,786
Buildings, works, plant and developmental items	765,900	1,209,535	—443,635
Total funds CSIRO — all sources	46,363,400	42,220,490	4,142,910



Building Congress

Nearly 500 delegates, including several from overseas attended the Third Australian Building Research Congress at Monash University, Melbourne, from August 14 to August 17.

The Congress was organized by the Division of Building Research.

Among the overseas delegates were the Directors of the National Building Research Institutes of Britain, Canada, India, South Africa, and the United States.

A world view of problems facing the building industry over the remainder of the twentieth century was given by Dr. R. F. Legget, Director of the Division of Building Research, Canada.

He said that in the next thirty years the world's population would be more than doubled.

This meant that between today and the end of the century the world must be prepared to build as many houses and all ancillary services — schools, roads, hospitals, churches, and so on — as exist on the face of the earth today.

Man's basic needs were for food, shelter, and health. All were essential, he said.

But not enough was being done at the international level.

There was a World Health Organization and a Food and Agricultural Organization yet there was no comparable body to cater for man's need for shelter.

Building was the international Cinderella.

Our picture above shows Mr. L. Lewis, Associate Member of the Executive, with Professor Dinesh Mohan, Director of the Central Building Research Institute, India, and Dr. T. L. Webb, Director of the National Building Research Institute, South Africa.

Mr. Enos Mwakha (above) returned to Kenya last month after spending twelve months with the Division of Plant Industry, Canberra. Mr. Mwakha, who is head of the Botany Section of the National Agricultural Research Station, Kitale, was in Australia on a Special Commonwealth African Assistance Plan Fellowship. During his stay with the Division he has been working on plant introduction and pasture plant breeding with particular reference to Kenya white clover. Phytotron studies enabled Mr. Mwakha to find out the factors limiting seed production by this clover in different parts of Kenya and also helped him in the development of a stalked variety from which seed can be harvested more easily.

WATERFOWL IN AUSTRALIA

The declining waterfowl population of Australia is the concern of both hunter and naturalist. But no effective means can be taken to halt this decline without a full knowledge of the biology of the species concerned.

The publication of "Waterfowl in Australia" by Dr. H. J. Frith, Chief of the Division of Wildlife Research, is therefore particularly timely.

Probably the most comprehensive book yet written on any group of Australian birds, it gives a life history of each species with a detailed account of its appearance, distribution and habitat, nesting and breeding behaviour, and food.

These are preceded by more general sections in which different aspects of the group as a whole are considered and their characteristics seen as part of a broader picture.

Conservation methods are also discussed.

The book is lavishly illustrated with colour plates and many excellent photographs, as well as identification charts for birds in flight or on the water, maps showing the distribution of each species, sonograms of their calls, and other drawings and diagrams.

In his foreword, Mr. F. N. Ratcliffe, an Assistant Chief of the Division of Entomology, describes the book as "a compendium of first-hand information."

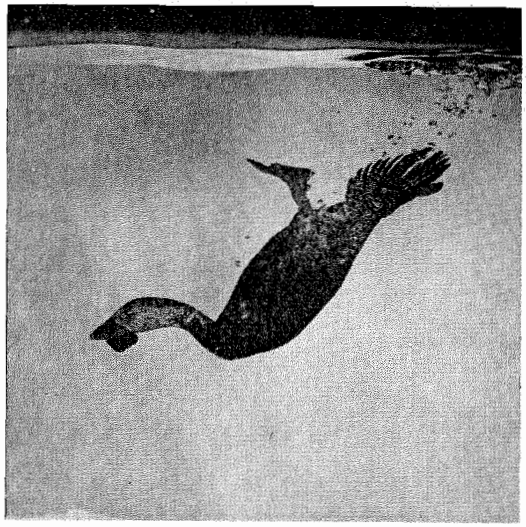
"In dealing with two or three species only has the author had to depend substantially on the data and observation of others.

"For the rest he has relied almost entirely on the results of his own field studies and those of his Divisional team-mates.

"As a result his writing has that special authority which comes only from an author's intimate personal acquaintance with his living subjects.

"With its added scientific solidity, I have no doubt at all that 'Waterfowl in Australia' will be hailed as a landmark and a classic in its field."

"Waterfowl in Australia," by H. J. Frith. 328 pages (Angus and Robertson, Sydney, $10.00).



Above: This photograph of a male musk duck diving was taken by Division of Wildlife Research photographer, Ederic Slater. It is one of the many excellent illustrations in Dr. Frith's book.

POSITIONS VACANT

The following vacancies for professional appointments are current:

PHYSICAL CHEMIST/CHEMIST/BIOCHEMIST (RS/SRS) — Division of Food Preservation — Meat Research Laboratory — 305/104 (22/9/67).

RESEARCH SCIENTIST (SRS) — CHEMIST/PHYSICIST — Division of Chemical Physics — 582/27 (22/9/67).

RESEARCH SCIENTIST (SRS) — HYDROLOGIST OR WATER SCIENCE ENGINEER — Irrigation Research Laboratory — 500/205 (22/9/67).

RESEARCH SCIENTIST (SRS) — Division of Mathematical Statistics — W.A. Laboratories — 448/5 (22/9/67).

DIVISIONAL POSTGRADUATE STUDENTSHIP IN BIOCHEMISTRY — Division of Entomology — 180/427 (22/9/67).

POSTDOCTORAL FELLOWSHIP IN BIOCHEMISTRY — Division of Entomology — 180/428 (22/9/67).

EDITOR (SSO 1, 2 or 3) — Editorial and Publications — 112/52 (25/9/67).

RESEARCH SCIENTISTS — Computing Research Section — 900/81 (1/10/67).

Death of Lady McMaster

Lady Muriel McMaster, the widow of the late Sir Frederick McMaster of Dalkeith, Cassilis, New South Wales, died on the 31st July.

The McMaster family have been generous supporters of CSIRO.

In 1929, Sir Frederick gave $40,000 for a laboratory to be used by CSIRO for work on the problems confronting Australian pastoralists.

The laboratory was built in the grounds of the University of Sydney and was opened in November 1931. It was named the McMaster Laboratory.

During the Second World War Sir Frederick's only son, Captain Ian McMaster, M.C., died of wounds at El Alamein. He bequeathed $80,000 for the furtherance of the work of the Laboratory.

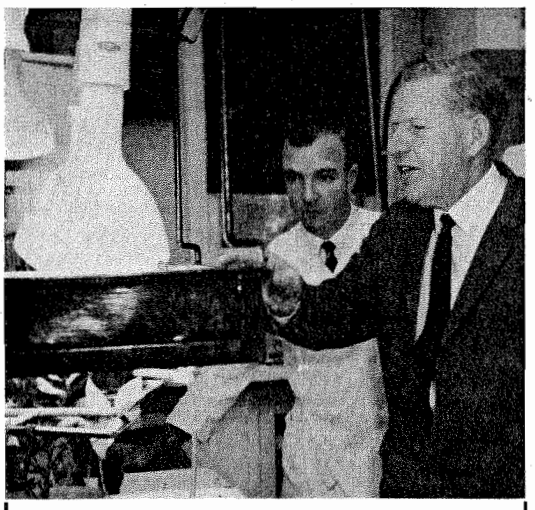
Just before his own death in November, 1954, Sir Frederick gave a further $105,600 for the erection of a wing to the McMaster Laboratory in memory of his son.

This wing, known as the Ian McMaster Wing, was opened in November, 1956.

In the early days of the Laboratory, Sir Frederick made part of his own property at Hinchenbrook available for experimental work.

Later, when CSIRO purchased a property at Badgery's Creek it was named the F. D. McMaster Field Station.

The McMaster family has also contributed generously to other projects, such as the M. C. Franklin Meat Research Laboratory, Camden, now part of the University of Sydney's Faculty of Veterinary Science.



Sir Frederick Bawden, F.R.S., Director of Rothamsted Experimental Station, Britain, attended the Congress of the International Association of Agricultural Economists in Sydney last month. Before the Congress he visited CSIRO laboratories in Perth, Adelaide, Merbein, Melbourne, Canberra, Sydney and Brisbane. He also visited universities and State Departments of Agriculture. Our picture shows Sir Frederick (right) at the Horticultural Research Section's research station at Merbein with Dr. P. Kriedemann.

New Stamp For Congress

This month, the Australian Post Office will issue a special 4c postage stamp to mark the occasion of the Fifth World Congress of Gynaecology and Obstetrics which will be held at the University of Sydney from September 23 to September 30.

The stamp, which will be on sale for two weeks, was designed by Mr. R. Ingpen of Head Office.

Black circles on the woman on the left indicate the parts of the body normally affected by gynaecological diseases, while white circles on the woman on the right indicate the parts involved in pregnancy.

Between them in black is the symbol for female. On it is superimposed the same symbol in white indicating the desire of medical science for good health to overcome the bad.

The stamp is being printed in sheets of 100 by the multicolor photogravure process at the Note Printing Branch, Reserve Bank of Australia, Melbourne, in horizontal format and large commemorative size (37.5 mm x 25 mm) including perforations.

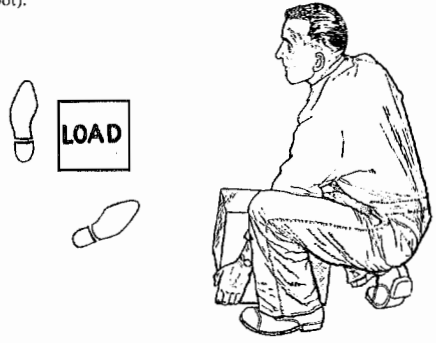
SAFETY NOTES

Lift the right Way

When lifting loads, many people forget that their leg and thigh muscles are stronger than those of the back and abdomen; the results are strained backs and abdominal muscles.

The Division of Occupational Health of the New South Wales Department of Public Health gives the following guide to correct lifting:

Correct foot positions. Place one foot behind the load (rear foot) and the other beside the load about 15 inches in advance pointing in the direction in which the load is to be moved. Left or right whichever is the preference (advanced foot).



Maintain straight back. In order to lower the body to reach the load and maintain a straight back the legs must be relaxed, the advanced leg bent to about 90 degrees with the foot flat on the ground. This will bring you within firm grip of the load with arms straight.

Proper hold. Bear down on the nearest corner of the load. This will bring the opposite corner off the ground and allow your hand to go beneath the load. Use full palmar grip.

Keep head erect with chin close in. This will assist in stabilising the straight back.

Keep arms close into the body and inside the legs.

Use body weight. Start the lift by thrust of the legs (remember to maintain the factors already mentioned). Move forward towards the load, and by keeping the arms straight the load will remain close to the body. The body is now moving upward and forward. The legs having initiated the move will now continue to straighten and lift body and load. The forward movement of the body and the load will combine to make the lift so much easier.

By keeping the arms relaxed straight against the body the movement of the legs in walking forward will help to propel the load.

When the table, bench or stack is reached the leg will help to lift the load to the required level.

The basic factors described can be applied to all lifting jobs whether they are boxes, sacks, drums or machine parts.

Remember correct lifting prevents fatigue and injury to back and abdominal muscles.

A strained back can be with you for a lifetime and nothing will compensate for that.

J. W. Hallam, Safety Officer.

News In Brief

Professor

Dr. R. O. Slatyer, Assistant Chief of the Division of Land Research, has been appointed to one of the foundation chairs of biology in the Australian National University's Research School of Biological Sciences. He will take up his new post next February.

Double Honour

Dr. E. M. Hutton, Assistant Chief of the Division of Tropical Pastures, has been awarded the Farrer Memorial Medal for 1968 for his contributions to Australian agriculture through the breeding of improved varieties of tropical grasses and legumes. Dr. Hutton has also been made a Fellow of the Australian Institute of Agricultural Science for his plant breeding work and for his earlier research on diseases of potatoes and tomatoes.

Fellow

Mr. W. Hartley, Australian Scientific Attaché in Washington, has been made a Fellow of the Australian Institute of Agricultural Science for his work in plant introduction. Mr. Hartley has introduced many important pasture legumes and grasses into Australia. He has led expeditions in tropical America in the search for new plants and has sent other expeditions to the Mediterranean and to South America.

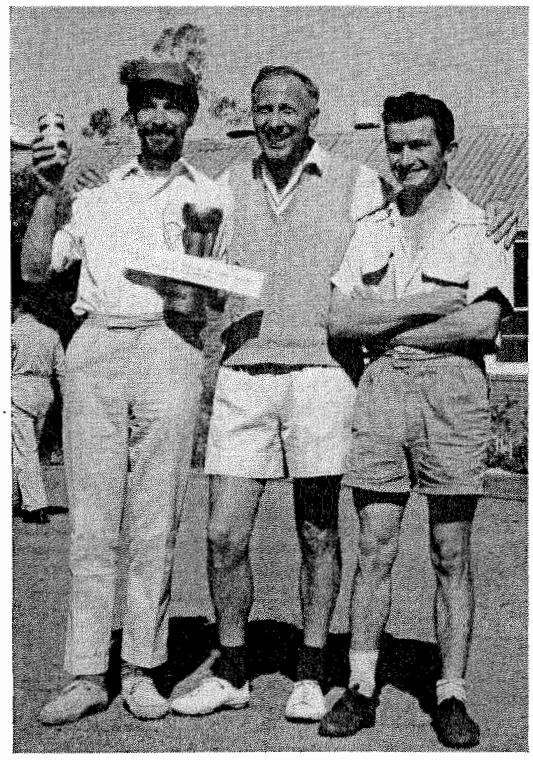
Doctorate

Dr. L. M. Clarebrough of the Division of Tribophysics has been awarded the degree of Doctor of Science (Physical Metallurgy and Science of Materials) by the University of Birmingham.

Fitness Fanatics

Last month some thirty members of the staff of the Irrigation Research Laboratory held a three mile walk from the centre of Griffith to the Laboratory's front gate, as part of National Health Week celebrations.

The winners are shown below. They are, from left to right, Dr. G. Moss (29 mins. 42 sec.), Mr. A. Low (27 mins. 14 sec.) and Mr. M. Lord (28 mins. 14 sec.).



Opening Ceremony

The Minister for Education and Science, **Senator J. G. Gorton,** will commission the Radioheliograph of the Division of Radiophysics and open the Solar Observatory of the Division of Physics at Culgoora, New South Wales, on Friday, 22nd September.

Masters of Science

Mrs. J. P. Loke of the Wheat Research Unit has been awarded an M.Sc. by the University of Sydney for her work on alkaline phosphatase and protein metabolism in *Escherichia coli*.

Mr. K. D. Woodyer of the Division of Land Research has been awarded an M.Sc. by the University of New South Wales for his work on the frequency of bankfull flow.

Clunies-Ross Chair

A new Chair of Education at Monash University, Melbourne, is to be known as "The Ian Clunies-Ross Chair of Education" after **Sir Ian Clunies-Ross,** Chairman of CSIRO from 1949 to 1959.

It will be occupied by Dr. P. Fensham who has a particular interest in the methods of teaching science in schools and universities.

Land Evaluation Symposium

A symposium on land evaluation has been organized by CSIRO in co-operation with UNESCO and will be held in Canberra from August 26 to 31, 1968.

Emphasis will be directed at the rapid evaluation of large areas of land and contributions on the principles and methods of land research are being sought.

Abstracts are required by the end of this month. Further information may be obtained from **Mr. G. A. Stewart,** Chief, Division of Land Research, Canberra.

Electron Microscopy Conference

A Conference on Electron Microscopy, sponsored by the Australian Academy of Science, will be held in Canberra from 19 to 22 February, 1968. The scope will include both biological and physical applications of electron microscopy and will be the first gathering in Australia of research workers who use the electron microscope.

Further information may be obtained from **Dr. D. J. Goodchild,** Division of Plant Industry, Canberra.

Washington Job

Any young stenographer planning a working holiday in the United States may be interested in a vacancy in the Office of the Australian Scientific Attaché in Washington.

Applicants should be able to write shorthand at 100 words a minute and type at 60 words a minute. The salary is $U.S.-4,776.

Fares to and from Washington will be the responsibility of the individual and not the Commonwealth.

Mr. J. R. Warwick at Head Office would be pleased to hear from any CSIRO staff or friends of staff who may be interested in this position.

Freudian Slip

"At the invitation of CSIRO, Dr. Corfield will spend a few days at the Division of Animal Psychology at Parramatta, N.S.W."

Financial Review.

Visitor

Professor N. J. Shaulis of Cornell University is spending nine months with the Horticultural Research Section under an Australian - American Educational Foundation Scholarship.

Most of his time will be spent at the Section's Field Station at Merbein.

Professor N. J. SHAULIS

Professor Shaulis will investigate vineyard layout and new methods of training and pruning of vines which will increase grape production and allow the crop to be harvested mechanically.

Canberra Ball

The annual ball for Canberra Divisions will be held in the Embassy Room of the Canberra Rex Hotel on Friday, 15th September, commencing at 8.00 p.m.

A buffet supper will be served during the evening and the Hotel's liquor licence has been extended to 2.00 a.m. Two bands will provide the music.

Tickets can be obtained from **J. Murphy** and **Margot Andersen** (Entomology), **Pamela Rumble** (Plant Industry), **G. See** (Site Services), **Celia Hillman** (Land Research), **J. Forshaw** (Wildlife), **Val Rosell** (Computing), **P. O'Brien** (Regional Administrative Office), and **Jennifer Gregory** (Soils).

Melbourne Ball

The twenty-first annual ball for Melbourne Divisions will be held at the Royale Ballroom on Thursday, September 21. There will be two bands, a smorgasbord supper, and free champagne. Tickets are $8.00 a double.

Screen News

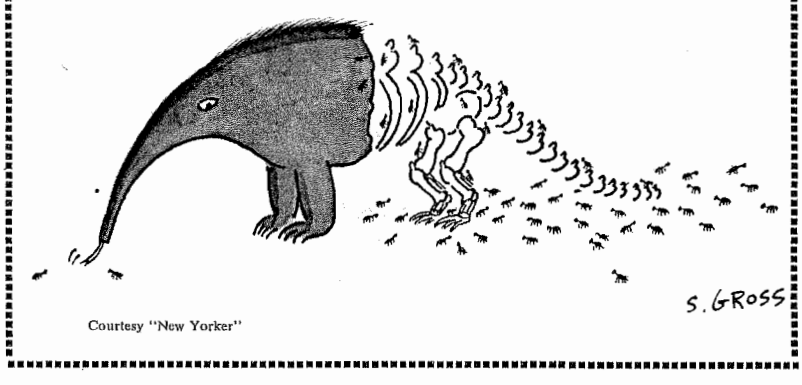
The Food Preservation Film Society will screen the film version of "Confessions of Felix Krull", the Pulitzer Prize satire by Thomas Mann, at 7.30 p.m. on Tuesday, September 26 at Ryde.

The Forest Products Film Society will show "Lord of the Flies" at 8.00 p.m. on Tuesday, September 19, in the Division's theatrette. It is based on William Golding's novel of the same title. There will also be a film about New Guinea.

The Annual General Meeting of the 314 Film Society will be held at Head Office on Thursday, September 14, at 8.00 p.m. It will be followed by a screening of "Our Man in Havana" starring Alec Guinness.

A SKELETON IN THE CROP

"A Skeleton in the Crop", the Film Unit's latest production, had its premiere in Melbourne last month. The film, which is in colour and lasts for 32 minutes, was made as an experimental film for television. It traces the spread of skeleton weed since its introduction to Australia more than sixty years ago and shows how scientists from CSIRO, State Departments of Agriculture, and other State Weed Control Authorities have worked together in an attempt to combat this problem. Our picture above is taken from the opening sequence of the film which shows horses being mustered in the Riverina during the great drought of 1914-15. Skeleton weed is thought to have been introduced accidentally into the Riverina during the drought in fodder imported from the United States.



Courtesy "New Yorker"

APPOINTMENTS TO STAFF

Mr. A. Ceresa has been appointed to the Irrigation Research Laboratory at Griffith where he will work on the application of automatic data processing to agricultural research programmes. Mr. Ceresa

Mr. A. CERESA

obtained his Higher National Certificate in Electrical Engineering from Southall Technical College, Britain, in 1963 and was elected to graduate membership of the Institution of Electrical Engineers and the Institution of Electronic and Radio Engineers in 1956. He has spent the last seven years as an engineer with Elliott-Automation.

Dr. C. T. Forwood has been appointed to a fellowship in metal physics with the Division of Tribophysics to study defects in metal crystals. Dr. Forwood graduated B.Sc. with honours from the University of Bristol in 1961 and Ph.D. from the same university in 1964. He has spent the last three years at the School of Physics, University of Warwick.

Mr. P. L. Larkins has joined the Division of Chemical Physics where he will carry out research on atomic absorption and resonance spectroscopy. Mr. Larkins obtained his

Mr. P. L. LARKINS

Diploma of Applied Chemistry from the Royal Melbourne Institute of Technology in 1960 and for the last seven years has been working with Australian Synthetic Rubber Co. Ltd.

Dr. K. O. L. F. Jayaweera has joined the Division of Radiophysics where he will carry out research on cloud

Dr. K. O. L. F. JAYAWEERA

physics. Dr. Jayaweera graduated B.Sc. with honours from the University of Ceylon in 1960. He obtained his Ph.D. from the University of London in 1965 and since then has been lecturing in physics at the University of Ceylon.

Mr. W. G. Keating has been appointed to the Division of Forest Products where he will help in making available information to the industry and others on the Division's work in timber engineering. Mr. Keating obtained his Diploma of Applied Science from the Royal Melbourne Institute of

Mr. W. G. KEATING

Technology in 1954, and his Fellowship Diploma of Applied Physics from the Institute in 1967. He has been a timber technologist with the P.M.G. for the last 10 years.

INTRODUCING MISS CSIRO

Meet twenty-year-old Elizabeth Hoare who will represent CSIRO in the Miss Australia Quest. Elizabeth is Secretary to Dr. J. Arnold of the Division of Plant Industry and works at the Western Australian Laboratories, Perth. Her interests include basketball, squash, debating, social welfare work, reading and cooking. The purpose of the contest is to raise money for the Australian Cerebral Palsy Association which helps spastics. Elizabeth would like to hear from the Secretaries of any CSIRO Social Committees or from anyone else in CSIRO who is interested in supporting her in her good work. Fund raising finishes at the end of the month, so please hurry.

Overseas Visits

Mr. J. Czulak and Mr. N. H. Freeman of the Division of Dairy Research are visiting New Zealand in connection with the installation of equipment for the mechanized manufacture of cheddar cheese. They will return later this month.

Mr. E. L. Deacon of the Division of Meteorological Physics left last month for the United States where he will take up a temporary position as visiting Professor in the Department of Meteorology, University of Texas. Mr. Deacon will be away for ten months.

Dr. K. A. Ferguson, Assistant Chief of the Division of Animal Physiology, left recently for Canada where he will spend twelve months at the Department of Medicine, McGill University, Montreal.

Mr. C. A. Gladman of the Division of Applied Physics left last month on a two-month visit of Britain, Europe, and the United States where he will study current developments in applied mechanics. Mr. Gladman will also take part in an international congress on manufacturing technology in the United States.

Dr. J. D. G. Hamilton of the Division of Building Research is spending three weeks visiting research centres in the United States on his way to Spain where he will spend eight months at the University of Madrid.

Dr. B. S. Harrap of the Division of Protein Chemistry left recently on a five week visit of leather research centres in France, Germany, India, Britain and the United States. He will also attend two leather research conferences in Switzerland.

Mr. G. D. Loftus Hills, Chief of the Division of Dairy Research, left recently for Israel where he will attend a meeting of the International Dairy Federation. He will return later this month.

Dr. A. G. Turnbull of the Division of Mineral Chemistry left recently for Vienna where he will attend a symposium on the thermodynamics of nuclear materials. He will also attend a symposium in West Germany and will visit research centres in Sweden, Britain and the United States before returning to Australia in mid-October.

Dr. A. L. C. Wallace of the Division of Animal Physiology left recently for the United States where he will spend twelve months at the Department of Biochemistry, Emory University, Atlanta.

Mr. L. G. Wilson, Secretary (Administration), will leave for Tokyo later this month where he will attend a meeting of the International Federation of Documentation. He will also attend a UNESCO meeting on documentation in Paris and will visit the Scientific Liaison Offices in London and Washington before returning in mid-October.

Dr. R. C. Henrikson has been appointed to the Division of Animal Physiology as an electron microscopist. Dr. Henrikson graduated B.S. from the University of Massachusetts in 1959 and M.S. from Bow University, Rhode Island, in 1962. He obtained his Ph.D. from Boston University last year and since then has been a research instructor in dermatology at the University's School of Medicine.

Dr. G. Shearing has been appointed to the Computing Research Section where he will carry out research on picture scanning and recognition. Dr. Shearing graduated B.Sc. with honours from the University of Manchester in 1957 and Ph.D. from the same university in 1960. Since 1963 he has been a Lecturer in the University's Mathematics Department.

Dr. G. SHEARING

Dr. Margaret Sheridan has been appointed to a Post-Doctoral Fellowship in surface chemistry with the Division of Tribophysics. Dr. Sheridan

Dr. MARGARET SHERIDAN

graduated B.Sc. with honours from the University of Glasgow in 1963. She recently obtained her Ph.D. from the same university for work on adsorption on evaporated metal films.

"Oh dear! It's from your old university. The classes from '32 through '36 are being recalled, owing to faculty incompetence during that period."

Courtesy "Saturday Review"

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 103, MELBOURNE, OCTOBER 1967

CULGOORA SOLAR OBSERVATORY OPENED

On Friday, 22nd September, the Minister for Education and Science, Senator J. G. Gorton, opened the CSIRO Solar Observatory at Culgoora in northern New South Wales and commissioned the Observatory's radioheliograph, a unique instrument for obtaining continuous "radio-pictures" of the Sun.

The Observatory, which occupies a 3,000 acre site halfway between Narrabri and Wee Waa, is operated by the Divisions of Radiophysics and Physics.

Construction of the radioheliograph was made possible by a grant of $563,000 from the Ford Foundation of America. In addition, some $513,000 has been contributed so far by the Commonwealth Government for the capital cost of works associated with the radioheliograph and the Observatory.

The Observatory, which is the only one in the world with facilities at the one site for making high resolution radio and optical observations of the Sun, will enable scientists to see the Sun in much greater detail than before.

This should lead to a better understanding of the processes taking place on the Sun and of phenomena such as sunspots and solar flares.

The largest instrument at the Observatory is the radioheliograph, a huge ring of 96 dish-shaped radio aerials, each 45 feet across, and equally spaced around the perimeter of a circle nearly 2 miles in diameter.

Each of the radioheliograph's aerials is automatically steered to follow the Sun.

Radio signals from the Sun are picked up by the aerials and fed to a central observatory.

Here the signals are passed into a complex of electronic circuits and computers and finally displayed as detailed pictures on a television screen at a rate of one every second.

The pictures obtained are the sort of thing we might see if our eyes were sensitive to radio waves with a frequency of 80 Megacycles per second.

Before the radioheliograph came into operation the fastest radio picture of the Sun took about 45 minutes to compile.

The radioheliograph was conceived and designed by Dr. J. P. Wild and his colleagues of the Division of Radiophysics.

All of the electronic equipment was developed and constructed by the Division.

Near the centre of the ring of radioheliograph aerials are the optical telescopes operated by the Division of Physics.

The main optical instrument is a 12-inch high-resolution telescope capable of seeing details of the Sun's surface as small as 450 miles in diameter.

It is mounted on a 50 foot tower to avoid turbulent currents of heated air which interfere with the solar image and prevent the observation of fine detail.

The telescope dispenses with the conventional dome, which itself can be a source of damaging thermal currents.

Instead, it is provided with a canopy which can be fully retracted into the supporting structure when the telescope is being used.

The telescope itself is of open lattice-work construction so that it remains in full thermal equilibrium with the surrounding air.

As a final aid to thermal control, all parts of the telescope directly exposed to the Sun's rays are cooled by an elaborate air suction system.

In operation, the telescope is completely automatic; even the decision to take an exposure at a given instant is made by an electronic device that continuously monitors the image quality.

The telescope's unique design was the conception of Dr. R. J. Bray and Mr R. E. Loughhead and their colleagues of the Division of Physics.

All construction, with the exception of the main 12-inch lens, has been the responsibility either of the Division's own workshop or of outside contractors in Sydney and Newcastle.

In addition to the 12-inch telescope the Division of Physics operates a smaller telescope provided by the United States Environment Science Services Administration for recording flares and other solar disturbances.

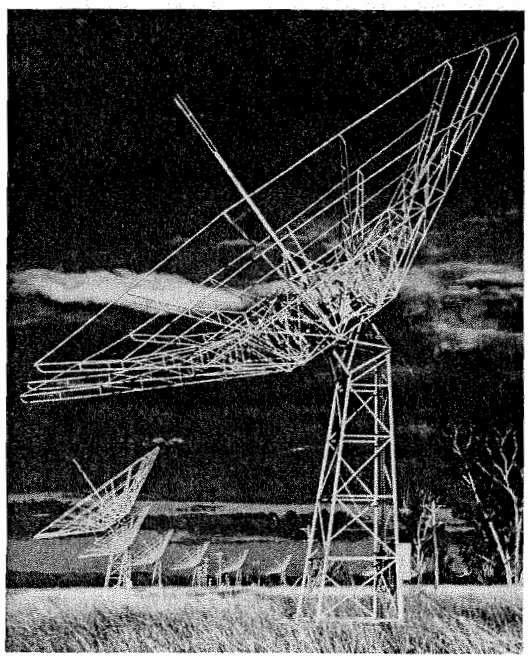
This is part of an international programme and reports on solar activity are sent regularly to World Data Centres in France, Russia, and the United States.

Next year a second tower housing two telescope mountings is to be erected at the Observatory.

One mounting will carry several 5-inch telescopes for routine observations. The other will carry an instrument of radically new design called a "cinemagnetograph".

This instrument, which is being developed by the Division of Physics, will enable scientists to record the magnetic fields over extended regions of the Sun at time intervals as short as 30 seconds.

The National Aeronautics and Space Administration of the United States has made an initial grant of $88,000 towards its development.



Above: Section of the circle of radioheliograph aerials. They are uniformly spaced about 100 yards apart around the perimeter of a circle which measures almost exactly six miles.

POSITIONS VACANT

The following vacancies for professional appointments are current:

EXPERIMENTAL OFFICER — Division of Building Research — 390/379 (9/10/67).
RESEARCH SCIENTIST — Division of Building Research — 390/378 (9/10/67).
EXPERIMENTAL OFFICER — Division of Applied Physics — 750/395 (13/10/67)
EXPERIMENTAL OFFICER — Irrigation Research Laboratory — 500/211 (13/10/67).
SOIL CHEMIST (EO1/2) — Division of Soils — 274/7 (13/10/67).
MOLECULAR GENETICIST (RS/SRS) — Division of Animal Genetics — 675/199 (13/10/67).
MINERALOGIST/GEOCHEMIST — Division of Applied Mineralogy — 604/51 (13/10/67).
SCIENTIFIC SERVICES OFFICER — Division of Protein Chemistry — 462/292 (20/10/67).
DIVISIONAL POSTGRADUATE OVERSEAS STUDENTSHIPS — Division of Textile Industry — 464/422 (20/10/67).
LIBRARIAN — Central Library — 118/166 (20/10/67).
POSTDOCTORAL FELLOWSHIP (RS) — Division of Protein Chemistry — Collagen Chemistry — 462/290 (27/10/67).
FELLOWSHIP IN TIMBER RESEARCH — Division of Forest Products — 290/818 (10/11/67).

NEW FOOD CHIEF

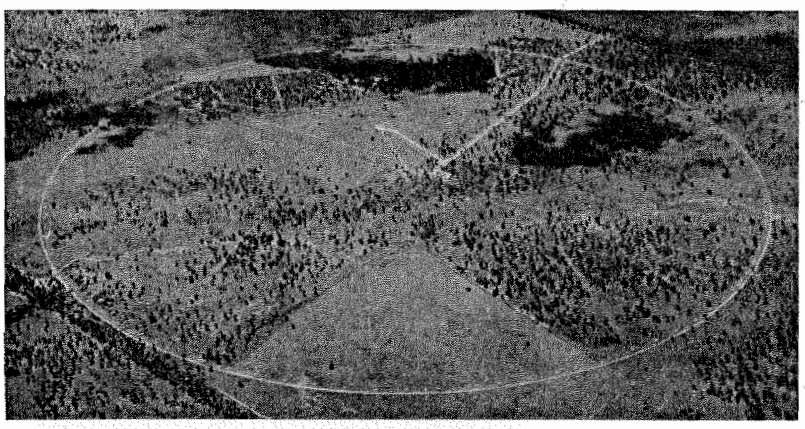
Mr. M. V. Tracey, Leader of the Wheat Research Unit, has been appointed Chief of the Division of Food Preservation. He will succeed Dr. J. R. Vickery, who retired from CSIRO last July.

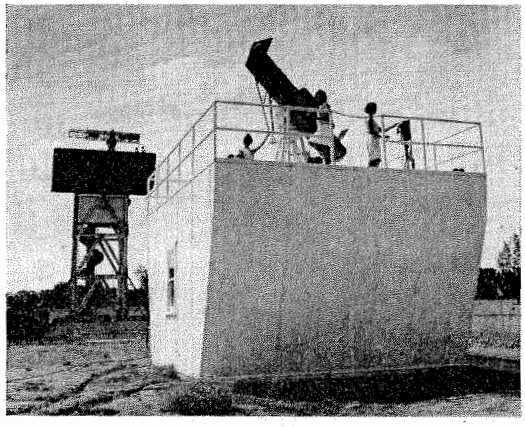
After graduating M.A. from the University of Cambridge, Mr. Tracey joined the Biochemistry Department at Rothamsted Experimental Station, Britain, in 1945. He was awarded a Royal Society and Nuffield Foundation Commonwealth Bursary in 1955 and spent a year with the Division of Protein Chemistry. In 1958 he returned to Australia to take up an appointment with CSIRO as Leader of the Wheat Research Unit.

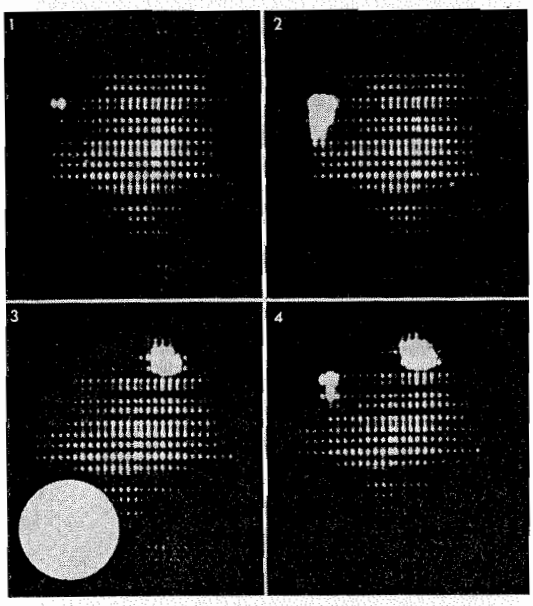
Mr. Tracey was admitted to Fellowship of the Institute of Biology last year. He will leave later this month on a short visit to Britain where he has accepted an invitation to deliver a paper to the Royal Society on the importance of water structure in the plant economy.

Mr. Tracey hopes to take up his new appointment at the end of November.

Dr. K. W. Zimmerman, Officer-in-Charge of the Microanalytical Laboratory operated jointly by the Division of Applied Chemistry and the University of Melbourne, retired last month. The Laboratory, which was established by Dr. Zimmerman in 1950, now performs more than 16,000 analyses a year. At a farewell ceremony held in his honour recently, Dr. Zimmerman was presented with a desk set from his friends and associates in CSIRO, universities and industry. Dr. Zimmerman is shown above (left) admiring the gift with Miss Josephine Placek of the Laboratory and Dr. J. R. Price of the Executive, who made the presentation.







CULGOORA

Top left: Aerial view of the radioheliograph site. The road which encircles the aerial array can be clearly seen; the individual dishes are just inside it.

Top right: The solar flare patrol telescope (foreground) and the 12-inch telescope.

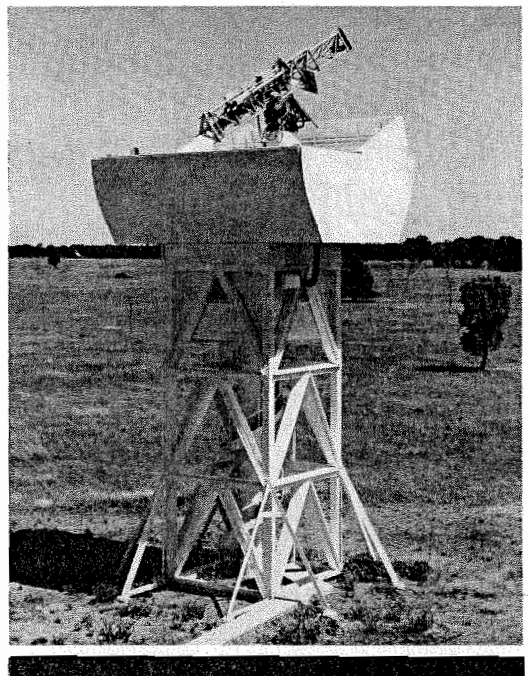
Left, second from top: The first pictures of solar bursts obtained with the radioheliograph. They were taken during a brief period of weak and isolated activity on the Sun on 2nd September. The size of the visible disk of the Sun is shown by the white disk inset at the bottom. (1) A burst which occurred near the Sun's limb a little after midday shows up as a bright spot against the much fainter background of radio emission from the corona. (2) Thirteen seconds later another burst of higher intensity breaks out at the same region. (3) Three and a half minutes later a new disturbance occurs in an entirely different area, again near the Sun's limb. (4) A minute later more bursts break out, this time almost simultaneously at both regions.

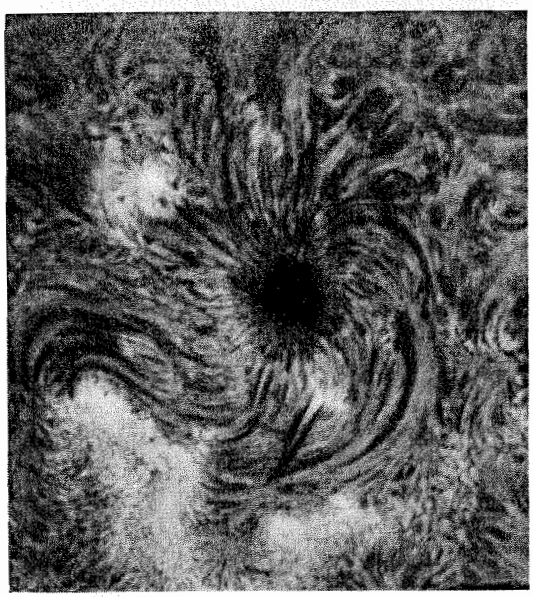
Right, second from top: The 12-inch telescope on its 50-ft. tower.

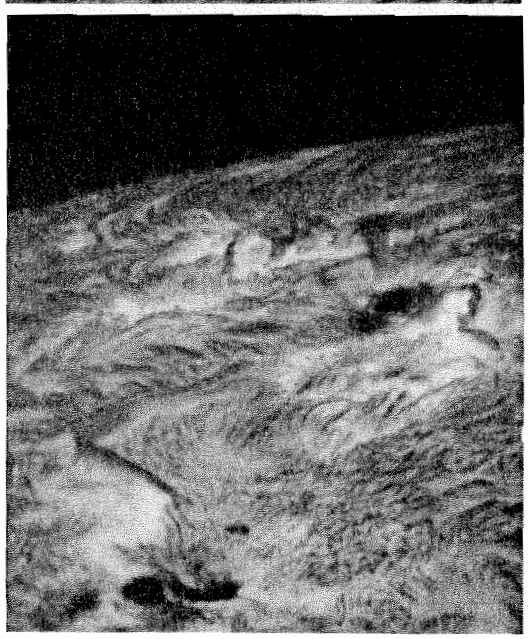
Left, second from bottom: This photograph of a sunspot taken with the 12-inch telescope gives some idea of the fine detail which can be obtained. The dark core of the sunspot is about 11,000 miles wide.

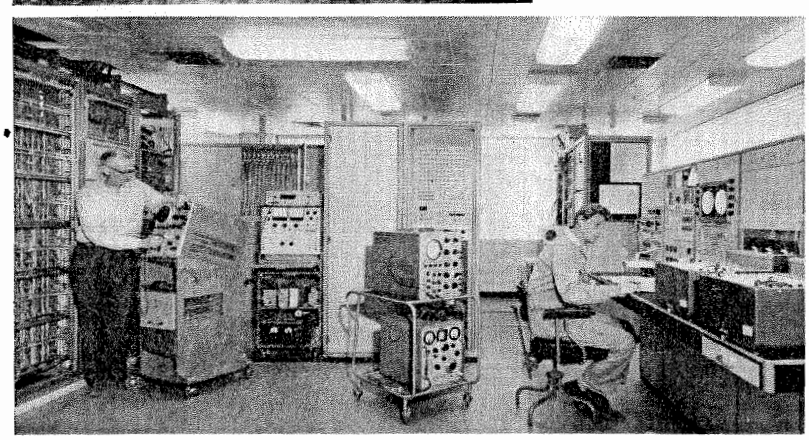
Right, second from bottom, and bottom right: The Sun's surface as seen with the 12-inch telescope.

Bottom left: Nerve centre for the radioheliograph is the control room in the observatory building.









News In Brief

New Divisions

Four CSIRO Sections have been given the status of Divisions.

The new Divisions are the Division of Computing Research (Chief, **Dr. G. N. Lance**), the Division of Horticultural Research (Chief, **Dr. J. V. Possingham**), the Division of Irrigation Research (Chief, **Mr. E. R. Hoare**), and the Division of Soil Mechanics (Chief, **Dr. G. D. Aitchison**).

This brings the total number of CSIRO Divisions to thirty-four.

President Elect

Dr. A. L. G. Rees, Chairman of the Chemical Research Laboratories has been elected Vice-President and President

Dr. A. L. G. REES

Elect of the International Union of Pure and Applied Chemistry. He is the first Australian to be elected to this post.

Meyer Medal

Mr W. Hartley, Scientific Attache to the Australian Embassy, Washington, has been awarded the Frank N. Meyer Memorial Medal of the American Genetic Association for his work in plant introduction.

Some 26 Medals have been awarded since it was established in 1920 in memory of

Mr. W. HARTLEY

Mr. F. N. Meyer, Agricultural Explorer of the Office of Foreign Seed and Plant Introduction of the U.S. Department of Agriculture.

Mr Hartley is the first non-American to receive the award in the last twenty years.

Fellowship

Miss Jean Conochie of the Central Library has been awarded a Fellowship of the Library Association of Australia for her distinguished personal contribution to the practice of librarianship in Australia.

Last month the Governor-General, Lord Casey, paid an official visit to Geelong and spent a morning at the laboratories of the Division of Textile Industry seeing something of the Division's research. Lord Casey, a former Member of the CSIRO Executive, is seen here with the Chief of the Division, Dr. M. Lipson, examining rolls of experimental cloth.

Board Member

Mr L. Lewis, Associate Member of the Executive, has been appointed a part-time member of the newly formed Australian Industrial Research and Development Grants Board.

Master of Science

Mr D. J. McCarthy of the Division of Chemical Engineering has been awarded the degree of Master of Applied Science in Industrial Chemistry by the University of Queensland.

Record Broken

Last month we reported **Mr Alastair Low's** record for the three-mile walk from the Co-op. Store corner in Griffith to the Laboratory of the Division of Irrigation Research.

Not to be outdone, forty-four Sixth Formers from Griffith High School, led a successful attack on Mr. Low's record of 27 minutes and 14 seconds and managed to beat it by 10 seconds.

Out of Luck

The Division of Plant Industry recently tried to purchase 1 gram of Mesoporphyrin IX from a Laboratory in Britain only to be advised that the material was no longer available from any source.

In their reply, the laboratory stated that *"this material is produced from the urine of a cow which has a rare sickness brought on by a South American fly. However, the only cow known to have this sickness has recently died".*

"In the circumstances, no further supplies can be expected and your demand has therefore been cancelled".

Screen News

The Food Presentation Film Society will screen "The Killers", a colour film based on Hemingway's short story of gangster brutality, and "Les Belles de Nuit", Rene Clair's adventure fantasy, at 7.30 p.m. on Tuesday, October 24 at Ryde.

The Forest Products Film Society will screen Ingmar Bergman's 'So Close to Life" at 8.00 p.m. on Thursday, October 19, in the Division's theatrette.

PROJECT WANGARA

During July and August, twenty three members of the Division of Meteorological Physics took part in a field experiment known as Project Wangara (aboriginal for "west wind") in the Riverina district of New South Wales.

They were assisted by sixteen junior observers and a meteorologist from the Commonwealth Bureau of Meteorology.

The aim of the experiment was to find out just exactly how the west winds of the temperate latitudes of the world continually replenish their strength.

Without this replenishment these winds, which predominate over 40% of the earth, would be brought to a halt within a few days by the braking effect of the earth's surface.

Four field stations were set up, each about 25 miles from Hay, with a central station near the town.

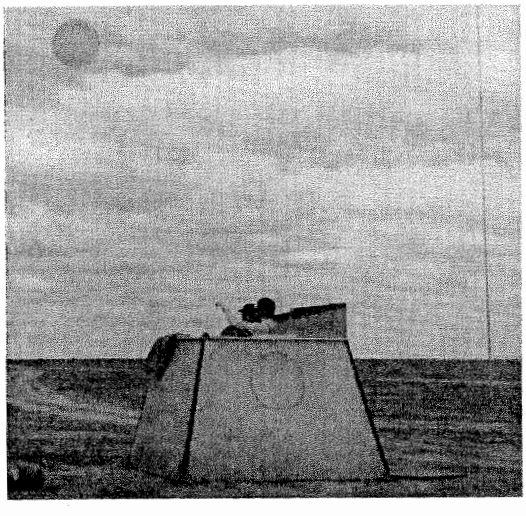
Balloons were released from each of these stations every hour (sometimes more frequently) and wind speeds at heights of up to one or two kilometres determined by the double theodolite technique.

This routine was kept up night and day in all weathers for six weeks.

In addition, temperature and humidity profiles were measured by radiosonde releases from the central station every three hours, and micrometeorological data obtained on a continuing basis from mast instruments.

The Division is now hard at work analysing the mass of data collected to obtain some insight into the workings of the lowest kilometre or two of our atmosphere.

Below: Mr. R. McKenzie of the Bureau of Meteorology follows one of the 400 pilot balloons he released during Project Wangara.



Obituary

Mr G. W. Wright of the Division of Forest Products died last August at the age of 56.

A graduate in civil engineering from the University of Western Australia, Mr. Wright joined the Seasoning Section of the Division in 1936.

He became Officer-in-Charge of the Section in 1942.

Mr. G. W. WRIGHT

His work and that of his colleagues on the principles of drying, the development of new types of driers, and the economics of seasoning are held in high regard in industry and it is largely to his credit that the seasoning position in Australia is so soundly based.

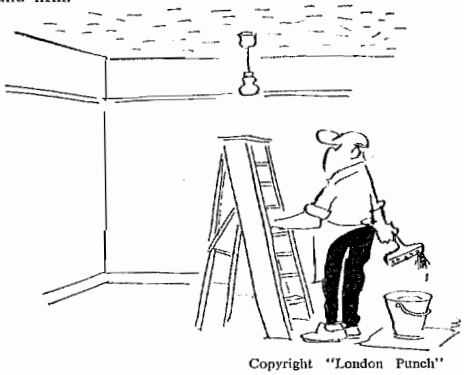
SAFETY NOTES

Step Right Up

Spring — when a young man's fancy lightly turns to love, and a husband's to painting the house.

Before embarking on the latter course of action, check your ladder and steps. Make sure they are in first class condition before you use them, and look after them as you would a parachute. Do not paint ladders. Oil or varnish does not hide defects.

The top shelf of a set of steps is to hold the paint can or tools, not to stand on. Make sure the footing is level and firm.



Copyright "London Punch"

To set up an extension ladder, extend it to about the correct height, then place the foot of the ladder against the base of the wall and raise it by walking in towards the wall. When vertical, set the base out a distance equal to one fourth of the extended length. This is the optimum for strength and tipping safety. Do not try to carry a long ladder upright. Beware of electric wires.

When up the ladder, do not over-reach. Keep the hips between the rails, and hang on to something besides the ladder. Use a hook for tools or supplies.

If you need both hands, hook a leg or arm through the rungs, and get the ladder as close to the work as possible.

If the ladder is the least bit unstable, have some-one steady it from below, but warn them to watch out for falling tools.

Take care. The fast way down is strictly for the birds.

J. W. Hallam, Safety Officer.

APPOINTMENTS TO STAFF

Mr. A. Choda has joined the Division of Textile Physics where he will work on the development of new and improved equipment for measuring and control in the textile and wool industry. Mr. Choda

Mr. A. CHODA

graduated B.E. with honours from the University of Sydney in 1958 and M.E. from the University of New South Wales in 1964. He has spent the last four years as a design engineer with the Australian Gas Light Company, Sydney.

Mr. C. D. Gilbert has joined the Computing Research Section where he will act as consultant to research workers on problems associated with the acquisition, conversion and recording of experimental data for processing by computer.

Mr. C. D. GILBERT

After obtaining his Diploma of Electrical Engineering from Kingston College of Technology, Britain, in 1963, Mr. Gilbert joined the U.K. Atomic Energy Authority as an instrument engineer. He came to Australia in 1965 and since then has been working in the patent office as an examiner of patents.

Dr. A. A. Harry has joined the Division of Textile Industry where he will study the wrinkling of wool. Dr. Harry graduated B.Sc. from the University

Dr. A. A. HARRY

of Mysore in 1957, M.Sc. from the University of Leeds in 1962, and Ph.D. from the University of Glasgow in 1965. He has spent the last eighteen months with the Bombay Textile Research Association.

Dr. R. N. Bagchi has been appointed to a Post Doctoral Fellowship with the Division of Physics where he will work on paramagnetic resonance. Dr. Bagchi graduated M.Sc. from the University of Calcutta in 1952 and D.Phil. from the same University in 1966.

Mrs. Veronica Bender has joined the Division of Animal Genetics where she will study embryology and tissue culture. Mrs. Bender graduated B.Sc. from the Eotvos Lorand University, Budapest, in 1954 and came to Australia in 1957. She obtained her M.Sc. from the University of New South Wales in 1962 and since then has been studying for her Ph.D. at the same University.

Dr. C. R. Hartzell has been appointed to a Post Doctoral Fellowship with the Division of Protein Chemistry where he will work on the interactions of metals with proteins. Dr. Hartzell graduated B.Sc. from

Dr. C. R. HARTZELL

Geneva College, Pennsylvania in 1962 and recently obtained his Ph.D. from Indiana University.

Dr. G. J. Bowden has been appointed to the Division of Applied Physics to carry out research on the magnetic properties of materials. Dr. Bowden graduated B.Sc. with honours from Manchester University in 1962 and recently obtained his Ph.D. from the same University for his work on the magnetic properties of the rare-earth metals.

Mr. D. J. Cooke has been appointed to the Division of Radiophysics where he will work on the design and installation of advanced radio astronomy receiving and digital equipment. Since graduating B.E. from the University of Adelaide in 1954 Mr. Cooke has been working at the Weapons Research Establishment of the Department of Supply at Salisbury, S.A.

Dr. D. J. Morton has been appointed to the Division of Food Preservation where he will carry out research on the biochemistry of meat. Dr. Morton graduated B.Sc. from

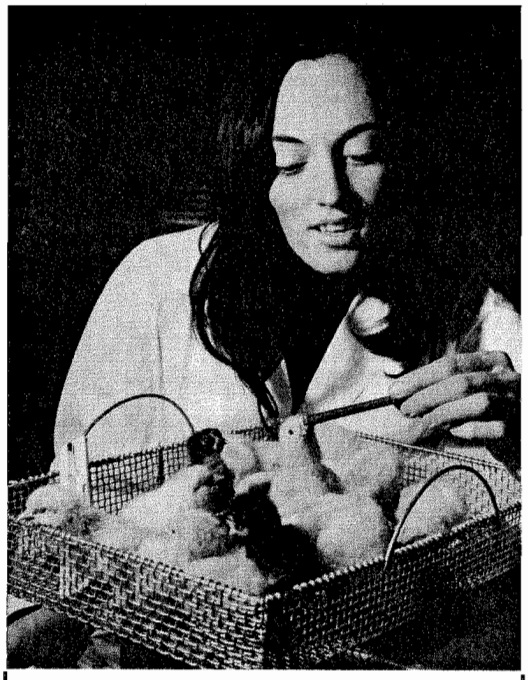
Dr. D. J. MORTON

the University of Adelaide in 1955 and Ph.D. from the University of Melbourne in 1961. For the last three years Dr. Morton has been working on the intermediary metabolism of leukocytes at Western Reserve University, Cleveland, Ohio.

Mr. H. M. Rawson has been appointed to a Post Doctoral Fellowship in Plant Pysiology with the Division of Plant Industry. He will carry out research on inflorescence development in wheat. Mr. Rawson graduated B.Sc. with honours from the University of

Mr. H. M. RAWSON

North Wales in 1963. For the past three years he has been working for his Ph.D. at the Waite Agricultural Research Institute, Adelaide.



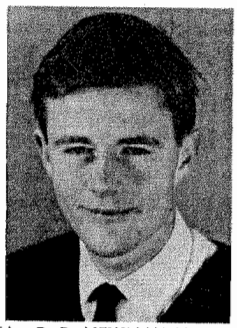
These chickens never had it so good. Life in an incubator mightn't be all beer and skittles but with someone like Jennifer Percy fussing over you who wants to live in a nest. Jennifer works at the Animal Health Laboratory, Parkville.

Dr. F. X. Jozwik has joined the Division of Land Research where he will study the growth and development of the important range species of tropical Australia. Dr. Jozwik graduated B.Sc. with honours from the University of Wyoming in 1962 and Ph.D. from the same University in 1966. He has been Assistant Professor of Plant Physiology at Wisconsin State University for the last year.

Dr. E. Loffler has been appointed to the Natural Resources Group of the Division of Land Research. He will carry out geomorphological investigations in New Guinea. Mr. Loffler graduated M.A. from Heidelberg University in 1965 and Ph.D. from the same University in 1966. Earlier this year Dr. Loffler took part in a preliminary geomorphological study of Western Nigeria.

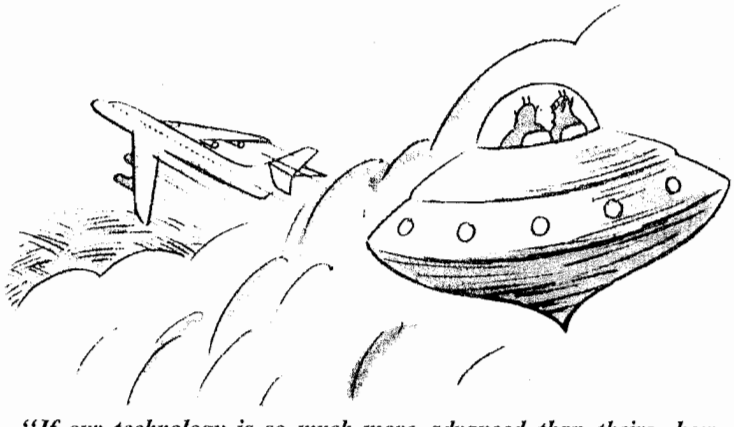
Miss Ann May has joined the Division of Entomology where she will carry out taxonomic research on the Australian Lepidoptera. Since graduating B.Sc. from the University of Queensland in 1965, Miss May has been a demonstrator in the University's Entomology Department.

Mr. G. R. Newman-Martin has been appointed to the Grassland Agronomy Section of the Division of Plant Industry. He will work on the development of techniques of chemical analysis. Mr. Newman-Martin graduated B.Sc. last year from the University



Mr. G. R. NEWMAN-MARTIN

of Western Australia and has been teaching with the State Education Department for the last three years.



"If our technology is so much more advanced than theirs, how come we don't have in-flight movies?"

Courtesy "Saturday Review"

Overseas Visits

Dr. G. D. Aitchison, Chief of the Division of Soil Mechanics, left early last month on a four-month visit of research centres in Turkey, Europe, Britain, North America and South Africa. Dr. Aitchison will also attend a number of conferences while overseas. In January he will spend a month in India as a Colombo Plan Fellow to advise on the application of soil mechanics to road research.

Dr. J. F. Brotchie of the Division of Building Research left recently on a six week visit to the United States. He will spend most of his time at the Massachussetts Institute of Technology studying specific problems in the design of concrete shell structures.

Dr. J. W. Loder of the Division of Applied Chemistry left recently for Harvard University, where he will spend about four months working on anti-tumour active compounds. He will also visit laboratories in Britain and Sweden before returning next April.

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CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 104, MELBOURNE, NOVEMBER 1967

Aid for Ceylon

In the last fifteen months, Community Aid Abroad groups at Head Office and at the Divisions of Forest Products and Textile Industry have raised $1,100 to provide the Ravals of India with the necessary capital to form a land co-operative.

This money has been provided as a loan and will enable the Ravals to raise further loans of up to $5,000 from a bank.

On repayment of the CAA loan, the money will be used to assist the formation of other co-operative societies.

The three CSIRO - CAA groups, which between them have raised over $2,500 for CAA in a little over two years, have chosen as their next project an appeal for $2,200 to provide irrigation equipment for an agricultural colony at Pahariya in north-western Ceylon.

The colony has about 900 acres of land, 540 of which are highland and 360 lowland, suitable for paddy culture.

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 owing to insufficient housing and lack of facilities.

Shramadama, a joint Government and voluntary agency, is anxious to assist the settlement and help increase agricultural output.

The CAA project has been drawn up with advice from Government agricultural officers and involves the irrigation and intense cultivation of 10 acres of the colony.

Groundnuts, chillies, mustard, onion and vegetables will be grown on this land once the irrigation facilities are available. The produce will be sold at nearby towns.

Work at the project will be supervised by an agricultural graduate from Tokyo University who is a volunteer from Service Civil International.

The people in the settlement will provide all the necessary labour for implementing the project.

Seeds and fertilizers will be obtained from the Government through the co-operative credit bank.

Spray irrigation will be used for the project as the land is undulating with a heavy run-off of surface water.

The project will help nearly 1000 people by providing higher incomes from the sale of crops.

The $2,200 raised by the CSIRO-CAA groups will be used to buy a set of sprinklers, 1000 ft. of 4 in. aluminium piping with couplings, 1000 ft. of 3 in. piping, and a 22 h.p. diesel pump.

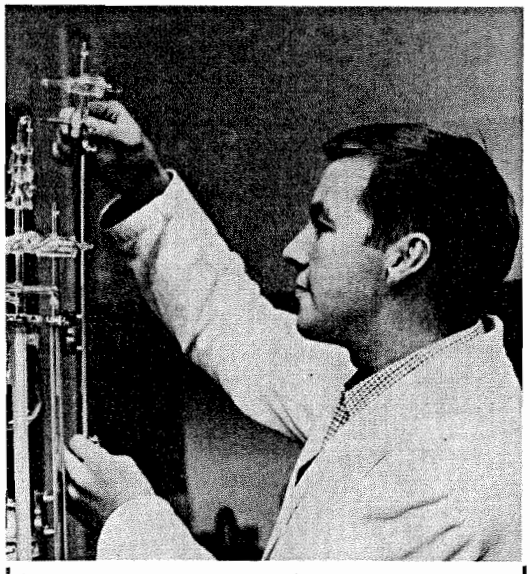
BESIDE THE SEA

Anyone feeling in need of a well earned rest at one of Victoria's best surfing beaches should contact the Committee of the Anglesea Holiday Club.

This Club still has vacancies in its Anglesea flats for next February and March.

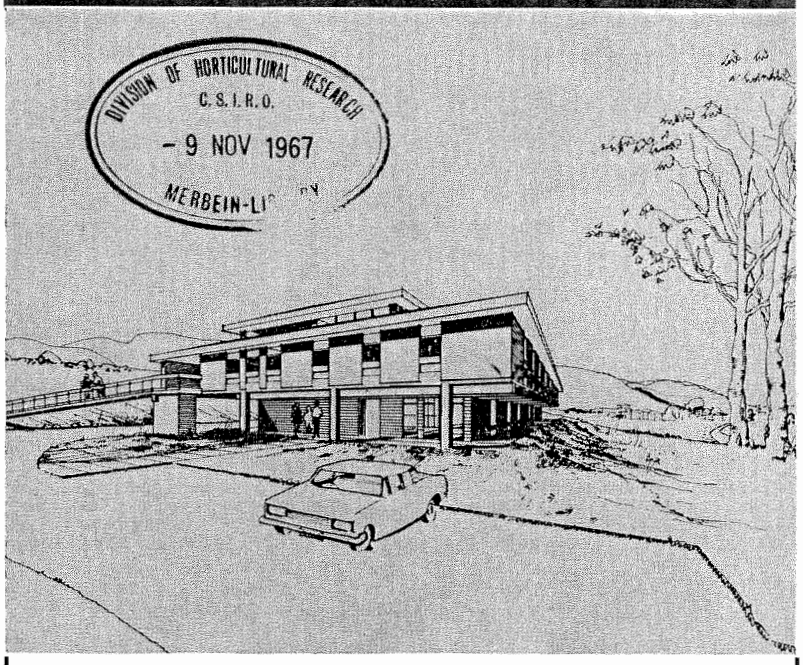
Each flat can accommodate up to eight people; all you need take is your bed linen.

Tariffs are $20 a week or $3 a day. For further information ring Miss Flora McDonald at Head Office.



Mr. L. Hall of the Division of Wildlife Research has been selected by the Rotary Foundation of Rotary International to receive an Overseas Technical Training Award for the 1968/69 academic year. The award is for training in the United States at the Western Washington State College, Bellingham. Mr. Hall, who is a member of the Division's rabbit ecology group, is a final year student in the Biological Technician's Certificate Course at Canberra Technical College. While in the United States, he will undertake a study of why the European rabbit has failed to spread in North America. Our picture above shows Mr. Hall reading a manometer used in respiration studies.

NEW HOME FOR MATH STATS



Above is an architect's impression of the two storey building now under construction for the Division of Mathematical Statistics at Glen Osmond, Adelaide. The new building is sited next to the Division of Soils and will be occupied early next year. It will have a total floor area of about 7,500 square feet and will cost $90,000. The ground floor will contain the library, air conditioning plant, staff amenities and offices while the first floor will comprise offices for research staff and a central computing room.

This will be the first building the Division has had as its own. Its present headquarters are in the Division of Nutritional Biochemistry's building at the University of Adelaide.

Credit Society's Tenth Birthday

The CSIRO Co-operative Credit Society has just completed its tenth successful year of operation. In that time it has lent almost $2,500,000, while its membership has grown to 1,967 in 1967.

It is now the second largest society of its kind in Australia.

In his foreword to the Society's latest Annual Report, the Chairman, Sir Frederick White, congratulated the Society on having completed a very successful and useful decade of life.

Sir Frederick said that one of the most striking things about the growth of the Society was the willingness of so many members of CSIRO to deposit money with the Society so that it could be used to help their colleagues.

When one considered that members of CSIRO had deposited with the Society nearly $1,200,000 of their savings to be used for the benefit of other people in the Organization, it was a remarkable tribute to the confidence placed in the Society.

The Co-operative Credit Society together with the Credit Societies in Canberra and Sydney, represented a measure of self-help among members of CSIRO that was very heartening to see.

The following are some of the highlights in the life of the Society:

1957 Formation meeting, 28th August. Loan maximum fixed at $600. Interest payable on deposits fixed at 5%.

1958 Deposits and share capital $20,000. Membership 230. Total loans made since inception $30,000.

1959 Loan maximum increased from $600 to $2000. Interest payable on deposits increased to 6%.

1961 Deposits and share capital $120,000. Membership 600. Death indemnity insurance cover provided for loans.

1962 Appointment of Associate Directors. Appointment of Mr. J. Stodart as Assistant Secretary.

1964 Loan maximum increased from $2000 to $4000. Deposits and share capital $500,000. Membership 1,290. Disability cover provided in addition to the death indemnity cover.

1965 Loan maximum increased from $4000 to $6000. Deposits and share capital $750,000. Membership 1,530.

1966 Board of Directors increased from 5 to 7. Mr. J. Belkin appointed as full-time Manager of the Society. Deposits and share capital passes $1,000,000.

1967 Membership nearly 2000. Total loans made since inception almost $2,500,000. Interest paid to depositors since inception $213,000.

Membership and Capital Growth of the Society

Financial Year Ending	Number of Members	Capital Total ($)	Net Yearly Increase ($)
1958	230	20,000	
1959	310	35,800	15,800
1960	430	68,200	32,400
1961	600	120,400	52,200
1962	800	217,000	96,600
1963	1,025	382,400	165,400
1964	1,290	511,800	129,400
1965	1,530	747,200	235,400
1966	1,773	955,400	208,200
1967	1,967	1,170,000	214,600

CONFERENCE

Sir Frederick White will open a conference of Commonwealth and State Entomologists in Canberra on Monday, 13th November.

The conference will be held at Black Mountain and will run for three days.

Question Time

Senator Prowse: Has the Minister for Education and Science seen in the Sydney "Daily Telegraph" what purports to be a photograph of a group of maiden merino ewes with their cross-bred lambs? Is this a genuine case of virgin birth or could it be attributed to some spectacular achievement by the officers of the Commonwealth Scientific and Industrial Research Organization, hitherto unpublished, in the field of animal reproduction?

Senator Gorton: I have not actually seen the photograph referred to, but if it is described in the way in which the honourable senator says it is I would at once dissociate the CSIRO from the whole affair. I think this is something more to do with art than with science. Probably the spectacular achievement has been on the part of the journalist who wrote the caption rather than anybody else.

Senator Tangney: Is the Minister for Science and Education aware that Canberra has once again established a claim to be a unique city in that last year, contrary to the trend in other Australian and American cities, female births in the Australian Capital Territory were in excess of male births and that scientists are suggesting that climatic factors may be the cause of this most desirable result? Has any research on this matter been done by officers of the Commonwealth Scientific and Industrial Research Organization? Does the Minister not think that this is a most worthy subject of research, or do not the researches of the CSIRO extend to human beings?

Senator Gorton: I do not know of any research that has been engaged in by the CSIRO or any other scientific organization to discover why more females than males are born in the A.C.T.

Senator Tangney: It would be a good idea.

Senator Gorton: I am not sure that it really is something to which the resources of the nation should be devoted to any great extent. If we got some scientific results from such experiments it just might lead to arguments as to whether we should apply them to get more females than males or not apply them in order to get more males than females.

Hansard, Thursday, 5th October.

RESEARCH GRANT

A.C.F. and Shirleys Fertilizers Ltd. will give $80,000 worth of assistance to the work of the Division of Tropical Pastures in Queensland over the next five years.

CSIRO has received considerable help from the Company in the past in the form of fertilizers and capital for establishing field experiments.

The new grant will be used to start a major experiment at Beerwah and to widen the scope of two grazing experiments at the new Narayen field station near Mundubbera.

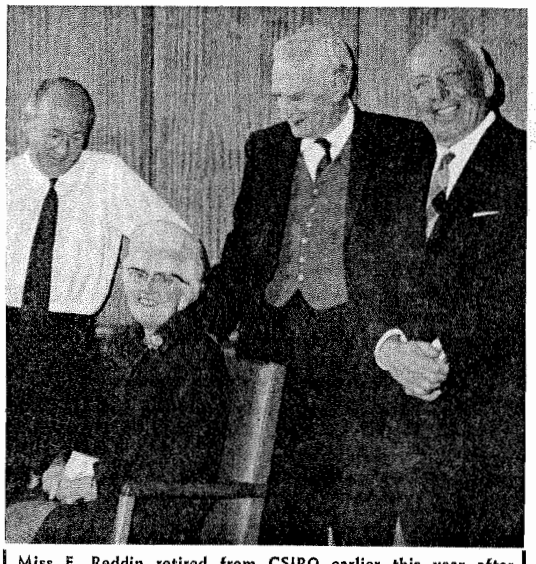
A.C.F. and Shirleys will provide all the fertilizer needed for the three experiments.

In addition the Company will second two members of its staff, one to work at each centre, and will provide each of them with a vehicle.

It will also bear the capital cost of establishing the experiment at Beerwah.

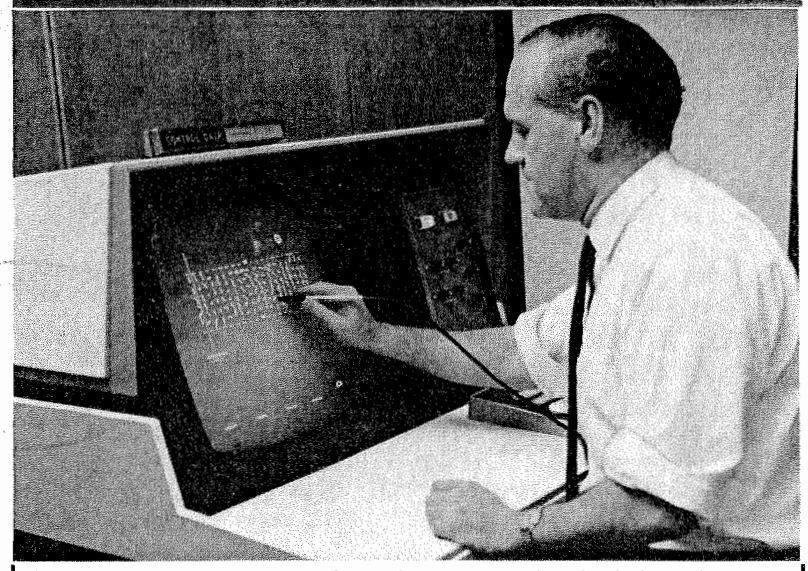
The experiments at Narayen are designed to find out more about the response of pastures and animals to fertilizers in the spear grass and brigalow country.

At Beerwah, the factors involved in beef production from grass pastures fertilized with nitrogen in the high rainfall Wallum region will be investigated.



Miss E. Reddin retired from CSIRO earlier this year after fifteen years as Secretary to the Chief of the Division of Animal Health. Last September several of her former associates presented her with a clock. Miss Reddin is seen here with the present Chief of the Division of Animal Health, Dr. A. E. Pierce (left) and with two former Chiefs of the Division, Dr. L. B. Bull (second from right) and Dr. T. S. Gregory.

METEOROLOGY BY NUMBERS



Many experiments in meteorology produce such quantities of data that high speed computers are needed to process it all. Even then, the results are often a bewildering mass of numbers. In the Division of Computing Research, Mr. C. E. Wallington is using display facilities in conjunction with a computer to produce results from meteorological experiments in a more meaningful and readily comprehensible way. The Film Unit has just completed an 18-minute black and white 16 mm. film about this work, entitled "Experiments in Numerical Meteorology". Our picture shows Mr. Wallington using a "Vista" display screen to study the eddy structure of a wind.

Obituary

Dr. S. J. Paramonov of the Division of Entomology died last month at the age of 73.

Dr. Paramonov graduated from the University of Kiev in 1917 and in 1939 became Director of the Zoological Museum at the Ukrainian Academy of Science.

He was later captured by German troops in World War II.

In 1947 he came to Australia and joined the Division of Entomology. Although he retired in 1959 he continued his work with the Division as a research fellow.

Dr. S. J. PARAMONOV

He was one of the world's leading authorities on flies and described more than 323 new species of Australian fly.

His work on flies led him to publish 59 papers in this country on Australian flies and more than 130 papers in Europe.

Dr. Paramonov was not only an outstanding biologist but also a distinguished musician, linguist and historian.

He produced twelve monographs on the history of southern Russia in the Byzantine era and made a detailed study of the folklore of the kingdom of ancient Ukraine.

These studies led him to the field of Slovak linguistics and he was offered the title of Doctor of Letters by the University of Melbourne several years ago in appreciation of his work.

POSITIONS VACANT

The following vacancies for professional appointments are current:

SCIENTIFIC SERVICES OFFICER — PATENTS AND LICENCES — Head Office — Industrial and Physical Sciences Branch — 111/18 (10/11/67).

EXPERIMENTAL OFFICER (ECOLOGY OF BLACK COCKATOOS) — Division of Wildlife Research — 560/231 (17/11/67).

SENIOR POSTGRADUATE STUDENTSHIP — Division of Mathematical Statistics — 440/205 (24/11/67).

STATISTICIANS (EO1/2) — Division of Mathematical Statistics — 440/204 (24/11/67).

CHEMICAL ENGINEER (RS) — Division of Textile Industry — 464/423 (24/11/67).

METALLURGICAL CHEMIST (RS/SRS) — Division of Mineral Chemistry — 601/61 (24/11/67).

CHEMIST (RS/SRS) — Division of Chemical Physics — 582/28 (1/12/67).

PARASITOLOGIST (ECOLOGIST) (E0/2) — Division of Animal Health — McMaster Laboratory — 202/314 (8/12/67).

RESEARCH SCIENTIST — Division of Chemical Engineering — 608/76 (8/12/67).

BIOCHEMIST (RS/SRS/PRS) — Division of Food Preservation — Cannon Hill — 305/106 (8/12/67).

SAFETY NOTES

Shishkabab on the Beach

Summer will soon be here, and on the beaches many a sunbather will try to avoid that "medium-rare" look by taking shelter under that most effective of spears, the beach umbrella.

The dangers of the beach umbrella were brought home to me last summer when I saw a sudden gust of wind blow a poorly anchored umbrella from its moorings and tumble it along the beach.

It came to a halt when the metal tipped shaft pierced a woman's arm.

Next time you see a beach umbrella rolling end over end along the sand remember just how easy it would be for it to puncture some unsuspecting sunbather.

Make sure your beach umbrella is firmly fixed in the sand so that it can withstand any sudden gusts.

Leave the pin-mounting of specimens to the entomologists.

Through a Glass Darkly

Sunglasses have become almost universal in this country in the last few years, particularly among the younger set.

Unfortunately, too many advertisements present sunglasses as an indispensable cosmetic aid and give little attention to the real purpose of using sunglasses, which is to absorb excessive and harmful solar radiation.

In a note in the Australian Journal of Science last year, Dr. R. G. Laffer of the University of Western Australia warned against the use of grey coloured lenses and plastic lenses.

Both types of lens transmit strongly in the infra-red region while grey lenses also transmit strongly in the ultra-violet region.

Since the iris of the eye responds only to visible light, the use of these spectacles results in more infra-red and ultra-violet light entering the eye than if the spectacles were not worn at all.

According to Dr. Laffer the best type of sunglasses are those with green glass lenses particularly the more expensive ones sold by opticians.

They're your eyes, look after them.

J. W. Hallam, Safety Officer.

News In Brief

Double Header

Last month the Chief of the Division of Chemical Physics, **Dr. A. L. G. Rees,** became President of the Royal Australian Chemical Institute.

The Assistant Chief of the Division, **Dr. A. Walsh,** is President of the Australian Institute of Physics.

Visitor

Dr. S. C. Dhar of the Central Leather Research Institute, Madras, is spending twelve months with the Division of Protein Chemistry carrying out enzyme studies on bacteria used in the unhairing of hides

Dr. S. C. DHAR

and skins. While in Australia Dr. Dhar will visit wool textile and leather manufacturing establishments and laboratories.

Doctorates

Mr. T. R. A. Davey has been awarded the degree of Doctor of Applied Science by the University of Melbourne for his work on the refining of base metals.

Mr. R. M. Seebeck of the Division of Animal Genetics has been awarded the degree of Doctor of Philosophy by the University of Melbourne for his work on growth and development in farm animals.

Master of Science

Mr. D. McE. Alexander of the Division of Horticultural Research has been awarded his Master of Science by the University of California.

Top Producer

Miss Alice O'Donnell of the Film Unit won the best producer award last month at the Victorian Drama League's One Act Play Festival for her production of Sheridan's "St. Patrick's Day".

The play was performed by the Heidelberg Repertory Group. Miss O'Donnell has been a member of the Group for the last eleven years.

Assistant Registrar

Mr. G. A. Richards of Head Office has been appointed Assistant Registrar of the Victoria Institute of Colleges.

Howlers

The following answers were given in a recent Health Examination in an overseas country.

To remove air from a flask, fill the flask with water, tip the water out and put the cork in quick.

A thermometer is an instrument for raising temperatures.

Three kinds of blood vessels are arteries, veins and caterpillars.

Benjamin Franklin produced electricity by rubbing cats backwards.

Geometry teaches us to bisex angels.

A magnet is something you find in a bad apple.

Parallel lines do not meet unless you bend one or both of them.

Blood flows down one leg and up the other.

The cerebum is a cavity in the head.

It is well known that a deceased body warps the mind.

For asphyxiation, apply artificial respiration until the patient is dead.

For head colds, use an agoniser to spray nose until it drops into your throat.

To remove dust from the eye, pull the eye over the nose.

For nose bleed, put the nose lower than the body.

For a dog bite, put the dog away for several days, if it has not recovered, then kill it.

For fractures, to see if the limb is broken, wiggle it gently back and forth.

For fainting, rub the person's chest, or if a lady, rub her arm above the hand.

A person should take a bath once in summer time and not quite so often in winter.

A super saturated solution is one that holds more than it can hold.

By self pollination a farmer may get a flock of long-haired sheep.

An example of animal breeding is the farmer who mated a bull that gave a great deal of milk with a bull with good meat.

An aziom is a thing that is so visible that it is not necessary to see it.

Algebra was the wife of Euclid.

Typhoid fever may be prevented by fascination.

A circle is a line which meets its other end without ending.

The cuckoo does not lay its own eggs.

A vacuum is a U tube with a flask at each end.

A litre is a nest for young animals.

Last month ten presidents of local government councils from various districts in Papua-New Guinea spent three weeks in Australia learning something about our way of life and our institutions. While in Canberra, they spent a day visiting CSIRO's Divisions and field stations. They are seen here at the Division of Wildlife Research watching a friendly tussle between Mr. W. E. Poole and an old man red kangaroo.

Estimates Debate

The 1967/68 Estimates for CSIRO were debated in the House of Representatives on September 19 and 20 and in the Senate on October 4.

Aboriginal Scholarship

Twelve months ago a group in the Division of Animal Genetics decided to establish a fund which could be used for aboriginal welfare, particularly in the field of education.

They began collecting money from staff members each pay day and almost everyone in the Division is now contributing.

It was decided to support the "Consultative Committee on Aboriginal Education" at the University of Sydney.

The Committee is concentrating on secondary education where there is the biggest drop-out and is offering scholarships to selected aboriginals.

The CSIRO Aboriginal Scholarship Fund, as it is now known, will be used initially to support a $1,000 scholarship which will take one pupil over six years of study.

So far some $300 has been contributed.

Anyone wishing to establish a branch of the CSIRO Aboriginal Scholarship Fund in their Division should contact the Secretary of the Fund, **Dr. W. R. Sobey,** at the Division of Animal Genetics, Sydney.

On Tour

Miss Margaret Pennington of the Office of the Scientific Attaché to the Australian Embassy, Washington, will arrive in Australia shortly to begin a three week visit of Divisions in Brisbane, Canberra, Melbourne and Sydney.

Advisory Committee Member

Mr. J. P. Shelton, Secretary (Industrial and Physical Sciences) has been appointed to a committee which will advise the Australian Industrial Research and Development Grants Board.

Screen News

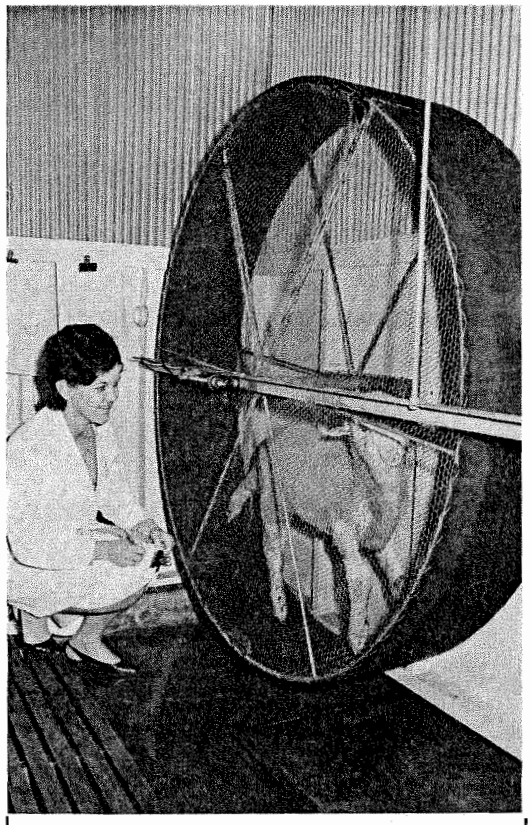
The Food Preservation Film Society will screen "Monsieur Vincent", which depicts the life of St. Vincent de Paul, on Tuesday, November 21, at Ryde.

The Forest Products Film Society will screen "The Collector" starring Terence Stamp and Samantha Egar at 8.00 p.m. on Tuesday, November 14, in the Division's theatrette. Evening screenings will be discontinued after December.

The 314 Film Society will screen "La Strada" at 8.00 p.m. on Thursday, November 16, at Head Office. The film was made in Italy in 1954 and stars Anthony Quinn.

"There I was, armed only with my intellect . . ."

Courtesy "Saturday Review"



Seven days a week, four lambs at the Division of Nutritional Biochemistry take turns in this wheel. Each lamb does about one-sixth of a mile (50 revolutions) in just under eight minutes in a fast walk or slow canter. It's all part of a research programme on white muscle disease in sheep. Assisting in these "revolutionary" studies is Miss Marilyn Horn.

APPOINTMENTS TO STAFF

Mr. D. B. Adams has joined the McMaster Laboratory of the Division of Animal Health where he will study immunological problems relating to parasitic diseases of sheep.

Mr. D. B. ADAMS

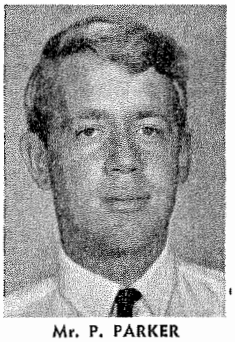
Mr. Adams graduated B.V.Sc. from the University of Sydney in 1965 and since last year has been in private practice at Cowra.

Dr. P. J. Banks has been appointed to the Division of Mechanical Engineering where he will work with the solar energy group on dehumidification. Dr. Banks graduated B.Mech.E. from the University of Melbourne in 1953. After four years in Britain with the Aero Engineering Division of Rolls Royce Ltd. he went to

Dr. P. J. BANKS

the University of Cambridge where he obtained his Ph.D. in 1962. Since then he has been a senior lecturer at the Department of Mechanical Engineering at Monash University, Melbourne.

Mr. P. Parker has joined the Division of Fisheries and Oceanography where he will study the structure and dynamics of southern bluefin tuna populations. Mr. Parker gradu-



Mr. P. PARKER

ated B.Sc. from the University of New South Wales in 1964. He obtained his Diploma of Education from the University of Sydney in 1965 and since then has been teaching at a Sydney high school.

Dr. A. P. Damaglou has joined the Division of Protein Chemistry where he will work on the characterization of proteins of the wool fibre and on the determination of their composition and complete amino acid sequence. Dr. Damaglou graduated B.Sc. with honours from Trinity College, Dublin, in 1964. He recently obtained his Ph.D. from the University of Hull for his work on the effect of phosphate limitation on *Escherichia coli*.

Mr. B. H. Flinter had joined the Coal Research Laboratory of the Division of Mineral Chemistry and will work on the petrographic examination and quantitative analysis of Australian coals and on the petro-

Mr. B. H. FLINTER

graphic study of graphites and carbons. Mr. Flinter graduated B.Sc. with honours from the University of Sydney in 1951 and until recently was a geologist with the Geological Survey of Malaysia.

Dr. J. D. Saxby has joined the Coal Research Laboratory of the Division of Mineral Chemistry where he will carry out research on the formation, structure and properties of ordered or crystalline forms of

Dr. J. D. SAXBY

carbon. Dr. Saxby graduated B.Sc. with honours from the University of Sydney in 1962 and Ph.D. from the same University in 1965. He has spent the last fifteen months at University College, London, on a CSIRO Post-graduate Studentship.

Mr. F. D. Shaw has been appointed to the Division of Food Preservation where he will study how the pre-slaughter treatment of cattle and sheep during transport affects the composition and properties of their meat. Mr. Shaw graduated B.V.Sc. from the University of Sydney in 1964 and since then has been in private practice in Victoria.

Mr. J. W. Wanless has joined the Division of Plant Industry where he will assist in the scientific administration of the Division including the communication of information on the Division's research programmes within and outside the Organization. Mr. Wanless graduated B.Sc. from the

Mr. J. W. WANLESS

University of Sydney in 1953 and M.Sc. from the same University in 1964. For the last thirteen years he has been a chemist with the Department of Health.

Mr. K. Tittle has joined the Division of Mineral Chemistry where he will carry out research on new methods of recovering metals from ore. Mr. Tittle graduated B.Sc. with honours from the University of London in 1957. From 1952 to 1963 he was employed with Magnesium Elektron Ltd. and since 1963 he has been with the British Central Electricity Generating Board.

SUN SPOTTERS

Mrs. Carol Huttary of the Division of Radiophysics took time off during the recent opening of CSIRO's Solar Observatory at Culgoora to scan the Sun for sunspots. Waiting to have a look is Mrs. June Payten, wife of the manager of the Radio Observatory, Mr. W. Payten. In case any of our readers should wonder, the Observatory does have more sophisticated telescopes than the one above.

Overseas Visits

Dr. B. J. Austin of the Division of Computing Research returned recently from the United States where he has spent three weeks visiting computer manufacturers and computing research centres.

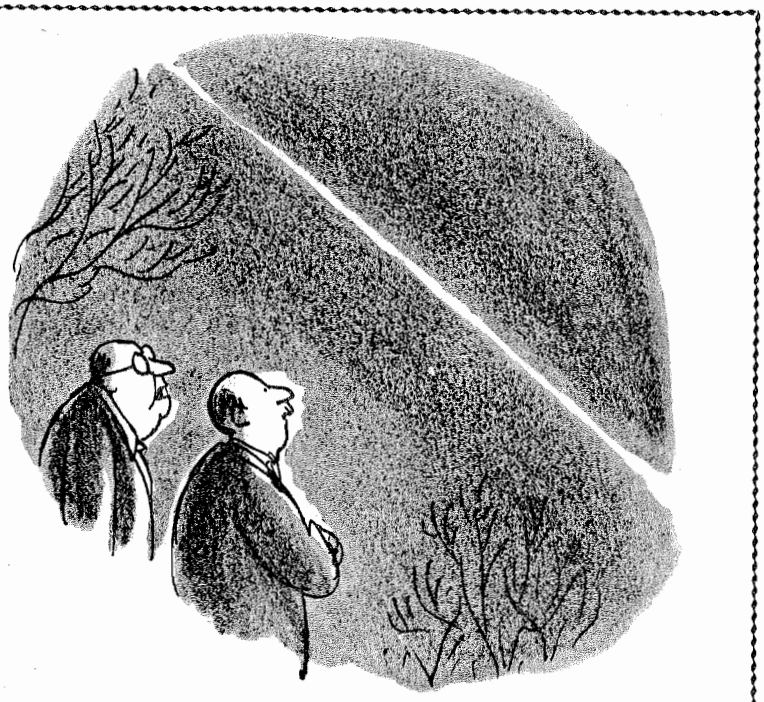
Mr. T. P. Jones of the Division of Physics will leave Sydney later this month for the Massachusetts Institute of Technology where he will spend six months working on transport phenomena in ceramic oxides at high temperatures. He will also visit laboratories concerned with high temperature measurement in North America, Britain, Europe, Russia and Japan before returning to Australia in August.

Mr. D. J. McCarthy of the Division of Chemical Engineering will leave later this month for Britain where he will spend two years at the Central Instrument Laboratory of I.C.I.

Dr. J. V. Ramsay of the Division of Physics left recently for the United States. He will spend two weeks at the Bartol Research Foundation of the Franklin Institute, Pennsylvania. The Foundation has recently purchased a control interferometer designed by Dr. Ramsay and manufactured commercially in South Australia and Dr. Ramsay will give personal instruction in its use and will deliver a series of lectures. He will also visit other laboratories in the United States befort returning later this month.

Mr. M. V. Tracey, Chief of the Division of Food Preservation, will return shortly from a three week visit of wheat quality research centres in Mexico, the United States, Britain and Switzerland. While in Britain Mr. Tracey will deliver a paper to a Royal Society symposium.

Mr. C. E. Wallington of the Division of Computing Research left early last month for the United States, Britain, Russia and Switzerland for discussions on research in numerical meteorology. He will return later this month.



"What do you think, Professor? Is it a laser, a maser, a quasar, or just a little ray of hope for all mankind?"

Courtesy "Saturday Review"

Printed by CSIRO, Melbourne

CORESEARCH

FOR CIRCULATION AMONG MEMBERS OF CSIRO STAFF — NUMBER 105, MELBOURNE, DECEMBER 1967

MELBOURNE MEETING

The metric system and its implications for Australia was among the topics discussed by the Advisory Council in Melbourne last month. The Council met in the Reserve Bank Building on Tuesday, 14th, and Wednesday, 15th November.

Mr. A. F. A. Harper of the Division of Physics was the principal speaker on the first morning.

He said that if world trends were any guide Australia would have to switch to the metric system one day. Such a change seemed inevitable and the sooner it was started the easier it would be.

While the problem of familiarising people with the new units would be much greater than that involved in the switch to decimal currency, the proportion of new Australians with previous experience of metric units was probably higher now than it would be in the future.

The Commonwealth Government was expected to consider the change next year when it received a report from a Select Committee appointed by the Senate to advise on the practicability of the early adoption of the metric system.

Mr. Harper, who is Secretary of the National Standards Commission, is also technical consultant to the Senate Committee.

He pointed out that some of Australia's biggest industrial concerns such as the steel and electronics industry supported the change.

Among the advantages to be gained from adoption of the metric system were:

- Simplification and increased efficiency in technical and business activities.
- Expansion and simplification of international trade.
- A marked saving in teaching time at schools, estimated by some at 5% of the total teaching time in the 7-11 years age group.
- An opportunity to improve and rationalise outdated business and industrial procedures and equipment.

Disadvantages were the temporary inconvenience and loss of efficiency during the actual conversion, the cost of conversion, and the need to retain the use of some units based on the inch and pound for a number of years.

There were also problems in specific fields; for example special attention would have to be given to screw threads, conversion of land titles, and conversion in the retail trade.

According to Mr. Harper more than 90% of the world's population was now using the metric system.

Japan and India had changed over to it and were happy with the new system.

One large Japanese automobile manufacturing company had reported that its conversion costs were being recouped at 20% a year.

Britain's plans for the change were announced two years ago and a similar announcement was made recently by South Africa.

In both cases the moves came about at the request of industry and with industry's full support.

In the United States there was growing concern that the question of adopting the metric system should be looked at urgently.

Some Government departments and several large industrial and commercial bodies such as the Ford Motor Company, Hughes Aviation and Sears Roebuck had already started their investigations.

Mr. Harper said that a change to use of the metric system in the retail trade could probably be made in Australia over two or three years.

This would help in educating the public and preparing them for changes elsewhere.

In some areas such as secondary industry, the change would probably have to be made over ten or more years because it was often cheaper to replace plant and equipment when it became obsolete rather than attempt immediate conversion.

Above. Dr. A. W. Wylie (right) of the Division of Mineral Chemistry explains a new technique for investigating underground mineral deposits to Advisory Council Members, Professor E. A. Rudd (centre), Professor of Economic Geology at Adelaide University, and Mr. W. M. Morgan, Managing Director of Western Mining Corporation. The three-inch metal tube they are holding contains a neutron gun and a gamma ray detector. It can be lowered down a bore hole where it fires neutrons at the walls of the hole. Most metals respond to neutron bombardment by emitting gamma rays which are characteristic of the metal. In this way information can be obtained on the sort of metal located at a given depth and on its concentration.

Divisional Visit

On Tuesday afternoon, the Advisory Council visited the laboratories of the Division of Mineral Chemistry where they saw something of the Division's work on fuel cells, mineral exploration, and new methods of processing ores.

The following day talks were given by Dr. M. J. T. Norman of the Division of Land Research (Townsville lucerne in northern Australia), Dr. J. P. Wild of the Division of Radiophysics (the radioheligraph), and Dr. F. G. Lennox, Chief of the Division of Protein Chemistry (Wool Structure and Utilization).

Below. Mr. H. R. Skewes (right) of the Division of Mineral Chemistry demonstrates a prototype fuel cell to Dr. H. C. Coombs, Governor of the Reserve Bank, during the visit of the Advisory Council to the Division last month. Work on development of the fuel cell began in the Division in 1961 with financial support from the Reserve Bank of Australia.

Finance for Home Building

In the last eleven years 119 members of the CSIRO have received housing loans totalling $992,000 through the A.M.P. Housing Finance Plan.

The demands for housing finance from the A.M.P. Society have declined in recent years because finance has been available from other sources at lower interest rates.

However, the scheme is still useful to those staff members who need a fairly large advance and are in a position to cope with relatively high loan repayments.

The main features of the A.M.P. Housing Plan are:

Amount of Loan

Loans are granted up to 80% of the Society's valuation of the property offered as security.

Interest

Current interest rates are 6¼% a year for loans up to $8,000; 6¾% for loans over $8,000 but not exceeding $12,000; and 7% for loans exceeding $12,000 but not exceeding $15,000. These rates apply to the total amount of the loan.

Duration

Loans are usually made for 20 or 25 years but this can be varied according to the age of the applicant.

Locality of Property

Loans are normally restricted to capital city areas and large provincial towns in which the A.M.P. Society has its own Branch Offices.

In short, the assurance policy must be a permanent one based on the life of the member — not a temporary insurance cover which reduces year by year.

Confidential Nature

In accordance with the agreement between the A.M.P. Society and CSIRO, Mr. R. W. Viney, Finance Manager, Head Office, provides the Society with background information on each applicant and supports the application in general terms. All negotiations are kept strictly confidential.

Life Assurance Protection

All participants in the A.M.P. Society's Home Finance Plan are required to take out full life assurance cover for a sum at least equivalent to the amount of the loan. Existing life policies with the Society are acceptable collateral, but the "mortgage" or "reducing cover" type of policy is not regarded as adequate for this purpose.

POSITIONS VACANT

The following vacancies for professional appointments are current:

SCIENTIFIC SERVICES OFFICER (SSO2/3) — Head Office — Agricultural and Biological Sciences Branch — 110/1028 (11/12/67).

PLANT PHYSIOLOGIST (EO1/2)—Division of Entomology—180/436 (15/12/67).

SOIL FERTILITY (EO1/2) — Division of Plant Industry — 130/888 (15/12/67).

THERMAL INVESTIGATIONS (RS/SRS/PRS) — Division of Building Research — 390/383 (15/12/67).

SCIENTIFIC SERVICES OFFICER (SSO1/2)— Division of Protein Chemistry — 462/295 (22/12/67).

COTTON ENTOMOLOGIST (EO1/2) — Division of Land Research — Kimberley Research Station — 620/59 (22/12/67).

ECOLOGICAL INVESTIGATIONS OF DINGOES (EO1/2) — Division of Wildlife Research — 560/232 (22/12/67).

FELLOWSHIP IN SYNTHETIC ORGANIC CHEMISTRY (RS) — Division of Applied Chemistry — 586/46 (22/12/67).

FUEL CHEMIST (PRS/SPRS) — Division of Mineral Chemistry — Coal Research Laboratory — 480/554 (22/12/67).

PHYSICAL CHEMIST OR PHYSICIST (EO1/2) — Division of Mineral Chemistry — Coal Research Laboratory — 480/551 (2/1/68).

DEVELOPMENT ENGINEER (EO2/3 or Engineer 2/3) — Division of Mineral Chemistry — 601/64 (2/1/68).

TOWNSVILLE LUCERNE — LEGUME OF THE FUTURE

A spectacular pasture revolution was now under way in the north of Australia, Dr. M. J. T. Norman of the Division of Land Research told the Advisory Council at its meeting in Melbourne last month.

Dr. Norman said that research on the legume Townsville lucerne by CSIRO, the Northern Territory Administration, and the Queensland Department of Primary Industries could transform some 60 million acres of grazing land in northern Australia.

The introduction of Townsville lucerne into this area would enable it to carry at least 12,000,000 cattle — some four-fifths of the present total beef cattle population of Australia.

Large sums being invested in such places as Cape York Peninsula and the top end of the Northern Territory by Australian and American developers were bringing about a dramatic expansion of Townsville lucerne pastures.

On Manbullo Station, a Vestey's property near Katherine, 1,300 acres sown last year carried 600 cattle through the dry season.

The company planned to increase this at the rate of 5,000 acres a year.

In the Cape York Peninsula another company intended sowing 10,000 acres a year from the air.

The Townsville lucerne seed industry in the Northern Territory was expanding rapidly, and produced 200 tons of seed this year — enough to sow 90,000 acres.

Dr. Norman said that the name Townsville lucerne was misleading as the plant did not originate in Townsville and was not a lucerne.

It was a native of Central and South America and appeared to have been accidentally introduced to Australia at the turn of the century.

Being a legume it was able to take up nitrogen from the air through the bacteria in its roots and convert this nitrogen into plant protein.

For a long while, Townsville lucerne was regarded as a plant only for poor soils, for two reasons.

Firstly, on fertile soils in the absence of good grazing management, it tended to be swamped out by vigorous grass growth. Secondly, on poor soils it had a high capacity to extract nutrients, particularly phosphate, and grow moderately well.

However, research had now shown its capacity to respond to quite high levels of phosphate fertilizer, and to grow well on fertile soils if competition from other species was controlled.

Research on Townsville lucerne began in the 1930's, but although the Queensland Department of Primary Industries stressed the advantages of the species, it failed to gain wide acceptance as the economic situation of the northern Australian beef cattle industry at the time did not favour investment in pasture improvement.

Probably the major stimulus to further research and to commercial development came from the first field experiments on beef production from Townsville lucerne, which began under the Division of Tropical Pastures at Rodd's Bay, Queensland, in 1955, and in the Division of Land Research at the Katherine Research Station in 1956.

The work of the two Divisions had grown steadily but had remained complementary.

Dr. Norman said that the Division of Land Research was concerned with Townsville lucerne in the central north of Australia where the summer rainfall was brief, intense, and sharply defined and the winter was reliably dry; the Division of Tropical Pastures was concerned with Townsville lucerne in Queensland where summer rainfall was often more scattered in distribution and where there might be winter rainfall.

At Katherine, the Division of Land Research was concentrating upon systems of beef production based on Townsville lucerne and native pastures, and on detailed studies of the response of the species to water stress and phosphate.

In addition, plant physiologists and micro-meteorologists were making an intensive study of water and energy exchanges in Townsville lucerne pastures.

Their aim was to develop mathematical models of the growth of the species in relation to environmental variables and to use these models to predict the performance of the species in a wide range of northern environments.

At Townsville, the Division of Tropical Pastures was engaged in large scale production experiments with breeding cattle and steers on Townsville lucerne/spear grass pastures.

The Division was also studying the nitrogen-fixing power of Townsville lucerne in association with both sown and native grasses, and was conducting a systematic examination of strains of Townsville lucerne naturalised within Australia and of recent introductions of the species from overseas.

Further south, at Rodd's Bay, near Gladstone, the Division had widened its large-scale animal production work with the recent establishment of a 324-acre experiment, and was investigating the build-up of nitrogen in Townsville lucerne/spear grass pastures.

At its Cunningham Laboratory, Brisbane, it was conducting glass-house experiments on the nutritional requirements of the species and its ability to fix and transfer nitrogen to other species.

Dr. Norman then referred to some of the results of the research at Katherine.

In this region beef production was limited not by the amount of forage available, but by its protein content, particularly in the late dry season.

By substituting different amounts of this native forage with Townsville lucerne, animal performance improved in more or less direct proportion to the amount of Townsville lucerne made available.

Shorthorn steers maintained continuously on Townsville lucerne from weaning at a stocking rate of one beast to about 3 acres, could reach slaughter weight within 2 years.

Above: Mr. M. J. Fisher of the Division of Land Research examining a pasture of Townsville lucerne and birdwood grass at the Katherine Research Station.

On the other hand, Shorthorns raised on native pastures at a beast to 20 acres had not reached slaughter weight until they were 5 or 6 years old.

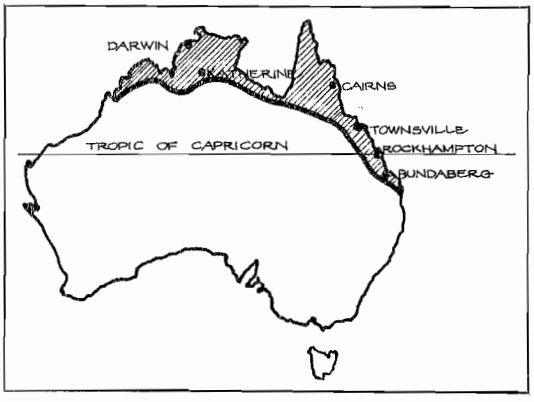
In other words it took about 6 acre-years to fatten a steer on Townsville lucerne pastures compared with 100-120 acre-years on native pastures — a twenty fold improvement.

Dr. Norman said that the one major problem with Townsville lucerne was its inability to compete with associated grass species, except under conditions of heavy stocking.

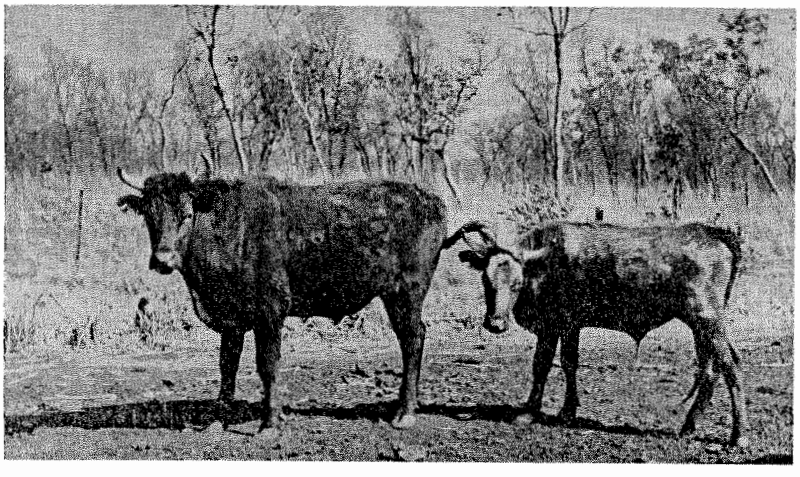
The solution could lie in methods of pasture management or in the selection or breeding of more aggressive strains.

Dr. Norman concluded by pointing out that while there were 60 million acres of potential Townsville lucerne country, development would be slow because there were just not enough cattle to stock the pastures that could be produced.

Development of Townsville lucerne pastures would soon be limited by the reproductive rate of the beef cow.



Left: The shaded area of northern Australia contains at least 60 million acres of potential Townsville lucerne country. Below: These two steers were the same weight at weaning and were on the same pasture for the first twelve months after weaning. The steer on the left was put on Townsville lucerne pastures for the second year after weaning, the steer on the right was kept on native pastures only.



SAFETY NOTES

A Happy Christmas and a Safe One

Brilliant Spectacle

A pine branch makes an attractive Christmas tree, particularly when lit up with coloured lights. It also makes a highly inflammable tree. Keep naked flames well away or you'll have the best lit-up tree in the neighbourhood — for a couple of minutes, anyway.

Slippery Dip

A cold shower could be just the thing after that party. But be careful not to slip in the bath or shower recess and break the shower screen. It takes some explaining next morning.

Make Your Party a Real Gasser

If you want to raise the roof or re-arrange the furniture in your room, don't do it by filling your party balloons with hydrogen or any other explosive or inflammable gas.

Bubble and Squeak

Champagne and other sparkling wines can be great fun, particularly when the stopper shoots out with a bang. Don't point the bottle at anyone when opening it. Eyes have been lost this way.

Look for the Silver Lining

Small decimal currency coins must not be used in the Christmas pudding. Only silver coins are suitable. No longer will we hear anguished cries of "I've just swallowed threepence". Ever tried swallowing a 50 cent piece?

Avoiding the Bumps

One final thought — the taxi fare home from that "smashing" party is probably about 5% of your "No-claim bonus".

J. W. Hallam — Safety Officer.

News In Brief

Vice-President

Dr. C. H. B. Priestley, Chief of the Division of Meteorological Physics, has been elected Vice-President of the International Association of Meteorology and Atmospheric Physics.

Assistant Chiefs

Dr. J. H. B. Christian and **Mr. J. F. Kefford** have been appointed Assistant Chiefs of the Division of Food Preservation.

Doctorate

Mr. A. E. Newsome of the Division of Wildlife Research has been awarded the degree of Doctor of Philosophy by the University of Adelaide for his research on the ecology of the house mouse in South Australia.

Hymn to Science

Modern scientific research
Has come to be a kind
of Church
Where white-coated Acolytes
Perform their scientific
rites.
Industries pay tithes they
do not hafter
In hopes of benefits hereafter.

With apologies to Kenneth Boulding.

Thought for the Month

"Even the ugliest human exteriors may contain the most beautiful viscera."

J. B. S. Haldane.

Screen News

The Food Preservation Film Society will screen the comedy-thriller "Charade", starring Cary Grant and Audrey Hepburn, on Tuesday, December 19th, at Ryde.

The Forest Products Film Society will screen Len Deighton's spy thriller "The Ipcress File" at 8.00 p.m. on Wednesday, December 6th, in the Division theatrette. Evening screenings will be discontinued after December.

The 314 Film Society will screen the Charlie Chaplin classic "The Gold Rush" at 8.00 p.m. on Thursday, December 21st, at Head Office.

Overseas Visits

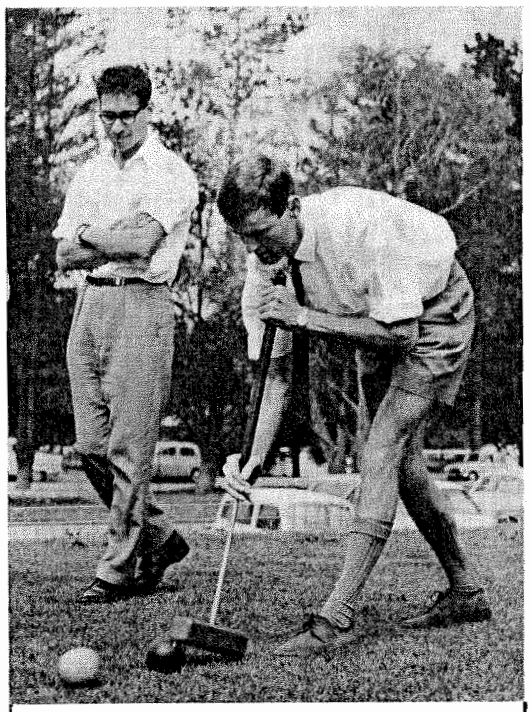
Dr. E. J. Bradley of the Division of Plant Industry left last month for the United States where he will spend 3½ months at the University of Wisconsin studying air flow in the vicinity of obstacles and five months at the Air Force Research Laboratories, Bedford, investigating the structure of turbulence in the lower atmosphere. Dr. Bradley will also visit micrometeorological research centres in Japan, Britain, Europe, and Israel, before returning to Australia next October.

Mr. R. V. Dunkle of the Division of Mechanical Engineering left last month on a two week visit to Pakistan at the invitation of the Pakistan Atomic Energy Commission. Mr. Dunkle will collaborate in the planning of a Solar Research Institute in West Pakistan.

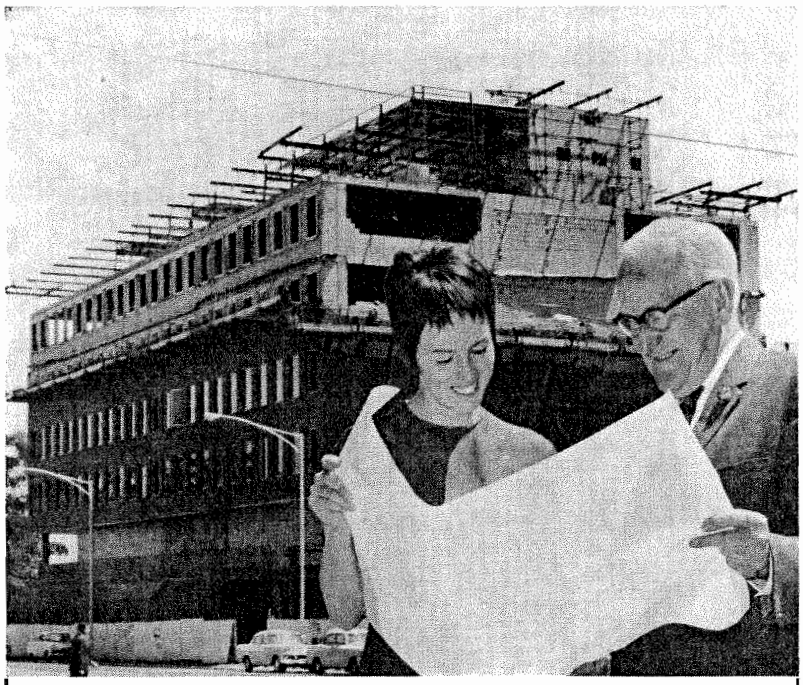
Mr. K. Grant of the Division of Soil Mechanics left early this month for South Africa where he will attend the 4th Regional Conference on Soil Mechanics and Foundation Engineering at Capetown. Mr. Grant is joint author of two of the papers being presented. He will return later this month.

Mr. R. W. R. Muncey, Chief of the Division of Forest Products, will leave later this month for India where he will attend the 9th Commonwealth Forestry Conference. Mr. Muncey will also visit forest products research centres in South-East Asia before returning early next February.

Mr. E. R. Wishart of the Division of Radiophysics left recently for the Antarctic. He will spend two months at Byrd Station measuring the ice nucleus content of the atmosphere and the precipitation rate of drifting snow.



The staff of the Division of Land Research, Canberra, have found that there's nothing quite like a lunchtime game of croquet for releasing aggression. Enjoying a spot of therapy are Mr. H. McPherson (wielding the croquet mallet) and Dr. J. Passioura.



Work on Clunies Ross House National Science Centre has progressed rapidly in the last seven months and the building should now be ready for occupation next July — one month ahead of schedule. The Secretary of the Clunies Ross Foundation, Mr. J. E. Cummins, is shown here discussing the design of the building with Miss Rosemary Paxton of the Division of Animal Health.

INDUSTRY MISSING OPPORTUNITY

Industrial management in Australia was neglecting a valuable source of technological progress by failing to make anything like enough use of university teachers, Sir Frederick White told an Australian Institute of Management conference in Canberra last October.

University teachers were probably the best informed group in the community about international progress in science and technology, and particularly about discoveries in science that had not yet had great impact on industry.

Sir Frederick said that much more use should and could be made of university people, but management's attitude would need to change.

Management hired as consultants those relatively few university teachers who had a particular skill or interest and who understood the business and industrial world.

Many university teachers had little contact with the practical world of industry.

Such contacts were more numerous in engineering, agriculture, veterinary science, geology and the like which were university disciplines closely allied to practical affairs.

But often the most exciting scientific discoveries which would have industrial importance in the future came from physics, chemistry, biochemistry, mathematics and biology.

The university, through its graduates, provided a channel of intelligence with the wider world of international technology.

There were other channels, more direct perhaps, but this was an important aspect of the employment of recent graduates.

For many years Britain had the reputation of pre-eminence in original scientific research; but the accusation had been made repeatedly that industry failed to use this output and that it had mainly benefited the industries of other countries more enterprising and adventurous in developing new ideas.

"I would not like to see this occur in Australia," Sir Frederick said.

Although the number of graduates being trained in research to the doctorate level was increasing rapidly, many of them were being absorbed in the rapid build up of the universities.

Others went to public research institutions or went overseas for further experience.

About 1 in 20 went into industry in Australia as compared with 1 in 3 of similar categories in the United States.

The general impression was that at present few of those trained by the universities in research in science and technology went into industrial firms, those that did, went to the larger firms that had well established research laboratories.

There would come a time, indeed it might already be with us, when the present avenues of employment for Ph.D. graduates would near saturation and we might find highly trained research scientists without satisfactory employment.

SHARE FOR SALE

The Anglesea Holiday Club has one share for sale for $220. Further details may be obtained from the Club Secretary, Mrs. Phyllis Fricker, South Eastern Fisheries Group of the Division of Fisheries and Oceanography, Melbourne (telephone 82 6757).

APPOINTMENTS TO STAFF

Mr. H. G. Bate has been appointed to the Meat Research Laboratory of the Division of Food Preservation where he will study the performance of refrigeration plant. Since graduating B.E. with honours from the University of New South Wales in 1965, Mr. Bate has been studying for his M.Sc. at the University of Sydney.

Dr. B. E. Fleischfresser has joined the Division of Textile Industry where he will study chemical modification of wool fibres including the application of resins. Dr. Fleischfresser graduated M.Sc. from the Uni-

Dr. B. E. FLEISCHFRESSER

versity of Queensland in 1961 and Ph.D. from the University of Leeds in 1965. Since 1966, he has been working at the Polymer Research Institute, Syracuse, United States.

Dr. P. M. Bremner has joined the Division of Plant Industry where he will work on the determinants of productivity of different pastures, crops and farming systems. Dr. Bremner graduated B.Sc. with honours from the University of Edinburgh in 1953 and M.S. from Cornell University in 1957. He recently obtained his Ph.D. from the University of Nottingham, where he has been lecturing since 1958.

Dr. D. C. Gibson has been appointed to the Aerodynamics of Fans and Ducts Section of the Division of Mechanical Engineering. Dr. Gibson graduated B.Sc. from the Uni-

Dr. D. C. GIBSON

versity of Sydney in 1960, and B.E. with honours from the same university in 1962. He recently obtained his Ph.D. from Cambridge University.

Dr. C. R. Hale has joined the Division of Horticultural Research as a vine physiologist. After graduating B.Sc.(Agric.) from the University of Western Australia in 1952, Dr. Hale spent five years with the Western Australian Department of Agriculture. He obtained his M.S. from the University of California in 1957 and his Ph.D. from the same university in 1962. For the last five years he has been with the Australian Wine Research Institute.

Dr. M. B. Dale has been appointed to the Division of Plant Industry as a systems ecologist. Dr. Dale graduated B.Sc. with honours from the University of Southampton in 1960 and Ph.D. from the same university in 1964. Following twelve months at the University of Sheffield he became a lecturer at the University of Hull last year.

Dr. Katherine Henrickson has been appointed to the Wheat Research Unit, where she will study enzymic hydrolosis. Dr. Henrickson graduated B.A. with honours from the University of Rochester in 1961, M.A. from Harvard University in 1963, and Ph.D. from Harvard University this year.

Miss Merrilyn Mowat has been appointed to the Division of Plant Industry where she will carry out research on soil fertility and the availability of nutrient elements to plants. Miss Mowat graduated B.Sc. with honours from the University of Queensland in 1962 and has spent the last four and a half years at the Department of Astronomy of the Australian National University.

Mr. K. C. Hodgkinson has joined the Division of Plant Industry and will carry out plant physiological studies at the Riverina Laboratory, Deniliquin, on native pasture species in the semi-arid zone. Since graduating B.Agr.Sc. from Massey University in 1962, Mr.

Mr. K. C. HODGKINSON

Hodgkinson has been studying for his Ph.D. at the University of New England.

Dr. R. Hoskinson has joined the Division of Textile Industry where he will work on the protection of wool against insect attack by the use of enzyme inhibitors. Dr. Hoskinson graduated B.Sc. with honours from the University of New South Wales in 1958 and Ph.D. from the same uni-

Dr. R. HOSKINSON

versity in 1962. After a year at the University of Wisconsin and two years at the University of Glasgow he became a research fellow in the Department of Medical Chemistry at the Australian National University.

Dr. P. J. Nelson has been appointed to a fellowship in wood science with the Division of Forest Products where he will work on the preparation from wood of free fibres or pulp for paper manufacture. After graduating B.Sc. with honours from the University of Adelaide in 1960 and Ph.D. from the same university in 1963, Dr. Nelson spent two years at the University of Liverpool. He has been at Iowa State University since last year.

Dr. D. B. Nicholas has joined the Division of Tropical Pastures where he will carry out a plant breeding programme with the legume Glycine javanica. Dr. Nicholas graduated B.Sc. with honours from the University of London in 1963 and obtained his Ph.D. recently from the University College of Wales.

According to Stendhal, "The shepherd always tries to persuade the sheep that their interests and his own are the same." Judging from the look of this lamb Miss Beverley Watt has him completely convinced. Beverley works at the Parkville Laboratory of the Division of Animal Health, Melbourne.

Miss Rosemary Sellwood has joined the Division of Animal Health where she will carry out biochemical analyses as part of an investigation of parasitic

Miss ROSEMARY SELLWOOD

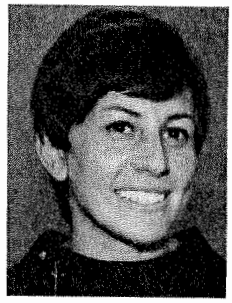
infestations of sheep and cattle. Since graduating B.Sc. from the University of Melbourne in 1965, Miss Sellwood has been a biochemist at the Royal Melbourne Hospital.

Dr. T. L. Ogden has been appointed to the Division of Radiophysics where he will carry out research in cloud physics. Dr. Ogden graduated B.Sc. with honours from the University of Durham in 1964 and Ph.D. from the same university this year.

Mr. J. A. Shaw has joined the Division of Computing Research. He will be located at Griffith to provide computing assistance for the research staff of the Division of Irrigation Research. Since graduating B.Sc. from the University of Queensland in 1962, Mr. Shaw has been a hydrologist with the Queensland Irrigation and Water Supply Commission.

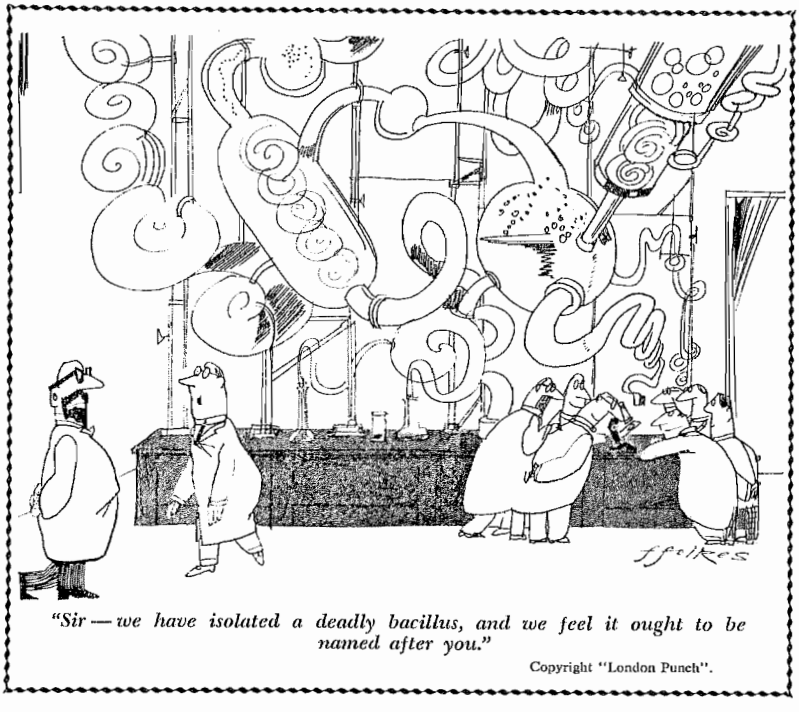
Mr. N. W. Ridgway has been appointed to the Division of Fisheries and Oceanography where he will analyse prawn survey data. Mr. Ridgway worked with the Australian Atomic Energy Commission from 1961 until early this year when he became a mathematics teacher with the N.S.W. Department of Technical Education. He graduated B.Sc. from the University of N.S.W. in 1965.

Mrs. Lorna Solomon has been appointed to the Editorial and Publications Section. Mrs Solomon graduated B.Sc. with honours from the University of Witwatersrand in 1962 and came to Australia in 1963



Mrs. LORNA SOLOMON

where she taught for a year. She then spent two years as a demonstrator in zoology at the University of Melbourne and then two years in Britain as an information officer with the firm of Smith, Kline and French.



"Sir — we have isolated a deadly bacillus, and we feel it ought to be named after you."

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