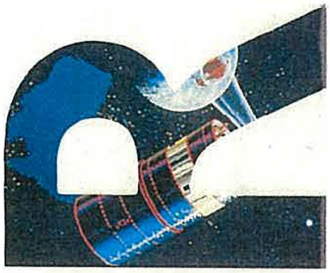
Strategic Plan
1988-92

CSIRO
AUSTRALIA



Research Advancing Australia

Chairman's Foreword

In the future the welfare of Australia and Australians will depend more and more on ideas rather than physical resources.

The role to be played by creative and skilled people will be paramount in achieving a prosperous and well-balanced Australia and in maintaining the living style to which Australians have become accustomed.

The challenge is to put Australia's economy on a more competitive footing, and one step towards meeting that challenge lies in understanding the scope of the technological revolution now sweeping the world and accepting its implications.

We must recognise the importance of science and technology in our society and we must adapt more quickly to the significant changes that are occurring.

The community has accepted the need to respond to the changed circumstances confronting the Australian economy. Governments, industry, business, employees and their representative organisations, all are now more aware of the need for greater competitiveness.

CSIRO is determined to play a critical role in the shaping of Australia's future and in the generation of Australia's wealth.

CSIRO scientists are a key resource whose efforts and results will contribute towards the underpinning of Australia's primary industries, whilst creating the products and techniques necessary for the development of more value-added technology-based industries.

The Board of CSIRO is intent on maintaining and advancing CSIRO as a world class research organisation. CSIRO, through leadership, teamwork and sheer intellectual skill, will play an increasingly important part in the lives of Australians.

The Strategic Plan defines the broad objectives which CSIRO has set itself for accomplishment between 1988 and 1992, as well as the policies and strategies to be followed in achieving those objectives.

It is vital that CSIRO's role in Australia's future matches its contribution in the years past. With adequate support from the Government, the understanding of the public and the commitment of members of the Organisation at all levels, I am confident that the goals we have set ourselves will be reached.

Neville Wran AC, QC

(L-R) Sir Gustav Nossal, Dr Tony Gregson, Dr Keith Boardman, The Hon Neville Wran AC QC, Dr Kevin Foley, Mr Bill Mansfield, Mr David Hoare.
(Inset) Professor Adrienne Clarke, Mr Graham Spurling, Sir Roderick Carnegie.

CSIRO Board

Chairman
The Hon. Neville Wran, AC, QC
Executive Director of
Whitlam Turnbull & Co. Ltd,
formerly Premier of New South Wales
(1976-86)

Dr Keith Boardman
Chief Executive of CSIRO

Sir Roderick Carnegie
Company Director and President,
Business Council of Australia

Professor Adrienne Clarke
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Plant Cell Biology Research Centre,
University of Melbourne

Dr Kevin Foley
Managing Director
Kevin Foley and Associates Pty Ltd,
Chairman of the Primary Industry
Research Councils Selection
Committee

Dr Tony Gregson
Wheat farmer,
formerly Associate Professor of
Chemistry at the University of New
England

Mr David Hoare
Chairman,
Bankers Trust Australia Ltd
and AUSSAT Pty Ltd

Mr Bill Mansfield
Assistant Secretary of the Australian
Council of Trade Unions,
Member of the Australian
Manufacturing Council

Sir Gustav Nossal
Director of the Walter and Eliza
Hall Institute of Medical Research

Mr Graham Spurling
Managing Director,
Pacific Dunlop International Battery
Group

Ministerial Guidelines

The guidelines below were provided to CSIRO under section 13 of the Science and Industry Research Act 1949 on 2 June 1988.

"The following guidelines for CSIRO are to be read in the context of the functions of the Organisation, and the responsibilities of its Board, as set out in the Science and Industry Research Amendment Act 1986.

1. CSIRO's main task will be the conduct of strategic and applied research in support of national economic, social and environmental objectives.
2. CSIRO will ensure that research activities in areas of significance to national economic development receive preferential support.
3. CSIRO's research priorities will be planned with due regard to the industry and research policies and priorities of the Government.
4. CSIRO will pay particular attention to strengthening means of ensuring that its research results are exploited to the greatest benefit of the Australian community.
5. CSIRO will maintain procedures to ensure effective communications between the Organisation, other publicly funded research institutions, the users and beneficiaries of its research and the general public.
6. CSIRO will maintain a distribution of effort in accord with the Government's policies and priorities in relation to research in support of existing industries, and research which will contribute to future balanced national development.
7. CSIRO will establish procedures to identify promising areas of research as part of its strategic planning process.
8. CSIRO will give greater attention to assessing the potential value of research before it is performed, and will strengthen procedures to evaluate research programs during their performance and after their completion.
9. CSIRO will maximise the proportion of its overall expenditure funded from non-Budgetary sources, subject to the need for continual Commonwealth support for its main task described in guideline one.
10. The Organisation shall, as far as possible, co-operate with other organisations and authorities in the co-ordination of scientific research, with a view to —
    a) the prevention of unnecessary overlapping; and
    b) the most effective use of available facilities and staffs.
11. CSIRO will ensure that its financial, administrative and personnel management practices are consistent with relevant Government policies for the operations of statutory authorities and business enterprises."

Chief Executive's Introduction

CSIRO has three crucially important objectives:

- to carry out strategic research which can be applied by Australian industry or by Government for community benefit,
- to collaborate with other institutions and industry to strengthen the research effort and ensure the transfer and application of that research,
- to lead and promote an expanded science and technology effort in Australia.

The great strength of the Australian economy has in the past been in exporting primary commodities. Now we must learn to compete in value-added technology-based industries, as well as maintaining the prosperity of our primary industries.

The Government is supporting the new direction with policies such as the 150 per cent tax incentive, offsets policy, National Industry Extension Service, and assistance through the Grants for Industry Research and Development Scheme.

The major restructuring of the Institutes and Divisions of CSIRO and the strengthening of line management are improving the application of research for economic and social benefit while maintaining our research effort at the cutting edge of developments in science and technology.

The changes are designed to ensure that CSIRO plays a major role in the development of Australia's manufacturing and information-based industries and businesses, and continues to provide vital outstanding research support for our rural, minerals and energy industries.

Improved techniques for evaluating research, better project and financial management, greater collaboration with industry and other institutions and more effective commercialisation of results will improve the return on investment in research.

We must continue to attract creative staff of the highest calibre. This requires a stable and exciting research environment, the provision of adequate financial and human resources and a system of incentives which rewards excellence and achievement.

CSIRO has an important national role in promoting the critical importance for Australia of an expanded research and development effort, particularly in the private sector.

CSIRO will contribute to an improved understanding by the community of science and technology issues. We will work for ever higher standards in our research, promote our reputation for excellence, and ensure Australia profits by the application of our work.

N Keith Boardman

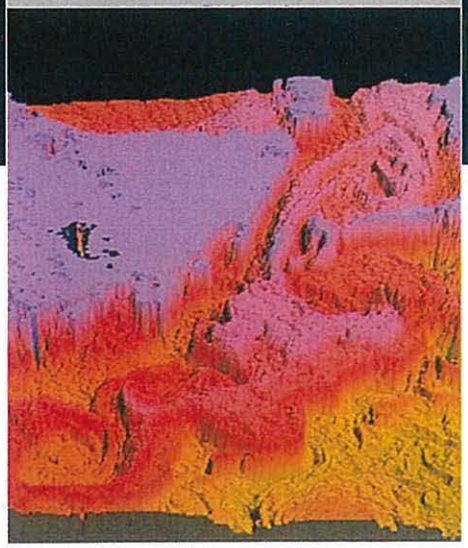
Keith Boardman

Responsiveness

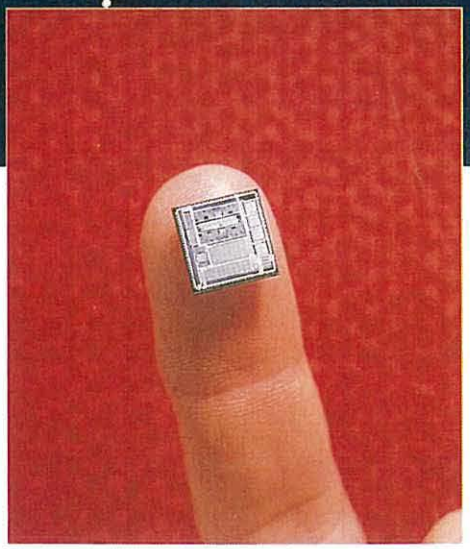
CSIRO has provided vital support to Australian rural and mineral industries for over 60 years. This will continue. The Organisation will also now provide similar support to new industries in the information and manufacturing sectors, and sharpen its response times to help meet Australia's needs in a

Institute of Information and Communications Technologies

Information and telecommunications industries are growing rapidly, and Australia is well placed to capture substantial niches in world markets in these industries. The Institute will form an integral part of Australia's product development efforts, building on existing strengths in microwave communication systems, computer networking, software engineering, remote sensing and mathematical analysis.



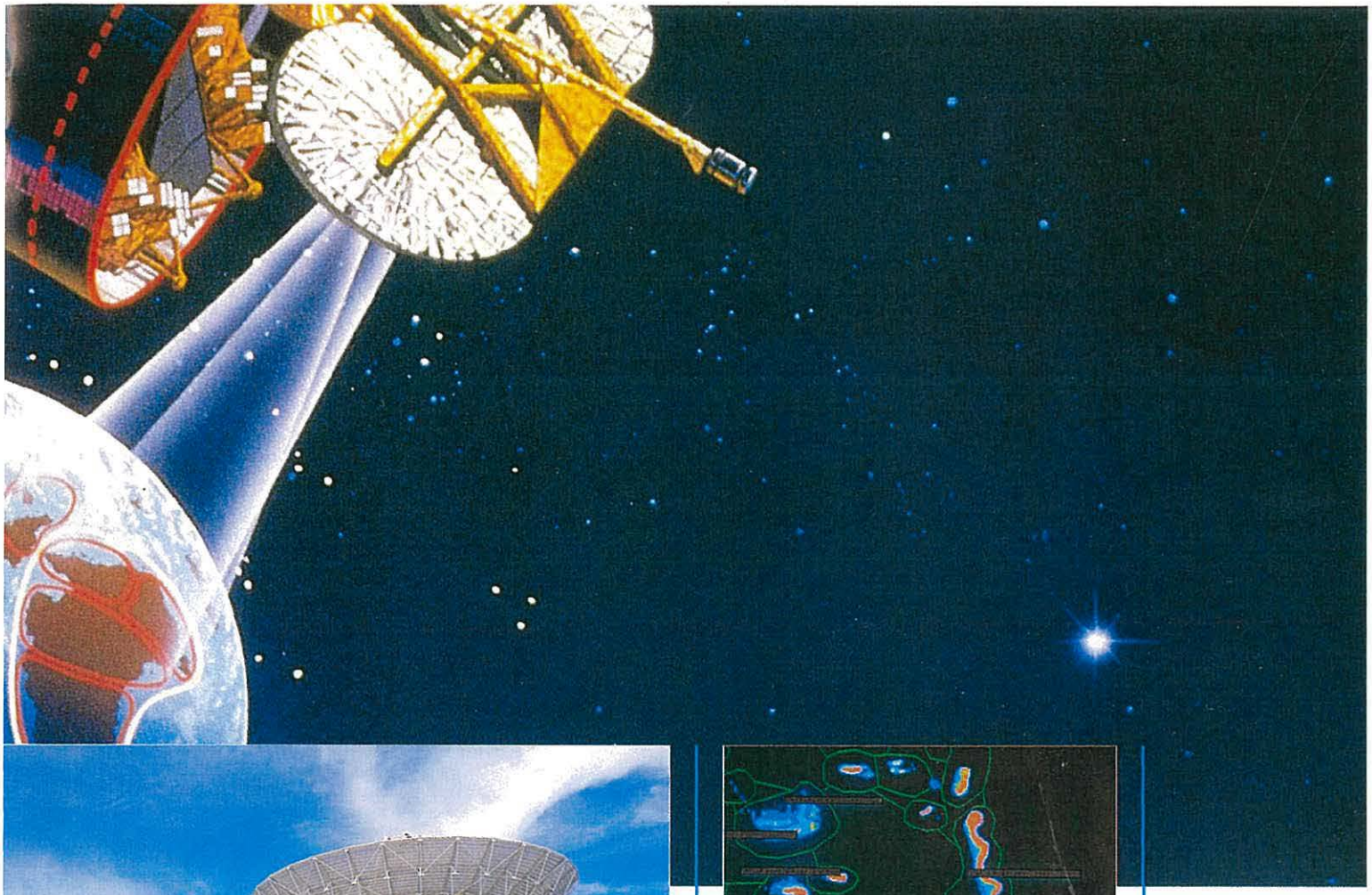
Information about conditions on earth gained from satellites is becoming essential to an enormous range of activities including mineral exploration, agriculture, land use management, weather prediction and environmental conservation. CSIRO is developing techniques to assist in the extraction of useful information from satellite pictures such as the delineation of ocean currents off Tasmania.



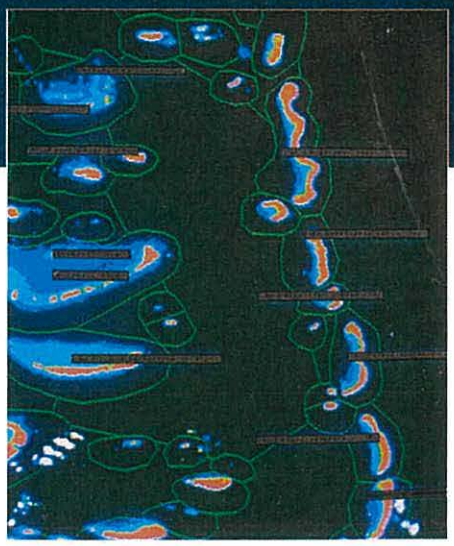
The miniaturisation of electronic circuits has revolutionised the computing industry and is having a dramatic effect on a wide range of manufactured products, from cars to domestic appliances. Australia needs to have world-class capabilities in this area of microelectronics. The VLSI chip, developed in conjunction with AUSTEK Microsystems, performs signal processing operations much faster than an ordinary mini-computer.

world where competitive advantage is increasingly dependent on new knowledge.

The new culture in CSIRO will be based on recognition and exploitation of opportunities which come from leading edge research. The best available staff will be attracted and retained by offering a dynamic work environment and appropriate rewards for achievement.



Australia is a world leader in the exploration of the universe through radiotelescopes, and the Australia Telescope at Culgoora will keep Australia at the forefront. CSIRO hosts this national research facility in recognition of its importance to the development of new technologies in the information, telecommunications and space industries.



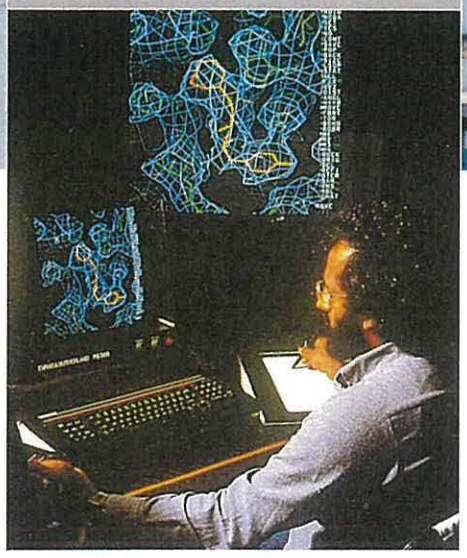
Bringing together a diverse range of information in a form that aids decision-makers is a major challenge in the development of computerised information systems. CSIRO has developed a novel system of sorting, retrieving and presenting the wide variety of data used in the management of the Great Barrier Reef Marine Park.

Structure

Links between CSIRO and its target groups in industry will be strengthened at all levels. This is to aid CSIRO's understanding of future directions in Australian industry and to improve the acceptance of new technologies. CSIRO also has a responsibility for research in areas of community interest and will strengthen links with community groups.

Institute of Industrial Technologies

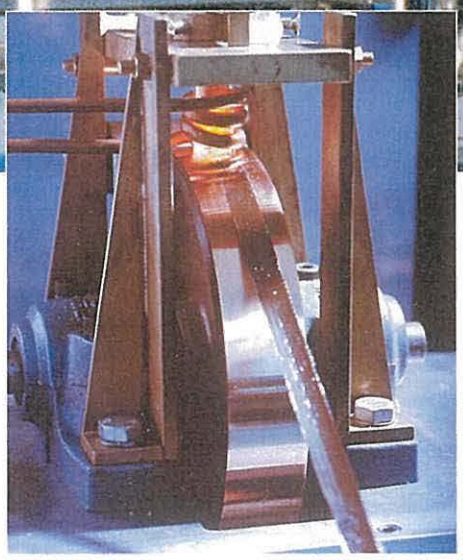
Australia must quickly diversify its exports to include a substantial proportion of manufactured products. The Institute will collaborate with industry to assist in the development and application of new materials (metals, ceramics, chemicals, polymers and composites), biotechnology and new manufacturing technologies including those based on computers, superconductors, plasmas and arcs.



Biotechnology has given scientists the tools to design molecules to perform specific tasks. It is also possible to examine the structure of tiny particles like viruses to combat or harness their power. CSIRO is working on developments with applications ranging from new industrial processes through agriculture to improving human health.

Improved welding techniques and other manufacturing processes based on electric arcs are vital to Australia's move into new markets. CSIRO is studying the behaviour of arcs and plasmas to develop new industrial processes and techniques for fabricating and hardfacing products.

A new structure has been introduced to facilitate links with industry and the community. There are six Institutes and within these Institutes there are 31 Divisions, each focusing on a critical area of science or technology. The new structure will aid the realignment of CSIRO's research resources to meet changing national priorities.



Radically new materials will find increasing roles in manufacturing processes and products. CSIRO is working on catalysts, ceramics, glassy metals, metal foams, polymers and many others.

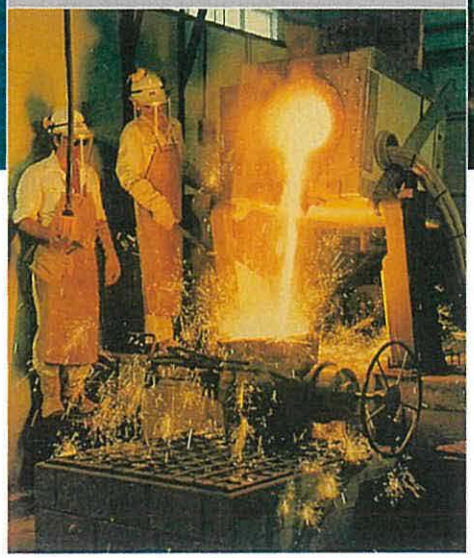
Automated manufacturing gives Australian industry, hampered by a small domestic market and high costs of transport into international markets, the opportunity to compete. CSIRO is developing computer aided manufacturing systems in collaboration with industry.

Industry Collaboration

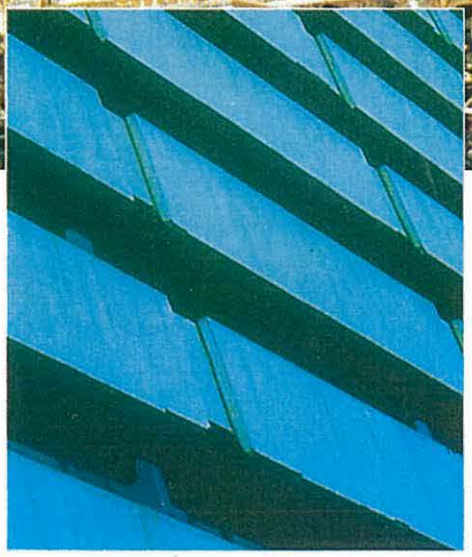
CSIRO and industry have complementary roles in the development of new technologies. CSIRO's part is to work at the forefronts of world knowledge — identifying areas that will become particularly important to Australia and translating this knowledge into ideas and technologies for specific new products and processes. Industry's involvement becomes greater as

Institute of Minerals, Energy and Construction

Minerals and energy exports remain vitally important to Australia, and new and improved technologies will be critical in maintaining competitiveness. The Institute will collaborate with industry to develop technologies which will reduce costs, provide new value-added products or help establish new industries. Construction and engineering research will concentrate on the maintenance of Australia's infrastructure as well as the promotion of efficient and cost-effective practices, procedures and products in related industries.



Australia can make much more from its natural resources if it processes and refines them before export. CSIRO is researching ways of adding value to mineral and other products.



The nation has a huge investment in existing buildings, bridges and other capital works but maintenance of this stock has become a major problem. CSIRO is investigating ways of combating 'concrete cancer' and improving the design of buildings to prolong their life.

technologies approach practical application. Industry will be invited to collaborate more closely in the early stages of the development of new technologies. CSIRO will benefit from having early input from industry in assessing research priorities and their potential. Industry will benefit from having advance notice of developments and an opportunity to influence research directions.

Future discoveries of major mineral deposits will rely heavily on the analysis of satellite photographs. Tell-tale signs of mineralisation can be deduced from infra-red and visible radiation. CSIRO is developing maps which provide more relevant information with higher resolution to guide exploration.

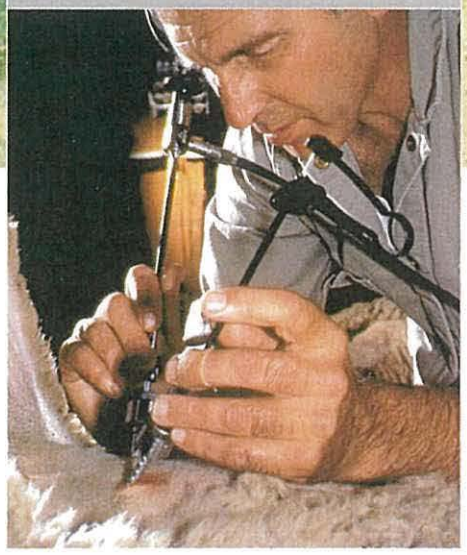
Coal is a vital contributor to Australia's exports and domestic electricity supplies. CSIRO research aims to reduce production costs and improve the range and efficiency of coal use through work on exploration, mining, product quality control, handling, fuel conversion and pollution.

Technology Transfer

CSIRO works with private companies or government agencies at state or federal levels to ensure that the potential benefits of its research are realised. Collaboration with end users, particularly in the pre-competitive phase of research, is a powerful tool for transferring technology, and will be fostered increasingly.

Institute of Animal Production and Processing

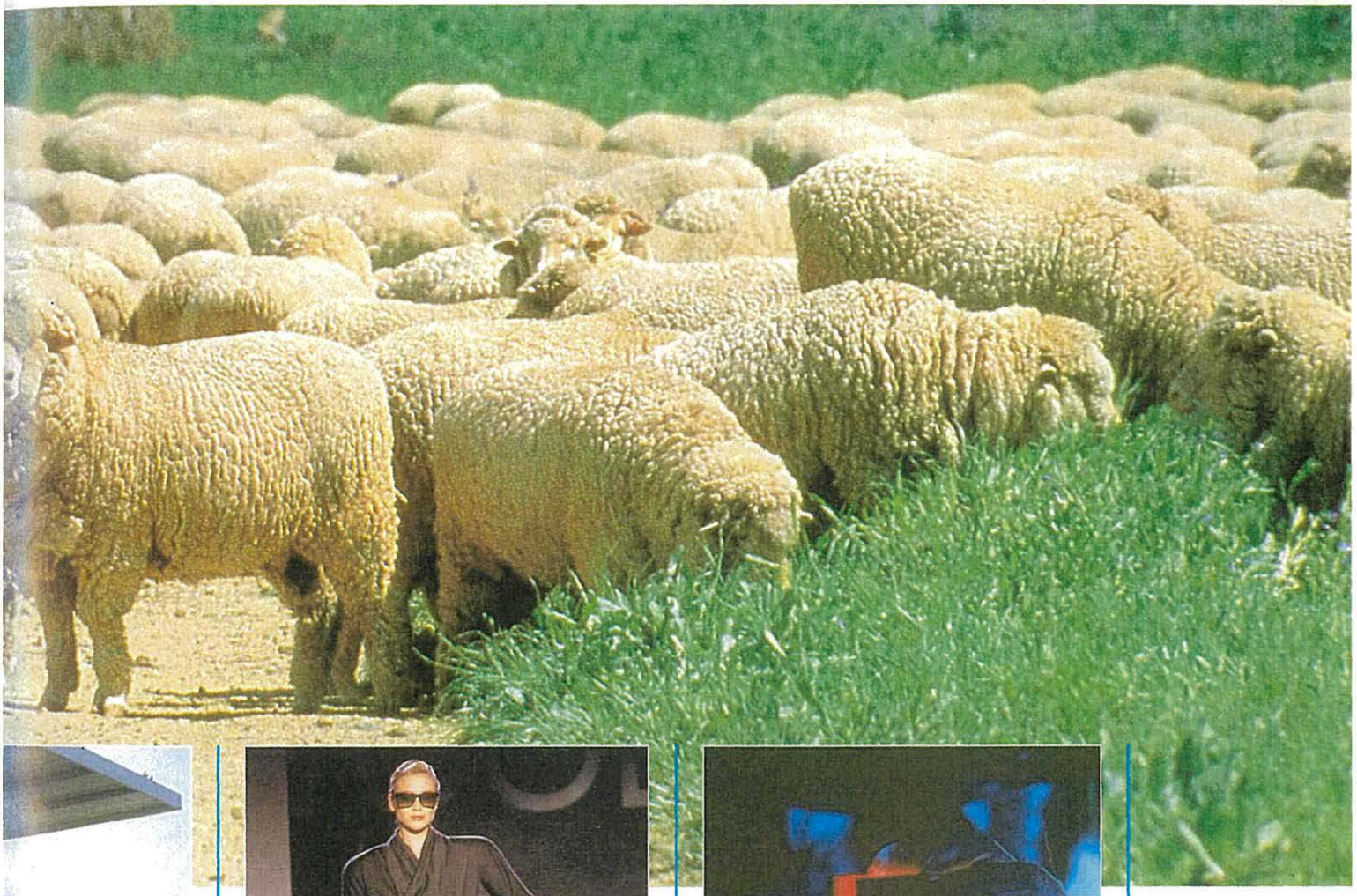
To maintain the competitiveness of Australian wool, beef, sheepmeat and dairy products the Institute will concentrate on technologies which reduce production or processing costs, improve quality and add value in Australia, and on developing new or modified products. The role of nutrition in human health will continue to be explored and this will guide the development of improved products.

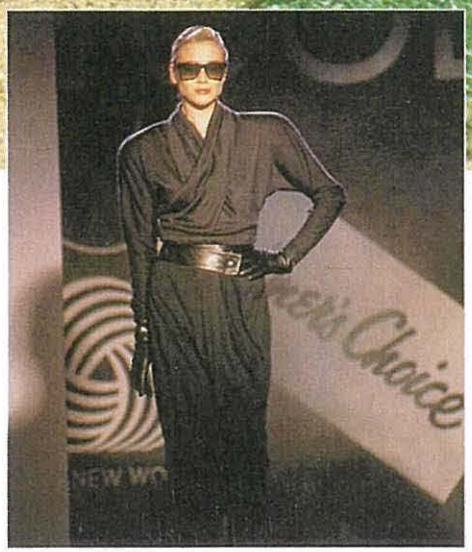


Techniques for splitting embryos are being developed to create more productive hybrid animals and to raise reproductive rates.

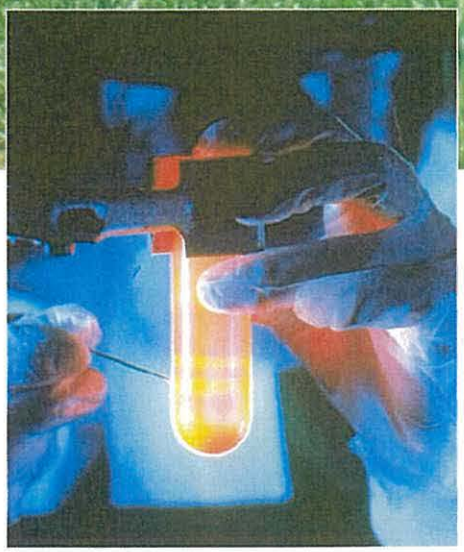
The emphasis of much medical research has been on curing diseases. CSIRO is researching the nutritional factors important to preventing disease before it begins. Heart disease and many cancers are preventable by good eating habits and a healthy lifestyle.

Other technology transfer mechanisms, including patenting, licensing, information dissemination and staff interchanges will continue to be developed. Staff will be encouraged to become more involved with industry and other users, and be rewarded for success in technology transfer.





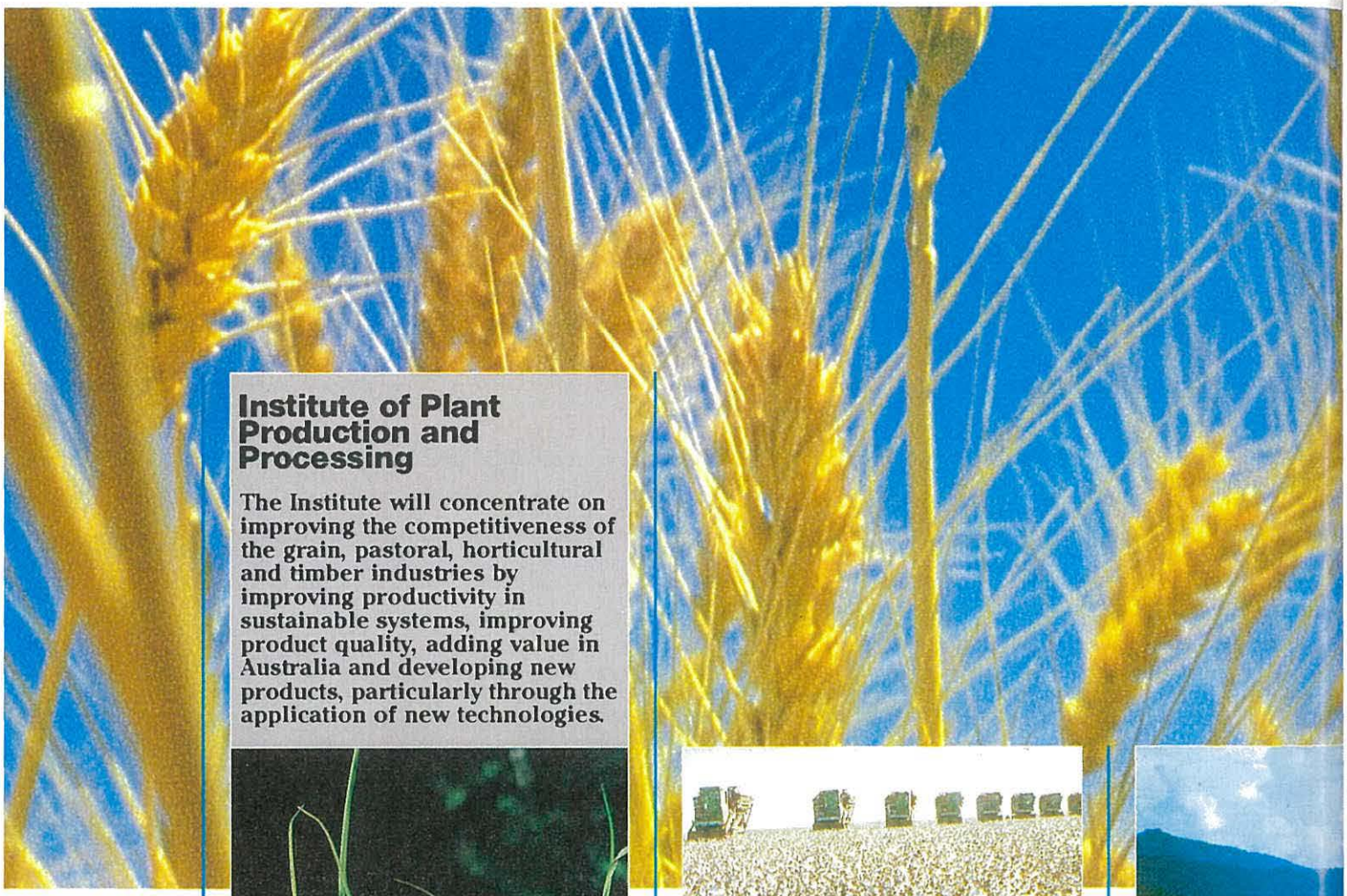
Wool has retained its place as a premier fashion fabric in the face of strong competition from synthetics largely because of research into improving the properties and processing of wool. CSIRO is continuing to develop better wool cleaning, spinning and weaving machinery and techniques.



Genetic manipulation offers great opportunities for improving the quality of Australian livestock. CSIRO is researching biological mechanisms at the molecular level to help identify ways of improving the genetic composition of farm animals.

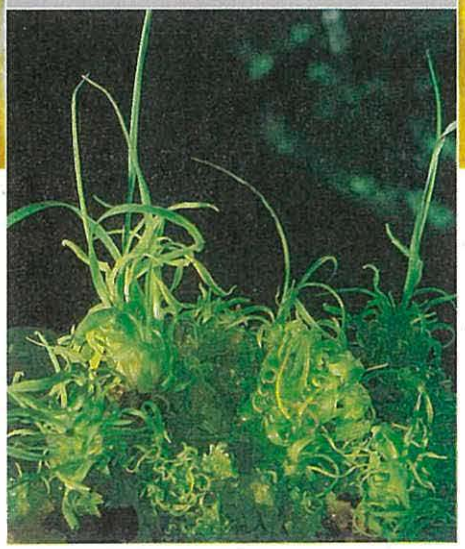
Resources

CSIRO's main task continues to be the conduct of strategic and applied research in support of national economic and social objectives. As in the past, funding of this work is to come mainly from government appropriation direct to CSIRO. There will also be a substantial increase in the amount of tactical and developmental work carried out by CSIRO,



Institute of Plant Production and Processing

The Institute will concentrate on improving the competitiveness of the grain, pastoral, horticultural and timber industries by improving productivity in sustainable systems, improving product quality, adding value in Australia and developing new products, particularly through the application of new technologies.

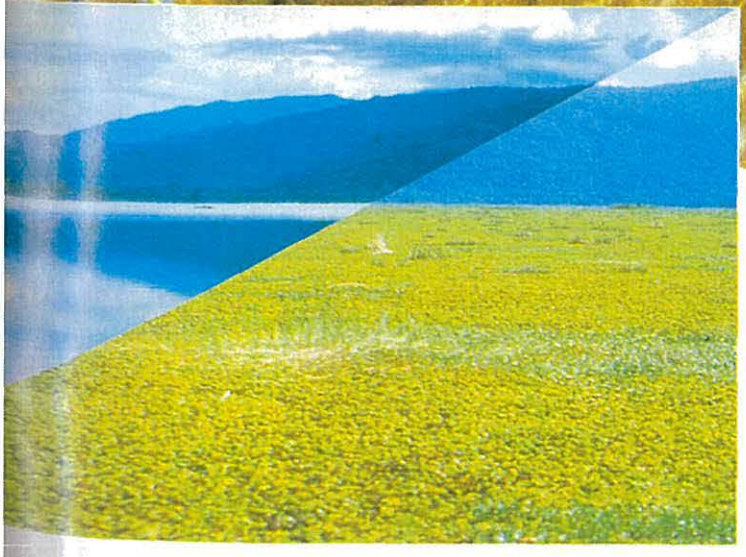


Advances in biotechnology open the way to dramatically improved plants and plant production systems. Tissue culture is being used by CSIRO to build up stocks of new plants from very small quantities of original materials with valuable genetic properties.

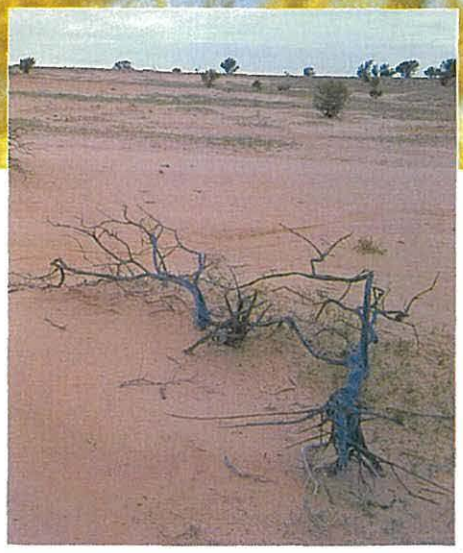
Farming is becoming increasingly dependent on applying the right knowledge at the right time. CSIRO is helping to devise 'expert systems' which provide computerised advice to farmers about pest control, irrigation and the application of fertilisers.

which will be funded mainly by users.

A greater financial contribution to CSIRO's work will be sought directly from industry. The main contribution is to be in funds for collaborative research, where companies actively participate with CSIRO. Investment in the early phases of research will be sought from industrial partners.



Biological control is particularly important to Australia because numerous weeds and other pests have been introduced without their natural predators, allowing them to run wild. Biological control provides a permanent solution at minimal cost. The lake above was cleared of a water weed by using a species of weevil.



Soil erosion is a problem for all Australians. CSIRO research is leading to better ways of managing the land to safeguard the nation's soil resources.

Streamlining

The return to Australia on funds invested in CSIRO will be optimised through improved management of research projects and financial resources.

Improved techniques will be used for the evaluation of the potential of research to create benefits for Australia, and the measurement of those benefits after the research is completed.

Institute of Natural Resources and Environment

Knowledge and management of Australia's natural environment is vitally important to the quality of life and to preserving conditions essential to many major industries. The Institute will concentrate on land use and conservation, climate, pollution, water resources, oceanography, fisheries and native flora and fauna.

Australia has a unique wildlife. Ensuring the survival of these species requires a detailed understanding of their physiology and the ecology of their habitats. Some native animals can become pests and management plans to contain their numbers need to be developed.

Bushfires can be both destructive and beneficial. Controlled burning strategies are being developed by CSIRO to preserve the natural balance of both plants and animals and to prevent catastrophic wild fires in areas such as Uluru National Park.

Community Participation

As Australia's principal scientific research institution, CSIRO is to play a more active role in encouraging young people to seek careers in science and engineering, and in communicating science-related issues to the public. We will continue to use available avenues for advice to ensure that CSIRO's research priorities are attuned to the needs of the nation.

Salinity threatens the viability of agriculture and the quality of water supplies in many parts of Australia. Unravelling the complex hydrological processes involved and developing appropriate management strategies are part of CSIRO's research effort.

Conservation of Australia's unique and diverse plant heritage requires detailed knowledge of ecosystems, and an understanding of how far the resource can be exploited without destroying it.

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