Spring 1988 Vol. 3 No. 4

Forest Products NEWSLETTER

The beginning of a new Chapter

CSIRO's Forest Products Newsletter *was a regular source of information for more than 40 years until its suspension in the early 1970s after the closure of the Division of Forest Products. It returned in its present form in 1985 and proved a valuable means of communicating various aspects of the work of the Division of Chemical and Wood Technology. With the formation of the new Division of Forestry and Forest Products this year, we see a broadening of CSIRO's application of research at the same time as an opportunity to acheive the continuum of planning and research from forest to marketplace.*

We recognise that this sort of communication is more vital than ever and so this publication will be replaced by Forestry and Forest Products Newsletter. *It will bring details of our research across the breadth and diversity of the Division's programs, from land utilisation through forestry to tree quality, wood quality and processing, fibre quality and product quality. As we look forward to the future with enthusiasm, it is entirely appropriate that this final edition of the* Forest Products Newsletter *should reflect the past.*

As a long-term senior officer of the Division, past Chief of the Division of Chemical Technology and current Honorary Research fellow with the Division of Forestry and Forest Products, Huntly Higgins is the ideal choice to compile that reflection.

Warren Hewertson
Chief,
CSIRO Division of Forestry and Forest

Divisions of Forest Products, Chemical Technology, and Chemical and Wood Technology — The Last 20 Years

H G Higgins

A brief history of the CSIRO Division of Forest Products, by Sue Preston, was published in the Forest Products Newsletter, April-May, 1968. The present account is designed to bring this up to date.

In March 1966, when Mr (later Dr) R W Muncey became Chief, the Division of Forest Products, located at 69-77 Yarra Bank Road, South Melbourne, with adjacent sites on the east side earlier taken over from Gunnersens and Lees, was organised into eight sections:- Wood and Fibre Structure (Officer-in-Charge Dr W E Hillis), Wood Chemistry, Pulp and Paper (Dr H G Higgins), Timber Physics (Mr R S T Kingston), Timber Mechanics (Dr J D Boyd), Timber Seasoning (Mr G W Wright), Wood Preservation (Mr N Tamblyn), Plywood and Gluing (Mr J W Gottstein) and Utilisation (Mr R F Turnbull). In July 1966 the names of some research sections were changed; "Wood and Fibre Structure" to "Physiology and Microstructure"; "Wood Chemistry, Pulp and Paper" to "Paper Science"; and "Timber Mechanics" to "Engineering".

About this time Ray Turnbull was seconded as Chief Scientific Liaison Officer for Australia in London, and he did not return to the Division before retiring. In August 1967 the Division was saddened by the comparatively early death of George Wright. Following these events the former Seasoning, Plywood and Gluing, and Utilisation Sections were combined into a new Timber Conversion Section with Bill Gottstein in charge.

The Assistant Chief of the Division, Dr W E Cohen, retired in June 1967 and Dr W G Kauman was appointed to this position in July 1967.

in this issue. . .

Dr Huntly Higgins

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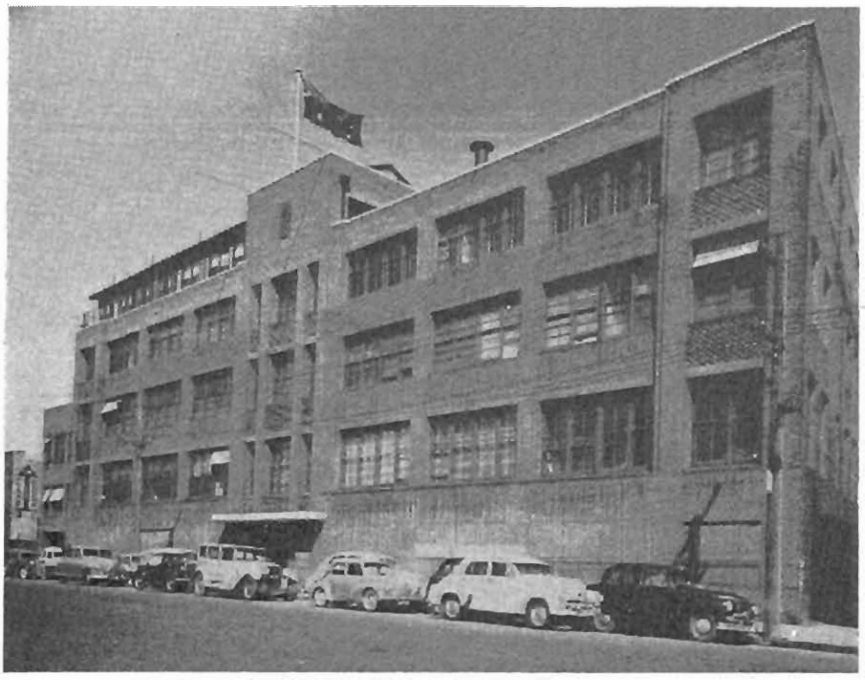
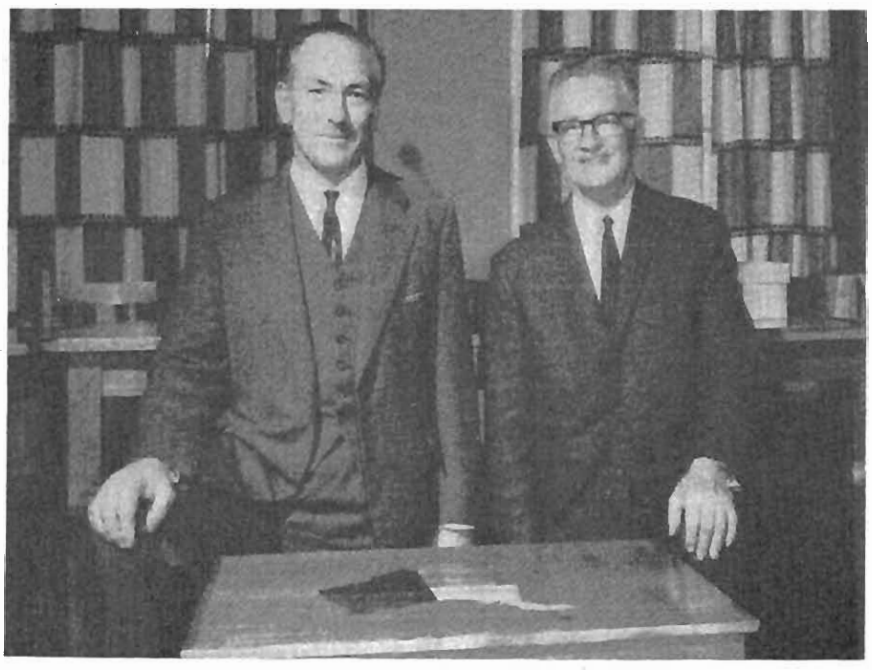


The South Melbourne laboratories occupied by the Division of Forest Products (1936-1971) and the Division of Chemical Technology (1972-1982)



Dr R.W. Murray (left) and Dr W.E. Cohen, 1967.

Reg Kingston retired in January 1971 and Mr L N (Bill) Clarke was appointed to lead the Physics Section. The Division suffered a tragic loss shortly afterwards by the premature death of Bill Gottstein as the result of a tree felling accident in New Guinea in March 1971.

The period up to 1971 was a most productive one for the Division in terms of basic research on wood and other forest products, practical application and a continuing and fruitful relationship with the forest industries. The staff were therefore ill prepared for the traumatic experience of 1971. In May of that year the CSIRO Executive took what many people regarded as the extraordinary step of transferring nearly two-thirds of the Division of Forest Products to the Division of Building Research which was located at Highett. Roy Muncey was appointed Chief of Building Research, in succession to Ian Langlands. The physical relocation took several years to accomplish. The areas of forest products affected were those most closely allied to the building industry (including timber engineering; sawmilling; veneer, plywood and adhesives; seasoning, wood preservation; timber physics) which provided some superficial rationale for the transfer. The residual areas (Paper Science, Physiology and Microstructure) were grafted on, organisationally, to elements derived from the Division of Applied Chemistry, which had its headquarters at Fishermen's Bend. As the DBR components moved to Highett, they were replaced at South Melbourne by people from Fishermen's Bend. These included the whole of the Water Treatment Group and a number of officers from other areas, who were eventually redeployed.

The splitting of DFP caused a furore among the staff and in the forest products industries. In a letter drafted by senior officers of the Division and sent to the Chairman of CSIRO, it was predicted that it would be necessary eventually for the Government to provide again for identifiable research in the forest products field. This prediction was fulfilled in 1981 when most of the groups which had gone to DBR were reunited organisationally with their former collegues.

From 1971 to 1974 the part of the Division of Applied Chemistry at South Melbourne was responsible directly to Dr D E Weiss, who moved to the site from Fishermen's Bend and was appointed Assistant Chief in 1971, and through him to the Chief, Dr S D Hamann, who remained at Fishermen's Bend. This period was characterised by some uncertainty as to the way the research programs were to be integrated. At the same time some positive effects of the changes were discernible, resulting from the areas of expertise which Don Weiss and his colleagues had brought to South Melbourne, and vigorous efforts were made to mould the new research entity into an effective and cohesive organisation.

The Section of Physiology and

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Inspecting the Mulgrave site, late 1960s. From left: J.D. Boyd, R.W. Murray, R.N. Bournow, J.W. Gottstein, H.G. Higgins, W.G. Kauman, W.E. Hillis, E.W.B. da Costa, D.E. Bland and W.M. McKenzie

Microstructure, led by Ted Hillis, changed its name to Wood and Forest Science, this was later broken up and by early 1974 research scientists and supporting staff had been transferred to two other Divisions, Building Research and Soils. Dr Hillis went to Building Research.

In 1974 Sefton Hamann relinquished the position of Chief, this led to the splitting-up of the Division of Applied Chemistry into the Divisions of Applied Organic Chemistry and Chemical Technology. Dr D H Solomon and Dr D E Weiss were appointed as Chiefs respectively. Applied Organic Chemistry continued to occupy the Fishermen's Bend site and the South Melbourne site became the Headquarters for Chemical Technology. At this time some further exchanges of staff were made between the two Divisions. I was appointed Assistant Chief of the Division of Chemical Technology in 1974.

The new Division was concerned initially with three research programs. Two of them (Renewable Resources; Water and Wastewater Purification) stemmed from similar programs in the Division of Applied Chemistry, and the former had close links with earlier activities of the Paper Science Section of the Division of Forest Products. A third program, Bioenergentics, which was a special interest of Don Weiss, was planned and was later to form one of the subprograms of the Biotechnology Program.

In 1976 the Agroindustrial Research Unit of CSIRO, a small but effective group under the leadership of Mr G A Stewart, was amalgamated with the Division, with which it was already collaborating. Based in Canberra, the Unit also carried out some agronomic research in North Queensland, but in 1980 it was considered appropriate to transfer this activity to the Division of Tropical Crops and Pastures.

The Program structure had now (1976) evolved as follows:

Cellulose Technology (Dr A J Michell, Coordinator), Water and Wastewater Purification (Dr B A Bolto), Biosynthetic Technology (Dr C C Curtain), Assessment and Development of Cellulosic Resources (Mr V Balodis), Lignin Technology (Dr D Willis), Agroindustrial Systems (Mr G A Stewart). Earlier (1975) the Cellulose Technology work and the incipient Biosynthetic Technology studies had formed the Renewable Resources Program, with Mr K D Kirby as Coordinator.

In the mid-1970s emphasis was given to building up the Division's strength in the field of chemical engineering, and a number of officers were transferred from the Division of Mineral Engineering. The period 1976-80 was characterised by an increasing emphasis on biotechnology, particularly in relation to the study of processes for the production of liquid fuels from biomass. In 1976 Cyril Curtain had been appointed to the Division as Coordinator of the Biosynthetic Technology Program, later to be renamed Biotechnology. Emphasis was placed on fermentation processes to produce ethanol and fatty acids, and some work was done on the use of vegetable oils as diesel substitutes. In related programs attention was given to the production of methane from wastes and to the potentialities of unicellular algae as a possible source of chemicals and energy. The need for a strengthening of the Division's microbiological skills was recognised and led eventually to some new appointments in this field.

In pulp and paper research increasing attention was given to the potential of high yield pulps, as distinct from the low yielding chemical pulps, and modified processes were investigated which could provide a basis for obtaining optimum pulp properties in plants of moderate size.

Work in the area of wood composite materials was consolidated around a few main themes - reconstituted wood products, applications of complex yarns to a new type of wool bale and to energy-absorbing materials, and a replacement of asbestos by cellulose fibres in fibre-cement composites.

In the field of water purification, an interest in desalintion processes was maintained, but increasing emphasis was laid on new processes for removing colour and turbidity from water supplies to render them suitable for use not only by large towns but small communities.

In February 1979, the Chief, Don Weiss, was appointed Director of the CSIRO Planning and Evaluation Advisory Unit. I succeeded him as Chief of the Division and later in the year Brian Bolto was appointed Assistant Chief. During Dr Weiss' term of office a firm foundation was laid for the development of productive and imaginative

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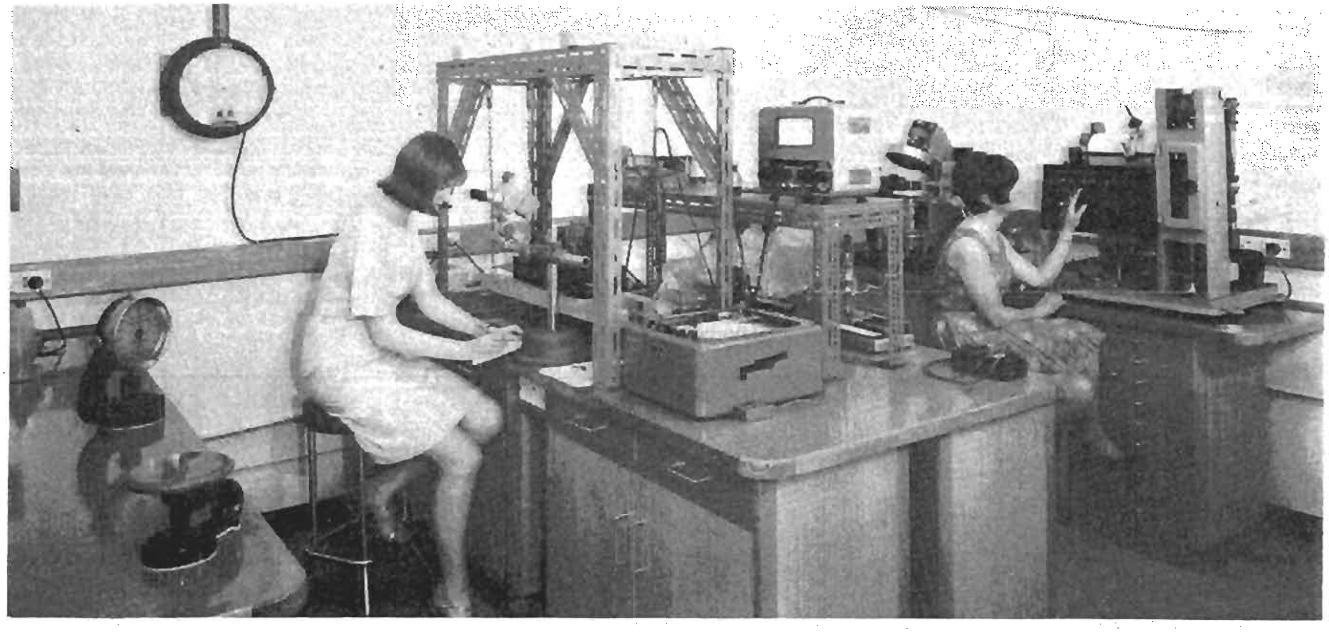

Part of the Paper Testing Laboratory, late 1960s, showing the Single Fibre Microcheometer (left) and the DFP Paper rheometer (right) being operated by Heather Rolfe and Jan Hamilton respectively.

programs in the fields of lignocellulose and water purification, and a considerable degree of program integration was attained.

The philosophy of the Division, insofar as it could be generalised in 1980, had developed in line with contemporary ideas regarding the value of strategic, mission-oriented research. With the introduction of the Institute structure in CSIRO, the Division became a component of the Institute of Industrial Technology in 1978, and, appropriately, it was concerned with the development of processes to help industry to provide products and services of value to the community. Equally, however, its concern was to develop a particular set of natural resources in the most effective way.

At this time the function of the Division of Chemical Technology was defined as the application of chemical and biological technology to the utilisation and processing of renewable resources such as forests, residues from forest and agricultural industries, algae, water and wastewater. Research areas included: fibre separation and pulping; development of pulpwood resources; cellulose-based composite materials; the use of biological systems for the production of chemicals and energy, particularly liquid and gaseous fuels; the development of agroindustrial systems; and technologies for purifying and recycling water.

In 1979 the Parliamentary Standing Committee on Public Works recommended that approval be given for work to proceed on a new laboratory complex for the Division, to be located on the CSIRO site adjacent to Monash University, Clayton. Building commenced in the middle of 1980, and was completed at the end of 1982.

It should be noted that the Division of Forest Products had acquired land as early as 1968, at Mulgrave, with the aim of erecting a new laboratory. However, with the organisational changes of 1971 these plans came to nought.

Towards the end of 1980 a Committee was set up by the CSIRO Executive to review the Division, and a report was presented in January 1981 which stated, *inter alia*, that the Division's research programs were consonant with perceived needs and priorities in relation to two important natural resources, lignocellulose and water.

Dr D.E. Weiss, First Chief of the Division of Chemical Technology

On 1st July 1981 groups concerned with Wood Science, Forest Conversion Engineering, and Conservation and Biodegradation (formerly Wood Preservation) were transferred back to the Division from the Division of Building Research. However they continued to be located at Highett.

The research programs were now as follows:- Cellulose Technology (Coordinator Dr A J Michell), Water and Wastewater Purification (Dr B A Bolto), Biotechnology (Dr C C Curtain), Pulping and Pulpwood Resources (Mr V Balodis), Chemical Conversion (Dr A F A Wallis), Agroindustrial Systems (Mr G A Stewart), Wood Science (Dr W E Hillis), Forest Conversion Engineering (Mr M W Page) and Conservation and Biodegradation (Dr H Greaves). The total staff of the Division was about 180, an increase of about 40 on the number before the transfer of the Highett groups. In 1971 the staff of the Division of Forest Products had exceeded 230.

Having reached the mandatory age, I retired as Chief in July 1982, but continued my connection with the Division as an Honorary Research Fellow. Brian Bolto was

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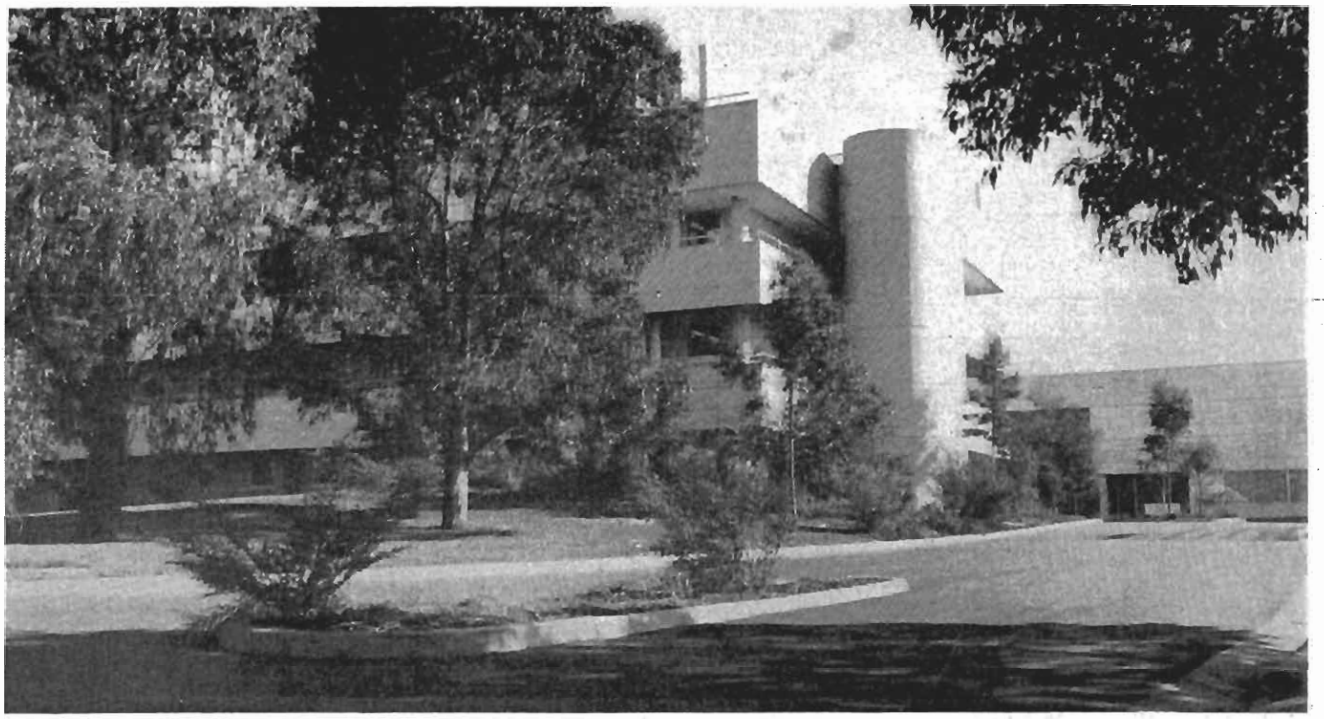

The Division of Forestry and Forest Products Headquarters at Clayton

Acting Chief until Dr Warren Hewertson, formerly of ICI, England, commenced duty early in 1983 as the new Chief. The move to Clayton was also completed about this time. The old laboratories at South Melbourne had served the Division well, but they had become overcrowded, out-of-date and hazardous, and the move to the splendid new facilities at Clayton was welcomed by the great majority of the staff.

The name "Chemical Technology" had never been a particularly apt description of the Division's activities, and after the review in 1980 it was suggested that a Division of Cellulose Research be formed, with separate units for water and microbiology research. In the event, however, no such fragmentation occurred, and the name "Chemical and Wood Technology" was adopted to accommodate sustained representations from industry and others for a more readily identifiable focus for forest products research.

In 1983 a small group, Agricultural Engineering, from the former Division of Mechanical Engineering, joined the Division and became the tenth research program, with Dr G R Thorpe as Coordinator. However in 1986 the group was again transferred, this time to the Division of Entomology.

The relocation at Clayton had additional advantages in that the Division became part of a powerful CSIRO research complex. The Divisions of Chemical Physics and Mineral Engineering were located one on each side of the new laboratories, and plans were afoot for the Divisions of Materials Science and Applied Organic Chemistry to move to the site. In addition the laboratories were immediately adjacent to Monash University.

In May 1984 the new laboratories were officially opened by the Prime Minister, and in November the complex to be occupied by Chemical and Wood Technology and Applied Organic Chemistry, which were to share a number of facilities, was dedicated to Sir Ian Wark, the first Chief of the Division of Industrial Chemistry and later a member of the CSIRO Executive.

With Dr Bolto as Assistant Chief, Mr W G C Raper became Coordinator of the Water Program. Other changes were Mr F J Christensen becoming Coordinator of the Forest Conversion Engineering Program on Mr Page's retirement, Dr G Gartside becoming Coordinator of the Techno-Economic Assessment Program on Alan Stewart's retirement (to become an Honorary Research Fellow), and the establishment of the Industrial Microbiology Program with Mr G M Black as Coordinator. At the end of 1986 the Chief announced that from January 1987 the Division would be structured around four major research activities, each working under the control of a Program Manager. The Programs and Managers' were Wood Processing (Dr H Greaves), Fibres and Chemicals (Dr G Gartside), Water (Mr W G C Raper) and Biotechnology (Mr G M Black). Dr Don Willis, who had been appointed Assistant to the Chief in 1979, became Research Services Program Manager.

As part of a major restructuring of CSIRO in 1987, the Division of Chemical and Wood Technology was combined in January 1988 with the Division of Forest Research under the name Division of Forestry and Forest Products. The Water Group was transferred to the new Division of Chemicals and Polymers, and the Biotechnology Group was transferred to the new Division of Biotechnology. The Adhesives Group of the Division of Building Research, formerly transferred from the old Division of Forest Products in 1971, returned to the new Division of Forestry and Forest Products. The cycle is thus almost complete, only the Timber Engineering Group remaining outside the Forest Products fold. The closer organisational links between

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forestry and forest products are to be welcomed and reflect a policy in accordance with that expressed by many in 1971.

Dr Warren Hewertson has been appointed Chief of the Division of Forestry and Forest Products, with Mr Alan Brown, in Canberra, as Deputy Chief and Dr Harry Greaves and Dr Sadandan Nambiar as Assistant Chiefs.

The Divisions have had many notable scientists and technologists. Among those who have retired or taken up other positions in the last 20 years (excluding those who have been mentioned already) are: Stan Attwood (Divisional Engineer), Les Armstrong (Wood Rheology), John Beesley (Wood Preservation), Dave Bland (Lignin Chemistry), Nora Bolza (Timber Mechanics), Ray Bouruon (Timber Structures), Leo Brennan (Timber Seasoning), George Campbell (Timber Seasoning), Bailey Carrodus (Wood Structure), Geoff Christensen (Sorption in Wood), Frank Christensen (Timber Seasoning), Bill Clarke (Timber Physics), Jim Colley (Paper Physics), Ross Cowling (Timber Utilisation), Bill Da Costa (Mycology, Wood Preservation), John De Yong (Paper Physics), Dick Donaldson (Physics), Frank Dale (Preservation), George Davies (Wood Structure), Noel Edwards (Physics), Kurt Eppinger (Water Purification), Rick Finighan (Seasoning), Ralph Foster (Wood Structure), Keith Fricke (Seasoning), Vic Garten (Fundamentals), Paul Grossman (Wood Rheology), Dick Head (Physical Chemistry), Dick Hemingway (Extractives), Ron Hinde (Assistant to Chief), Ken Hirst (Adhesives), Bob Ingle (Wood Anatomy and Identification), Bill Keating (Utilisation), Harry Kloot (Timber Mechanics), Ron Johanson (Inorganic Preservatives), Alan Logan (Pulping), Ron Liversidge (Timber Conversion), Dan McCarthy (Wood Preservatives), Joe Mack (Timber Mechanics), Bill McKenzie (Wood Cutting Utilisation), Lyn Osborne (Preservation), David Packham (Fire Research), Merv Page (Sawmilling, Utilisation), Ron Pearson (Timber Mechanics), Frank Phillips (Pulp and Paper), Ken Plomley (Adhesives), Bruce Poppleton (Crystal Structure), Greg Reardon (Timber Mechanics), Alan Rosel (Preservation), Anne Ryan (Timber Mechanics), Roger Sands (Tree Physiology), Lotse Santer (Divisional Engineer), Lou Shain (Wood Structure), Gordon Scurfield (Wood Structure), Rosemary Siudak (Water Purification), John Smelstorius (Wood Chemistry), Bob Swinton (Water Purification), Bob Vines (Climatology), Neville Walters (Mycology), Alf Watson (Pulp and Paper), Malcolm Winfield (Catalysis), Lon Wymond (Information).

John Mills (Carbohydrate Chemistry), who was attached to the Division of Chemical Technology, although working at the University of New South Wales, died in 1977. Andy Stashevski (Plywood and Gluing) also died before reaching retiring age, and the following have died after retirement - Ray Bourn (Engineering), Ken Hirst (Plywood), Reg Kingston (Physics), Clive Schuster (Engineering) and Charlie Stewart (Wood Chemistry). Frank Priest (Technical Secretary) retired in May 1975 on grounds of ill health, and died later.

People in research support and other categories who have retired or moved on during this period include Barbara Ashbolt (Secretary), Bob Bain (Pulp and Paper), Frank Butler (Senior Clerk), Ann Forbes (Librarian), Ollie Fyfe (Canteen), Wally Hastie (Photography), Ron Henderson (Draughtsman), Paul Kightly (Electron Microscopy), Leon Lau (Wood Structure), Norm Lynch (Carpenter), Mike Menshun (Chemistry), Alf Moroni (Cabinet Maker), Mary Parsons (Wood Anatomy), Jack Pattison (Administration), Ralph Periera (Pulp and Paper), John Read (Maintenance), Anna Yuritta (Pulping), and Elizabeth Zerdoner (Wood Chemistry).

Among those still working in the Division of Forestry and Forest Products (mid-1988) who were in the Divisions which preceded it at the time of the 1971 upheaval are:

From the Division of Forest Products - Bill Balodis, John Barnacle, Frank Christensen, John Coleman, Olga Collett, Jim Creffield, Carl Garland, Harry Greaves, Kevin Harrington, Ted Hillis (who became an Honorary Research Fellow in 1986), Doug Howick, Yugo Ilic, Goran Langfors, Barry McCombe, Alex McKenzie, Bob McNamee, Tony Michell, Peter Nelson, Bruce Nicholson, Andrew Rozsa, Adrian Wallis, John Ward and Yoshi Yazaki.

From the Division of Applied Chemistry - Bob Coutts, Louis Kolarik, David MacArthur, Norm Pilkington, and Tony Sioumis.

Several others were foundation members of the Division of Chemical Technology, including Dave Dixon, Rob Eldridge, Geoff Irvine, Merv Jackson and Noel Whelan, who has been the senior administrative officer through to the present time.

Over the whole period which has been briefly reviewed above there has been increasing emphasis on the applications of research and on ways of ensuring that process innovations and new products are transferred to the industrial level as soon as possible. During much of the period, particularly in recent years, this has had to be accomplished in a climate of diminishing Government funding, in real terms.

It is beyond the scope of this article to summarise the achievements over the last 20 years, and reference should be made to the Annual Research Reviews and other relevant publications. However, mention can be made of practical advances in the following areas:-

- Seasoning processes
- Sawmilling and conversion processes
- Continuous-feed timber drier
- New wood preservatives
- Veneer and plywood production
- Railway sleepers
- New consolidated wood product
- Fluid-bed carbonisation of wood residues
- Development of new forest resources for pulp production
- Pulping of tropical hardwoods
- Chemithermomechanical pulping
- Applications of explosive defibration (Siropulper)
- Ethanolamine pulping
- Applications of press drying of paper
- Air impingement device for paper drying
- Additive application at paper machine wet end
- Papermaking from kenaf
- Improving sugarcane bagasse quality for pulping
- Cellulose fibre-reinforced cement composites
- Composite paper-wrapped yarns for improved wool packs

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High-speed process for waxing corrugated fibreboard boxes
Relative humidity measurement and control
Wood chip destructuring in relation to pulping
The Sirotherm process for water desalination
Magnetic ion-exchange resins
Magnetic filter aids
Removing colour and turbidity from water (Sirofloc)
Decolorisation of mill effluents
Alternating aerobic/anaerobic activated sludge systems
Ozone-induced chemiluminescence for water analysis
Treatment of piggery waste
Solid-phase fermentation for ethanol production
Novel separation of alcohol from fermentation liquors
Separation of volatile fatty acids from fermenter effluent
Production of beta-carotene
Vegetable oils as diesel fuels and lubricants
Induced resin formation in pines
High temperature disinfestation of grain
Assessment of agroindustrial systems

Underpinning much of this work has been a series of more basic studies in the following fields:-

Wood anatomy
The nature of the cell wall
Cell contents
Wood chemistry
Chemistry of lignin and lignification
Polysaccharide chemistry
Chemistry of pulping and delignification
Adhesion and adhesives
Hydrogen bonding and crystal structure
Rheology of wood and paper
Design of timber structures
Fracture in wood, paper and composites
Moisture movement in wood
Drying stresses in wood
Collapse and recovery in wood
Water sorption and swelling of wood
Glass transitions in lignin and wood
Mechanism of cutting wood
Physics of paper and papermaking processes
Electrokinetic properties of fibres
Permeability of fibre networks
Mechanism of beating
cellulose fibres
Relationship between wood, fibre and paper properties
Timber mycology
Timber entomology
Biosynthetic production of chemicals
Membrane biochemistry
Recombinant DNA technology
Anaerobic fermentation
Digestibility of lignocellulosic substrates
Readily regenerable ion-exchange systems
Oxidation resistant resins for Sirotherm process
Polymer chemistry

Over the last 20 years members of the Division have received recognition in various ways (apart from the internal promotion system), including the following external honours and awards- CSIRO Medal (1), Fellow, Australian Academy of Science (1), Fellow, Australian Academy of Technological Sciences (4), President (1) and Fellow (3 others), International Academy of Wood Science, Senior Doctorate (5), Leighton Memorial Medal, RACI (1), Applied Research Medal, RACI (1), President, Appita (3), L R Benjamin Medal, Appita (2), Oertel Nadebaum Distinguished Service Award, Appita (2), Honorary Life Member, Appita (2), President, International Association of Scientific Papermakers (1), Ian McLennan Technology Award (1), Plant of the Year Award, Society of Chemical Industry (1), Humphreys and Glasgow Medal and Prize, Institution of Chemical Engineers (1), Grimwade Prize, University of Melbourne (1), Victorian Engineering Excellence Award, Institution of Engineers (1), Michael Flynn Award, Australian Water and Wastewater Association (1), Visiting Professorship (1), Honorary Life Member, Society of Chemical Industry (1), President, Australian Society of Rheology (1), Coordinator, Forest Products Division, International Union of Forest Research Organisations (1), Officer of the Order of the British Empire (1), Stanley Clarke Medal, Institute of Wood Science (3) and Churchill Fellow (1).

Officers of the Division have served with distinction, both nationally and internationally, on many professional committees, editorial boards and so on. Throughout the period reviewed the Chief or Assistant Chief has been an Observer on the Standing Committee of the Australian Forestry Council. Another important aspect of the Division's work has been in providing technological assistance to many other countries, mostly in the underdeveloped sectors of the world. These efforts alone would warrant a long chapter in the history of the Divisions. Similarly an account of the Divisions' relations with industry and with Government agencies (particularly State forestry and water supply authorities) could fill many chapters.

It should be emphasised that this account does not include the history of the Forest Products components which were part of the Division of Building Research between 1971 and 1981. Similarly the present article does not deal with the prior history of those groups and individuals who came to South Melbourne from Fishermen's Bend in the early seventies. Such accounts can best be written by members of the groups concerned.

The most controversial and far-reaching event in the last 20 years was undoubtedly the dismembering of the Division of Forest Products in 1971. The motives behind the reorganisation are not generally known. What is clear is that the experience and good judgement of the Division's staff, the forest products industries, forestry authorities and research colleagues in other countries were not brought into play. All this is now history, and its main value may be in helping us to make wise decisions for the future. As Churchill said in 1936, "*the use of recriminating about the past is to enforce effective action at the present.*"

For further information on this epoch the best references are the Annual Reports of the Divisions of Forest Products and Applied Chemistry and the Annual Research Reviews of the Divisions of Chemical Technology and Chemical and Wood Technology. Listed therein are about 800 papers and many patents describing the research conducted over the 20-year period.

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CSIRO Division of
Forestry and Forest Products

During Australia's pioneering years, settlers cleared much of the native forests for agriculture. Nowadays, the area of forest land is less than one-third of that which existed when Captain Cook arrived in 1770. In the first half of this century, the forest resource available to Australian industry was essentially old-growth native forest dominated by a variety of eucalypts. Although the establishment of softwood plantations began in South Australia as early as 1876, it expanded slowly until the 1930s. CSIRO's early research was aimed at making better use of the old-growth forests and improving the success and quality of exotic plantations.

Native forests and woodlands seldom produce as much timber as intensively-managed plantations grown in an equivalent area. Large scale softwood plantations complement production from native forests by supplying raw material for Australia's valuable forest products industries. There is increasing interest in an expanded role for eucalypt plantations

CSIRO in collaboration with State forest services and industry, began over 60 years ago to collect information on the properties and best uses of Australian hardwoods. Methods which CSIRO developed have been so successful that Australia now leads the world in many areas of forest-based technology, including the production of paper from hardwoods.

Today, CSIRO is still strongly committed to research for Australian Industry. Research on forests is mainly undertaken in the Division of Forestry and Forest products, integrating research on land use production and processing of wood. This Division was formed in January 1988 from the Divisions of Forest Research and Chemical and Wood Technology. Research is of two main types: (a) longer-term strategic research that will help shape the future of the industry; and (b) collaborative and contract research with individual companies and States.

The Division's aims are to:

- enhance our understanding of the ecology and the basis for sustained productivity of forests;
- develop strategies and techniques for management of forests for multiple uses including wood production, water supply and ecosystem conservation;
- develop technologies for increasing the profitability of forest-based industries through efficient use of wood resources and development of new products.

CHIEF - Dr W. Hewertson

DEPUTY CHIEF - Mr A.G. Brown

ASSISTANT CHIEFS - Dr H. Greaves
Dr E.K.S. Nambiar

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Australian Tree Resources - Mr A.G. Brown
Fibres and Chemicals - Dr G. Gartside
Intensively-Managed Temperate Eucalypts - Dr G.A. Kile
National Bushfire Research Unit - Mr N.P. Cheney
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Radiata Forests - Dr E.K.S. Nambiar
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