

1975

—
QUEENSLAND

ANNUAL REPORT

OF THE

DEPARTMENT OF FORESTRY

FOR THE

YEAR 1974-75

PRESENTED TO PARLIAMENT BY COMMAND

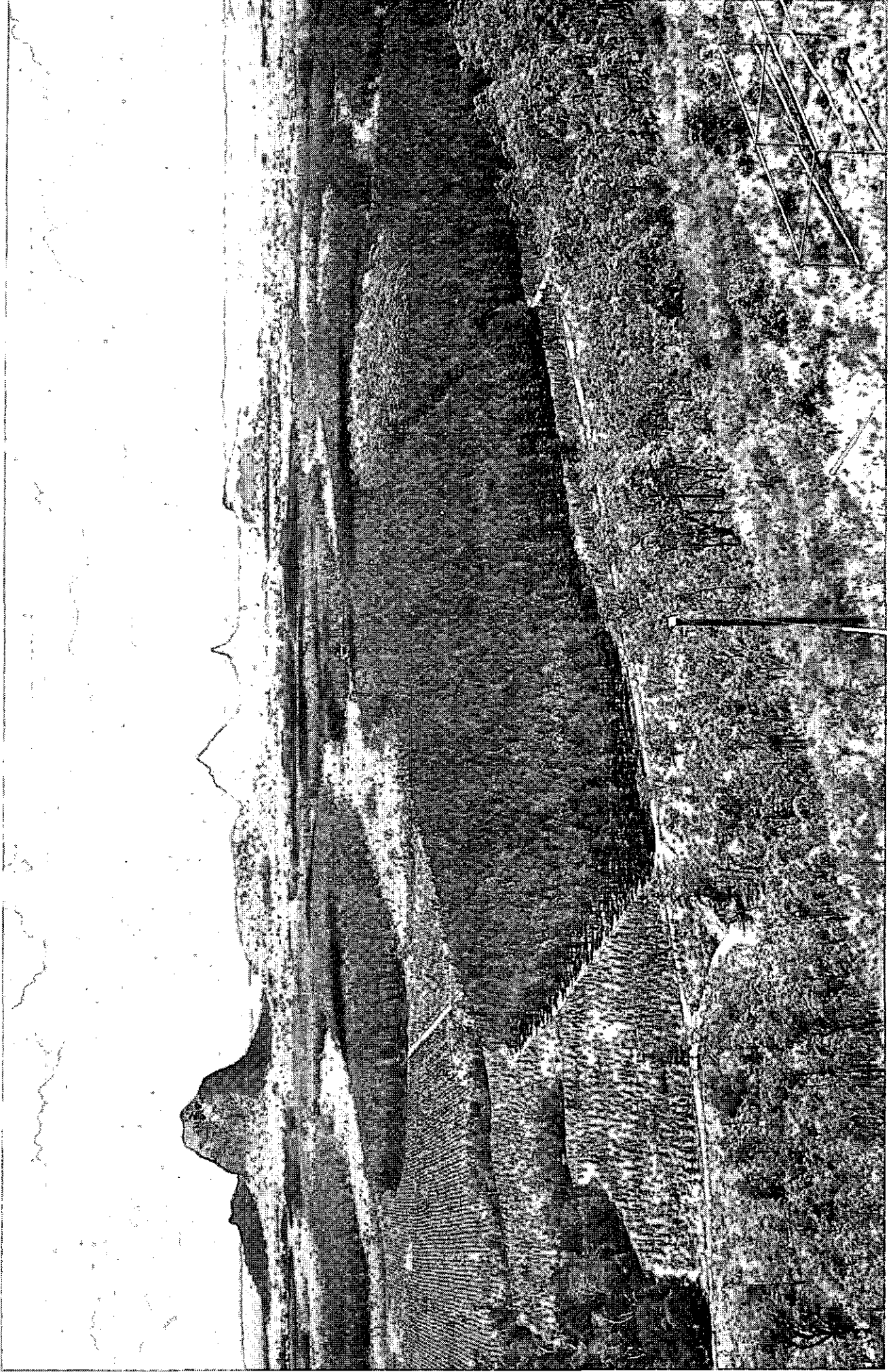
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View of Exotic Pine Plantations from Wildhorse Mountain—State Forest 611 Beerwah—Brisbane District.

ERRATUM

Annual Report of the Department of Forestry for the year ended 30th June, 1975—pages 1 and 2.

The first three paragraphs under "Management" (including Table on page 2) are deleted and the following is inserted in their stead:—

"MANAGEMENT

General

The area of State Forest as at 30th June, 1975, was 3 292 290·530 hectares a nett increase of 29 202·285 hectares.

Expenditure

Expenditure under the Reforestation Vote was \$10,741,040 compared with \$8,415,499 in 1973-74. Expenditure from Trust Funds on projects associated with the Reforestation Vote was \$291,371.

Expenditure is itemised as follows:—

| Item | Expenditure | Percentage of Total |
|---|--------------|---------------------|
| Direct Expenditure of Projects— | \$ | % |
| Plantations | 2,804,077 | 24·4 |
| Natural Regeneration | 592,831 | 5·2 |
| Nursery Expenses | 337,635 | 2·9 |
| Research | 397,248 | 3·5 |
| Protection | 1,258,813 | 11·0 |
| Surveys | 92,947 | 0·8 |
| New Construction | 233,469 | 2·0 |
| Seed Collection | 60,216 | 0·5 |
| Maintenance of Capital Improvements | 284,049 | 2·5 |
| Total Direct Expenditure .. | \$6,061,285 | 52·8 |
| Indirect Expenditure— | | |
| Wet Time, Holidays and Leave .. | 1,689,258 | 14·7 |
| Tools, Cartage, Award adjustments | 2,000,834 | 17·4 |
| Camp Allowance | 315,972 | 2·7 |
| Pay Roll Tax | 394,668 | 3·4 |
| Workers' Compensation | 202,118 | 1·8 |
| Administration | 338,255 | 2·9 |
| Material Suspense | 172,076 | 1·5 |
| Small plant purchase | 195,301 | 1·7 |
| Miscellaneous | 124,412 | 1·1 |
| Total Indirect Expenditure .. | \$5,432,894 | 47·2 |
| TOTAL EXPENDITURE | \$11,494,179 | 100·0 |

(Total Expenditure includes \$465,001 received on account of Aboriginal Advancement Fund, Commonwealth Unemployment Relief, Flood Submergence Claim, Apprentice Training Scheme and Regional Employment Development Scheme.)"

REPORT OF THE CONSERVATOR OF FORESTS

For the Year ended 30th June, 1975

TO THE HONOURABLE THE MINISTER FOR LANDS, FORESTRY, NATIONAL PARKS AND WILDLIFE SERVICE

INTRODUCTION

During the year under review there were a number of changes which will affect the long term planning of the Department.

Perhaps the most significant was the commencement of an Organisational Development programme directed at improving the overall performance of the Department, even though this is regarded as being of a reasonable standard at the present time. This O.D. programme will be a long term effort to achieve meaningful Departmental change through the collaborative effort of Departmental staff, and it has already stimulated very considerable staff interest.

On the Harvesting and Marketing side approval given to replace the regular six monthly auction sales for Crown log timber, comprising about half the total volume sold, by a system of non-competitive sales represented a major policy change. Although the Department had been looking at the possibility of such a change for some time this was in fact precipitated by a decision handed down by the Trades Practices Commission that "pre auction" meetings held by Timber Industry Associations to allocate lots were in contravention to the Trade Practices Act. The Department now has the problems of lot allocation but administration economies should result, and the industry will be in a position to make long term plans in such areas as sawmill machinery replacement, with assured log availability from Crown lands at a known level. Where there is Crown timber surplus to the requirements of existing sawmills it is proposed to continue the present practice of offering at auction lots representing the annual sustainable yield from this surplus, with the successful purchasers securing the right to new or additional sawmill license capacity and continuing log supply.

In this latter category the first sale of plantation pine in the Rockhampton District attracted keen competition at the auction held on 27th September, 1974, and this sale will lead to the establishment of a substantial new industry in the Yeppoon area. The sale covered Caribbean and Slash Pine on the Byfield State Forest with an annual availability of 9 000 cubic metres which will increase in stages to 24 000 cubic metres by 1980.

Another milestone has been the erection at Gympie of a new particleboard plant, being the second established by Woodland Limited to operate pulpwood from Crown plantation areas. This new plant will increase employment opportunities in the District to a significant extent.

Finance available for reforestation was at approximately the same level as in 1973-74 in real money terms and the successful containment of operating costs allowed the plantation establishment rate to be maintained, with a total for the year of 5 460 hectares.

Following a review of research data and cost trends it was decided to reduce expenditure on pruning, particularly in exotic pine plantations. The new formula will restrict pruning to higher quality stands than previously, and in these stands the height of final pruning will reduce from 6.4 metres to 5.2 metres.

A successful aerial ignition programme was again carried out in natural forest areas during the cooler winter months, to lower fuel concentrations and reduce the possibility of dangerous wildfires in the summer. These wildfires can be damaging to timber stands and the associated bush fauna, and threaten life and property.

Success has also been achieved with prescribed burns lit by hand under suitable conditions within coastal exotic plantation areas. Experiments have established that these burns

have little effect on growth, but can be a major factor in the control of lantana and groundsel. Areas burnt two years ago are still reasonably safe. They would not run a damaging fire and men could be put on any fire front with safety.

Research work reported last year on the open root planting of Hoop and Carribbean Pine has been continued, and satisfactory techniques seem to have been determined. The abandonment of the use of container grown stock now appears to be a real possibility, with considerable savings in establishment cost.

In a different field a co-operative experiment with the Wanamara Pastoral Co. has been established to test the feasibility of producing improved pastures in widely spaced Spotted Gum stands. Combined timber and beef values from the area carrying improved pastures will be compared with similar values on normally treated forests, and may suggest an alteration of emphasis in the multiple use of State Forests, as now accepted.

A matter of increasing concern at the present time is the demand for areas of State Forest for such purposes as water storage by Local Authorities and siting of transmission lines by Electricity Authorities. Unfortunately this demand is greatest in South East Queensland because of population density, which region is one of acute log supply shortage relative to sawmill capacity. Furthermore money has been spent on treatment of some areas involved, with contribution to loan debt. It is accepted that water and electricity must be provided for general community benefit but all practical alternatives should be examined in these circumstances before any State Forest areas are lost to timber production. Whilst agriculture and grazing may be continued under power lines this is not possible with timber production.

Another change with major significance has been the establishment by the Government of an independent National Parks and Wildlife Service, incorporating the National Parks Branch of this Department. This will end sixty seven years of direct association with National Parks, over which period it is thought a great deal was achieved and a sound basis established for further development. The Director of the new Service may be assured of co-operation in the future.

It is considered that Recreation Areas, within managed State Forests being developed by the Department for public use will be complementary to National Parks facilities, and may help to ease the present pressures on National Parks.

Mr. C. Haley retired as Conservator of Forests at the end of the period under review and I should like to place on record an appreciation of his contribution to Forestry during his long period of service. As Conservator he earned the respect of officers within the Department, and of members engaged in the timber industry.

MANAGEMENT

General

The area of State Forest as at 30th June, 1975, was 3 292 290.530 ha a nett increase of 29 202.285 ha.

Expenditure

Expenditure under the Reforestation Vote was \$12,048,808 compared with \$8,415,499 in 1973-74. Expenditure from Trust Funds on projects associated with the Reforestation Vote was \$291,371.



Picnic and Recreational Area at Reserve 69 Bunya—Brisbane District.

Expenditure is itemised as follows:—

| Item | Expenditure | Percentage of Total |
|---|---------------------|---------------------|
| Direct Expenditure of Projects— | \$ | |
| Plantations | 3,650,077 | 29.6 |
| Natural Regeneration | 592,831 | 4.8 |
| Nursery Expenses | 337,635 | 2.7 |
| Research | 397,248 | 3.2 |
| Protection | 1,258,813 | 10.2 |
| Surveys | 92,947 | 0.8 |
| New Construction | 233,469 | 1.9 |
| Seed Collection | 60,216 | 0.5 |
| Maintenance of Capital Improvements | 284,049 | 2.3 |
| Total Direct Expenditure | \$6,907,285 | 56.0 |
| Indirect Expenditure— | | |
| Wet Time, Holidays and Leave | 1,689,258 | 13.7 |
| Tools, Cartage, Award adjustments | 2,000,834 | 16.2 |
| Camp Allowance | 315,972 | 2.6 |
| Pay Roll Tax | 394,668 | 3.2 |
| Workers' Compensation | 202,118 | 1.6 |
| Administration | 338,255 | 2.7 |
| Material Suspense | 172,076 | 1.4 |
| Small plant purchase | 195,301 | 1.6 |
| Miscellaneous | 124,412 | 1.0 |
| Total Indirect Expenditure | \$5,432,894 | 44.0 |
| Total Expenditure | \$12,340,179 | 100.0 |

(Total Expenditure includes \$465,001 received on account of Aboriginal Advancement Fund, Commonwealth Unemployment Relief, Flood Submergence Claim, Apprentice Training Scheme and Regional Employment Development Scheme).

Timber Assessment

During the year assessment surveys in the Department's plantations covered exotic areas. Plots, sampling 7 000 ha were remeasured and new plots were established to sample 1 000 ha of younger plantations.

Remeasures of plots on two major coastal hardwood reserves were completed covering 6 000 ha.

Stripping for resource purposes comprised the bulk of the year's work and covered 67 000 ha of Cypress Pine and 38 000 ha of hardwood forest in Crown land and 2 000 ha of Cypress Pine on State Forest.

Considerable interest has been expressed in the resource of wood in the hardwood forests in South Queensland for wood chips production. These forests are fully committed to supply the established sawmilling industry, as well as producing sleepers, round timber fencing and mining timbers. Despite this there are large volumes of wood being wasted, in sawmill off cuts, logging waste, clearing operations, and useless trees destroyed in silvicultural operations that would be suitable for pulping. One firm in South Queensland has been using this material for many years, but there is still a large volume available surplus to this firm's current requirements.

Surveys are presently being done to assess this volume.

In September, 1974 a joint Forestry, National Parks, Australian Forest Research Institute and Australian Department of Conservation and Environment, survey was made of parts of the Cape York Peninsula using Royal Australian Air Force helicopters, to overcome the problems of moving field parties in a vast area with very limited access.

From the limited and very extensive survey made, the area of commercial forest outside the Weipa area is much smaller than previously thought and the quality is suspect so much more detailed study will be necessary before the resource is adequately assessed and the effect of cutting on the environment fully considered.

Valuation of Timber for Conversion of Tenure

This year there was a marked decline in the number of freeholding applications received although the area involved was similar to the average for the past 5 years. This has allowed field work to catch up on outstanding applications.

Ninety-two per cent. of all applications have now been valued and in about half the remaining cases the Department is negotiating with the lessees for surrender of land for State Forest purposes.

The table below sets out for comparison the current position of dealing with freeholding applications in comparison with past years.

COMPARATIVE POSITION RE FREEHOLDING APPLICATIONS AT THE END OF JUNE 1973, 1974 AND 1975

| | As at 30th June, 1973 | | As at 30th June, 1974 | | As at 30th June, 1975 | |
|--|-----------------------|-------------------|-----------------------|-------------------|-----------------------|-------------------|
| | No. | Area | No. | Area | No. | Area |
| Total applications made | 3,167 | 10 285 000 | 3,312 | 10 691 000 | 3,418 | 11 059 000 |
| Withdrawn | 32 | 98 000 | 33 | 96 000 | 39 | 120 000 |
| Total requiring valuation | 3,135 | 10 187 000 | 3,279 | 10 595 000 | 3,379 | 10 939 000 |
| Valuation complete— | | | | | | |
| (a) Determined by Court | 2,668 | 8 449 000 | 2,768 | 8 783 000 | 2,886 | 9 276 000 |
| (b) awaiting determination | 207 | 621 000 | 277 | 904 000 | 217 | 539 000 |
| Field assessment complete—Not yet valued | 191 | 925 000 | 91 | 467 000 | 164 | 754 000 |
| Awaiting Field assessment | 69 | 192 000 | 143 | 441 000 | 112 | 370 000 |
| Totals | 3,135 | 10 187 000 | 3,279 | 10 595 000 | 3,379 | 10 939 000 |

Protection

SEASONAL CHARACTERISTICS.—The months of July and August were dry and ideal for protection burning. The onset of spring rains in mid-September resulted in a milder than average fire season.

FIRE INCIDENCE.—One hundred and forty-six fires were reported as attended by departmental employees as against 47 in 1973-74. Eighteen fires were in excess of 400 ha and two in excess of 4 000 ha. The bulk of country involved in these large fires was privately owned or unprotected low value State Forest. Nine fires occurred in plantations covering a total area of 6 ha. Two successful prosecutions for breaches of the Rural Fires Act resulted in fines totalling \$85 being imposed. Six demands for payment resulted in \$511.25 being recovered. Fifteen letters of warning were issued and nine letters of appreciation were sent to persons reporting or assisting to combat fire outbreaks.

Employment Wages Staff

| | Average 1974-75 | As at 1-7-74 | As at 30-6-75 |
|---|--------------------|-----------------|------------------|
| Reforestation | 1,351 | 1,393 | 1,436 |
| Harvesting and Marketing | 172 | 172 | 164 |
| National Parks | 81 | 78 | 79 |
| Road Construction and Maintenance | 71 | 54 | 60 |
| Maintenance of Plant | 76 | 65 | 79 |
| Totals | 1,751 | 1,762 | 1,818 |

The number of fires reported by month of occurrence and size attained is set out as follows:—

| Month | Number of Fires | Size of Fires in ha | | | | |
|-----------------------|--------------------|---------------------|-----------|-----------|-----------|----------|
| | | 0-4 | 5-40 | 41-400 | 401-4 000 | 4 000+ |
| July | 18 | 5 | 4 | 6 | 3 | .. |
| August | 30 | 3 | 10 | 10 | 5 | 2 |
| September | 15 | 6 | 4 | 3 | 2 | .. |
| October | 17 | 4 | 3 | 10 | .. | .. |
| November | 9 | 2 | 3 | 2 | 2 | .. |
| December | 39 | 11 | 18 | 6 | 4 | .. |
| January | 7 | 3 | 1 | 1 | 2 | .. |
| February | 5 | 1 | 2 | 2 | .. | .. |
| March | .. | .. | .. | .. | .. | .. |
| April | 2 | .. | 1 | 1 | .. | .. |
| May | 1 | 1 | .. | .. | .. | .. |
| June | 3 | 2 | 1 | .. | .. | .. |
| Totals | 146 | 38 | 47 | 41 | 18 | 2 |

The following table shows fire occurrence by Districts and by degree of protection afforded the areas burnt—

| District | Number of Fires | Area (ha) Burnt by Protection Classes | | | |
|----------------------|--------------------|---------------------------------------|---------------|---------------|---------------|
| | | *Intensive | †Extensive | Non-Protected | Total |
| Atherton | 5 | 30 | 152 | .. | 182 |
| Brisbane | 28 | 559 | 481 | 5 | 1 045 |
| Dalby | 28 | 873 | 3 722 | 229 | 4 824 |
| Gympie | 36 | 373 | 1 948 | 231 | 2 552 |
| Maryborough | 12 | 472 | 5 660 | .. | 6 132 |
| Monto | 8 | 7 | 4 455 | 625 | 5 087 |
| Murgon | 5 | 49 | 311 | .. | 360 |
| Rockhampton | 16 | 32 | 2 935 | 3 879 | 6 846 |
| Warwick | 4 | 16 | 6 | .. | 22 |
| Yarraman | 4 | 3 | 202 | .. | 205 |
| Total | 146 | 2 414 | 19 872 | 4 969 | 27 255 |

* Intensive implies land covered by a detection system where fire suppression will normally commence within two hours of report to local headquarters.

† Extensive denotes areas not covered by a detection system, or where more than 2 hours will elapse between report and attack.

Major causes of fire outbreaks by percentages were:—

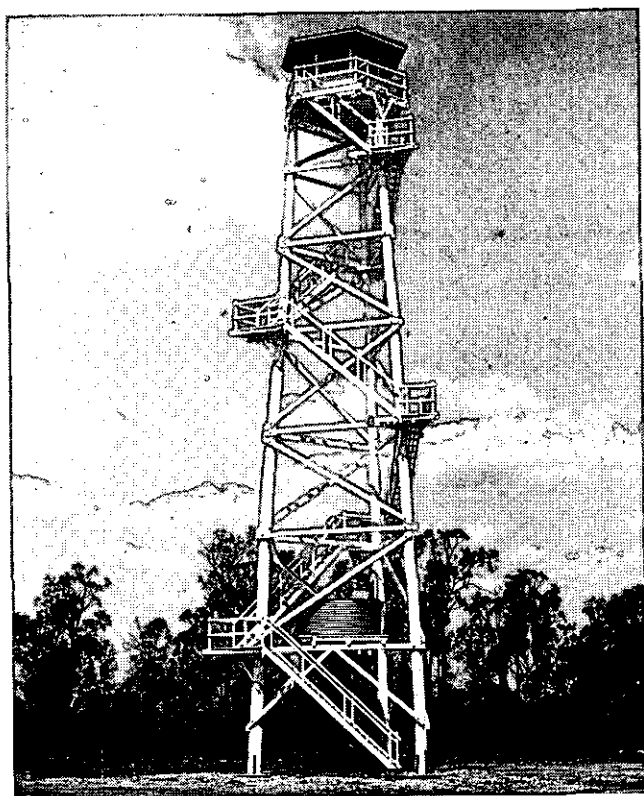
| | |
|--|--------------|
| Unauthorised burning off | 19.2 |
| Government, Semi-Government Authorities and bush workers | 17.9 |
| Escapes from permit fires | 15.0 |
| Re-lights of old fires | 0.7 |
| Lightning | 9.6 |
| Camp and billy fire escapes | 2.7 |
| Incendiarists | 0.7 |
| All other known causes | 2.0 |
| Unknown causes | 32.2 |
| Total | 100.0 |

Communications

Installation of H.F. S.S.B. base and mobile units progressed in Central Queensland. Additional V.H.F. frequencies have been requested but as yet no issue has been made. There is some interference between district radio traffic under the present three channels.

Twelve mobile and seven portable V.H.F. sets and six H.F. S.S.B. 25 watt units were purchased during the year.

Equipment in use comprises 534 V.H.F. mobile units, 18 H.F. S.S.B. 100 W units, 94 V.H.F. portables, 8 U.H.F. links, 39 consoles and 65 bases.



Bend Fire Tower, Western Creek—Dalby District.

Detection

Aircraft was used for firespotting in one instance only at Maryborough. Total expenditure was \$45.

Equipment

Two new fire tankers were completed, and new units are now located at Yarraman (one), Tuan and Toolara (two each), with the older units at Beerburum (two), Bowenia and Kennedy (one each). Five slip-on units (each 1 250 litres) were also constructed.

Fire Research

The prescribed burning programme in Exotic Pine plantations has expanded such that burns are being carried out over a greater span of months than previously. Whereas burning was once concentrated in the period May to June, burning has now been carried out in the period March to July, 1975. As a result, drying conditions are being encountered which were not envisaged in the production of the original prescribed burning guide. Observations on the 1975 burns have been used to expand the drying tables to allow for a temperature factor. Six separate drying tables have been produced, covering a temperature range of 20°C to 30°C.

The prescribed burning guide for native forests has been fully metricated and alterations made to the fire behaviour tables for grassy forest fuel types. Fire behaviour data

collected at permanent observation points within aerial ignition blocks indicated that rates of spread in such fuel types were underestimated considerably in the old tables. A more complex burning guide has been produced for more specific application such as the aerial ignition work. This new guide allows compensation for wind reduction due to varying canopy density, rainfall correction factors for a range of fuel types and provides operational guide-lines for burning times and ignition patterns for nominated conditions.

The fire ecology work has continued, with maintenance of burn schedules on the various experiments. Experiment 3 Fire in Slash Pine at Toolara has now received its third burn since the experiment was established in 1967. A detailed experiment has been established on Scientific Purposes Area No. 1 Beerwah to document the effect of three different burning treatments on two vegetation associations, one a treeless heath, the other an open Scribbly Gum—Red Bloodwood forest. Treatments include a moderate intensity burn at three yearly intervals, a hot burn at five yearly intervals and an unburnt control. Species density, frequency and dominance are recorded for all species on a series of plots and transects. Specific growth habits such as the form of regeneration (seedling, root coppice or stem epicormic), height increment and vitality are also recorded. Season of flowering and number of seasons taken to produce mature fruits is also being studied in order to ascertain optimum burning season in relation to flowering and minimum desirable interval between burns for particular species.

General

Expenditure on fire fighting, patrol and detection was \$143,671 compared with \$77,902 in 1973-74. Direct suppression costs were \$28,628 (*\$5,136). Prescribed burning to reduce forest fuel levels cost \$55,955 (*\$24,804). The area covered by prescribed burning was 153 639.7 ha (*109 255) including 114 069 ha (*57 109) burnt through aerial ignition and 39 570.7 ha (*51 662) hand burning of native forest. The area of Exotic Pine plantation prescribed burnt was 2 896.1 ha (*484)—the expansion of this programme resulted from further development of fire behaviour tables and lighting techniques. Burning of logging debris in hardwood forests cost \$6,828 (*\$2,609) over an area of 3 310.4 ha (*2 380).

Co-operative burning with neighbours cost \$27,696 (*\$14,770). New fire breaks and flat-bladed tracks cost \$44,835 and roads charged to protection \$247,062. These two items were separated this year for the first time (1973-74 costs were \$186,306). Maintenance of existing protection roads and fire breaks cost \$426,481 (*\$352,571).

Industrial Safety

The disabling-injury frequency rate for the year was 114.0 compared with 121.0 for 1973-74 and 134.0 for 1972-73.

A full-time Departmental Safety Officer was appointed during the year, emphasising the Department's concern for job safety for its employees.

Nine Departmental Accident Prevention courses were conducted during the year with a total attendance of 74 Supervisory Staff. It is anticipated that the delivery of these courses will be stepped up during 1975-76 with the objective of reaching every Forestry Supervisor. An innovation was an introductory course for a group of Forest Trainees and it is envisaged that this will form a regular component of first year training.

The number of safety committees operating in the districts more than doubled during 1974-75 and twenty such committees are now operating.

MECHANICAL EQUIPMENT

During the year the Department employed six Heavy Equipment Apprentices and two Motor Vehicle Apprentices under the Commonwealth Employment Scheme.

The Mechanical Engineer appointed in 1974 has carried out a vast amount of engineering design work for mechanical equipment used for clearing of areas for plantations.

Truck deliveries, carried over from 1973-74 did not commence until June, 1975 thereby causing excessive maintenance charges in keeping the disposal scheduled vehicles in operation by at least 12 months. There are still 20 trucks to be supplied against the 1973-74 purchase order.

In common with other fleet operators escalation of costs and difficulty in obtaining parts has increased repair downtime and increased maintenance costs.

Plant hire rates were increased two times during the year and it is anticipated that quarterly reviews may be necessary if inflation continues at the present rate.

Increased reliance on Mechanisation of field activities is placing an excessive work load on existing workshop staff and although two fully qualified tradesmen were engaged during the year the position is still critical.

* Figures in brackets apply to previous year 1973-74.



Forestry Exhibit at the 1974 Royal National Association Show—Brisbane.

The efforts of the four Chain Saw Instructors are now showing some improvement in efficiency and it is hoped that the number of units in use will be reduced.

Service Schools and Training Courses were suspended during the year due to the high participation costs.

No major additional items of workshop equipment were purchased during the year but a number of steam cleaners were replaced by high pressure hot and cold water cleaning units and if these prove successful it is envisaged that further units will be purchased.

Corrosion in motor vehicles in the wet coastal areas has shown that more treatment will be required when the vehicles are given their P.P.M. Programme Service. The extension of P.P.M. into the heavy equipment and small powered plant is currently under investigation and pilot programmes are expected to be issued during the first half of the 1975-76 financial year.

Purchase of Plant

Major items of Plant purchased during the year were:—

- 19 Pneumatic Tyred Tractors;
- 1 Pneumatic Tyred Loader;
- 1 Crawler Loader;
- 12 Crawler Dozers;
- 1 Grader;
- 109 Replacement Motor Vehicles; and
- 3 Additional Motor Vehicles.

Census of Major Plant as at 30th June, 1975:—

- 478 Motor Vehicles/Trucks;
- 58 Crawler dozers;
- 83 Pneumatic Tyred Tractors; and
- 29 Power Graders.

Maintenance of Plant

Main items for the years 1973-74 and 1974-75 were:—

| | 1973-74 | 1974-75 | Difference |
|----------------------------------|---------|---------|------------|
| | \$ | \$ | \$ |
| Fuel | 160,893 | 199,763 | +38,870 |
| Oils | 15,430 | 20,721 | +5,291 |
| Tyres and Tubes | 34,210 | 41,186 | +6,976 |
| Repairs | 661,952 | 879,614 | +217,662 |
| Registration and Insurance | 37,087 | 74,598 | +37,511 |

ACQUISITION OF LAND

During 1974-75, an amount of \$42,353.20 was expended on the acquisition of land for Forestry purposes as follows:—

| | \$ |
|---|--------------------|
| Purchase of Land | 22,618.00 |
| Survey Fees | 17,698.20 |
| Compensation for Improvements | 1,750.00 |
| Real Property Fees and Lands Department Charges | 287.00 |
| | <u>\$42,353.20</u> |

FOREST SURVEYS

Twenty-one survey parties operated during the year. Personnel consisted of:—

| | |
|--------------------------|----|
| Forest Surveyor | 1 |
| Survey Rangers | 12 |
| Survey Assistant | 1 |
| Survey Overseers | 16 |
| Estimators | 5 |
| Chainmen | 15 |
| Labourers | 28 |
| Cooks | 4 |

Work and type of surveys conducted were:—

| Parties | Type of Surveys |
|---------|---|
| 3 | Theodolite Control Surveys (to provide Survey control for other Forest Surveys) |
| 10 | General plantation management surveys associated with the reforestation programme or general native forest management surveys |
| 8 | Forest Inventory and Timber assessment surveys to provide basic data for management or Conversion of Tenure actions |

Details of Surveys carried out by the parties are:—

| | Kilometres |
|--|------------|
| Theodolite traverses | 68 |
| Compass traverses | 1 472 |
| Survey Connections and re-establishing original boundaries | 286 |
| Level Surveys | 434 |
| Stripping and assessment surveys | 4 110 |
| Road grade Surveys | 84 |
| Soil Surveys | 13 |
| | 6,467 |

In addition to the above the following surveys were also carried out:—

| | Number | ha |
|---|--------|--------|
| Forest Inventory Survey plots established | 142 | .. |
| Forest Inventory Survey plots re-measured | 1,020 | .. |
| Plots established for wood-chip assessment | 593 | .. |
| 100% Assessment of areas | .. | 48 149 |
| Predominant height determination | .. | 461 |
| Plantation survival counts | .. | 1 928 |
| Field location of Aerial fertilizing and fertilizing trials | .. | 2 445 |
| | 1,755 | 52 983 |

In general, the weather was favourable for survey operations, however survey camps operating in Central Queensland reported more than normal time lost due to wet conditions, especially in the early months of 1975.

Survey Training

Two Survey Training Courses, each of two weeks duration were conducted by the Forest Surveyor. These courses catered for a total of 18 Forest Trainees and 12 Adult Trainees. The trainees also received a further three months practical survey training in selected Survey Camps.

Mapping

The Survey and Mapping Branch comprises 52 officers of whom four are engaged in mapping and drafting supervision, and one in the supervision of Surveys and Survey training. Thirty are engaged on map compilations, preparing survey data, calculating contract areas for Forest clearing and aerial photograph interpretation. Two are engaged in theodolite, level, and compass and chain surveys. One officer is engaged operating a lettering and composing machine, two in duplication and photocopying. The remainder (twelve) carry out drafting and mapping duties for administration purposes.

AUTOMATIC DATA PROCESSING

Expansion of the Harvesting and Marketing computer project has continued.

Stumpage Accounts for all natural-grown mill logs and plantation timbers harvested from Crown lands in South and Central Queensland are now being processed by computer.

Design work has been commenced on computer systems to process stumpage accounts for logs harvested in Mackay and North Queensland and to maintain log timber accounts for all purchasers of Crown log timber.

REFORESTATION

Total expenditure in 1974-75 on reforestation works was \$10,714,040 about \$2,325,543 more than in 1973-74. This amount spent does not include salaries. The sources of funds spent were:—

| Source of Funding | 1973-74 | 1974-75 |
|---|--------------|------------|
| | \$ | \$ |
| State Loan Fund | 7,119,187 | 7,954,645 |
| Receipts under the Softwood Forestry Agreements Act | 1,021,806 | 2,339,000 |
| Regional Employment Development Scheme | .. | 259,444 |
| Aboriginal Advancement | 59,038 | 112,269 |
| Commonwealth Unemployment Relief | 145,438 | 48,500 |
| Flood Restoration | 70,028 | 27,182 |
| Total | \$ 8,415,497 | 10,741,040 |

Funds from Regional Employment Development Scheme, Aboriginal Advancement, and Commonwealth Unemployment Relief sources were spent on useful maintenance work in plantation and native forests which would not otherwise have been done.

The average annual employment of wages staff on reforestation projects with the 1974-75 funds was 1,402, compared with 1,365 in 1973-74. Costs per man-year rose by nearly 22 per cent. from about \$6,300 in 1973-74 to about \$7,660 in 1974-75.

The main silvicultural operations carried out in the past two years were:—

| Operation | 1973-74 | 1974-75 |
|--|----------|----------|
| | hectares | hectares |
| Area of plantations established | 5 119 | 5 460 |
| Area of plantations tended | 32 896 | 41 962 |
| Area of plantations fertilized | 3 085 | 5 000 |
| Area of plantations pruned | 6 001 | 7 745 |
| Area of plantations thinned non-commercially | 447 | 281 |
| Area of plantations thinned commercially | 5 283 | 4 348 |
| Area of natural Forest treated | 13 671 | 19 260 |

There were thus increases as compared with 1973-74 both in the areas of plantation established and of natural forest treated.

Generally speaking cultural work such as tending, fertilizing, pruning and thinning required in the management of softwood plantations is well in hand.

Much of the Department's silvicultural work is labour intensive, and avenues for containing rising costs are limited, particularly in Hoop Pine plantations and treatment of natural forest where scope for increased mechanisation is relatively limited. Steps taken during the year to increase cost efficiency included increased use of chain saws in pruning, introduction of large scale inter-row cultivation in tending, increased use of machines for planting, design and development of a plough to over-all plough and line-mound in a single operation, and extended use of weedicide in Hoop Pine nurseries.

New cost control procedures were introduced in order to achieve more effective control over costs in the field.

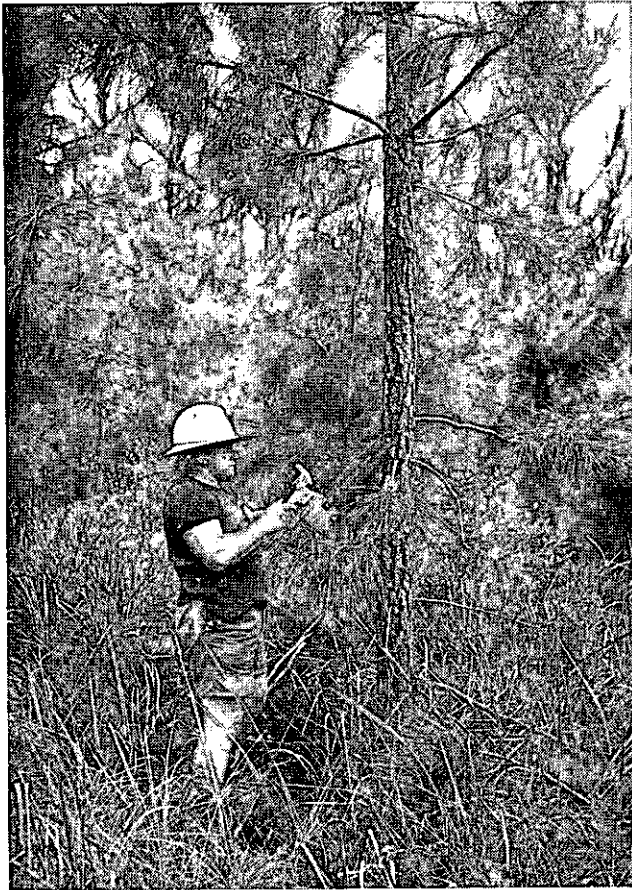
Planting—Open Plantations

The areas of plantations established in the 1974-75 plantation year (1st April, 1974 to 31st March, 1975) are shown by Districts and species in Appendix F, and the net areas of effective plantation as at 31st March, 1975 are shown by Districts and species in Appendix G.

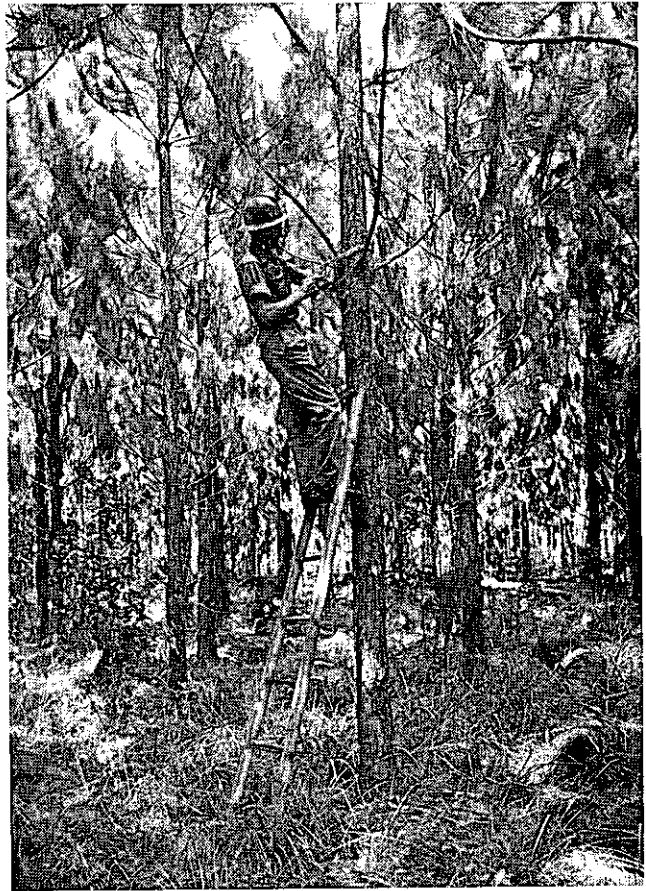
New plantings in the plantation year 1974-75 covered 5 460 ha to bring the total plantation area to 96 345 ha, comprising 94 216 ha in conifers and 2 129 ha in broadleaved species. Areas of the various species planted in the plantation years 1973-74 and 1974-75, together with the total area of plantation area:—

| Species | New Plantings by Plantation years | | Total Plantation Area to 31st March, 1975 |
|---|-----------------------------------|---------|---|
| | 1973-74 | 1974-75 | |
| | ha | ha | ha |
| Native conifers (mainly Hoop Pine) | 1 201.4 | 1 243.8 | 36 515.7 |
| Slash Pine | 3 232.9 | 3 311.5 | 43 947.7 |
| Caribbean Pine | 453.2 | 767.3 | 7 317.2 |
| Loblolly Pine | 106.4 | 39.0 | 2 094.7 |
| Radiata Pine | 101.1 | 78.5 | 2 375.6 |
| Patula Pine | 14.2 | 10.8 | 1 663.5 |
| Other exotic conifers | 2.5 | 5.6 | 301.9 |
| Broadleaved and Miscellaneous species | 7.3 | 3.6 | 2 129.0 |
| Totals | 5 119.0 | 5 460.1 | 96 345.3 |

The increase in the 1974-75 programme is due primarily to a carry-over of the 1973-74 summer plantings of Caribbean Pine at Byfield and Cardwell which had been delayed because of the abnormally wet conditions then prevailing. These wet conditions also delayed site preparation at most other exotic and Hoop Pine planting centres, with the result that very little land prepared for planting was carried over into 1974-75. At some centres slow progress with salvage logging of marketable timber associated with the current economic down-turn caused problems with site preparation. At Toolara, a major exotic plantation centre, parts of the Como scarp area had been salvage logged in preparation for planting, and the mbratorium on planting of this area necessitated salvage logging, draining and clearing of alternative areas on short notice. These difficulties of site preparation have been offset to some extent



Ground Pruning of Slash Pine with lightweight Chainsaws—Beerburrum State Forest.



Carry-up pruning in Slash Pine Plantations with ladders and handsaws—Beerburrum State Forest.

by rainfall generally below average prevailing at most plantation centres in southern Queensland since the spring of 1974, and by renewed interest by private contractors in site preparation work, the full benefit of which will be felt in 1975-76. Sufficient area was cleared and prepared to meet planting commitments.

Hoop and Caribbean Pines are routinely planted using tubed plants. Further trial plantings with open root Hoop Pine were carried out. Results continue to indicate this technique has potential for wider application particularly when the planting is done by machine. Following on promising results obtained with research plantings of open-root Honduras Caribbean Pine, open-root trials of this species were carried out at Beerburrum and Tuan. Results are not yet fully assessed. Very considerable savings would accrue from planting of open-root plants of these species as compared with tubed plants and further work will be pursued to develop suitable techniques.

Tending Conifer Plantations

The area of plantation covered by tending operations during the year increased to 41 962 ha and this increase reflects not only the increased acreage of plantations now being managed but also, in this instance, the effect of the recent seasonal conditions which favoured weed growth, particularly in Hoop Pine areas.

| Year | 1971-72 | 1972-73 | 1973-74 | 1974-75 |
|-------------------------|---------|---------|---------|---------|
| Area covered in tending | 38 375 | 41 673 | 32 896 | 41 962 |

Areas covered by species were:—

| Species | Total Area of Plantations to 31-3-74 | Area Tended 1973-74 | Total Area of Plantations to 31-3-75 | Area Tended 1974-75 |
|----------------------|--------------------------------------|---------------------|--------------------------------------|---------------------|
| Native Conifer areas | 35 302 | 23 838 | 36 516 | 33 776 |
| Exotic Conifer areas | 53 240 | 9 057 | 57 701 | 8 186 |

Despite the favourable conditions for weed growth and the increased area planted there has been a continued reduction in the tending of exotic pine plantations. This is indicative of the effectiveness of current preplanting cultivation practices in these areas.

Lantana continued to be a costly weed to control, particularly in Hoop Pine plantations where it has attained a dense growth over limited areas, following favourable seasonal conditions. Some progress was made in controlling this accumulated growth during the year but work was restricted by shortage of hormone weedkiller.

Fertilizing—Conifer Plantations

The area of young exotic pine plantations fertilized during 1974-75 was 5 000 ha, compared with 3 085 ha in 1973-74.

The major limiting nutrient to the growth of *Pinus* species on the coastal lowlands is phosphorus, and it is normal practice to apply a broadcast dressing of 57.6 kg phosphorus per ha as superphosphate immediately after planting to all Slash and Loblolly Pine plantations. Similar levels of phosphorus are applied to Caribbean Pine plantations in central and northern Queensland except that fertilizing is restricted to poorly drained sites, and those well-drained sites below site index 30.5 metres.

Because of the continuing difficulty in securing supplies of highly concentrated superphosphate with granule size suitable for aerial application, fertilizer was applied to most areas by tractor-mounted spreaders, with some limited hand application on small and poorly-drained areas. Costs of application of fertilizer from tractor-mounted spreaders and from aircraft are similar. However the former method limits the availability of the limited fleet of Departmental rubber-tired tractors for other necessary work such as site preparation and mechanical tending and efforts are continuing to secure fertilizer in a form suitable for aerial application.

Pruning

The areas of plantations pruned in 1974-75 by species were:—

| Species | Stage of Pruning | | | | Total |
|--------------|------------------|-------|-------|-----|-------|
| | 1st | 2nd | 3rd | 4th | |
| Hoop Pine | 892 | 413 | 737 | 78 | 2 120 |
| Exotic Pines | 2 718 | 1 686 | 1 185 | 36 | 5 625 |
| Totals | 3 610 | 2 099 | 1 922 | 114 | 7 745 |

Changes were made during the year to height of final pruning and the basis for selecting areas to be pruned. Final pruned height has been varied from 6.4 metres, reached in three stages, to 5.2 metres to be reached in two stages. The qualifying lower limit of Site Index for plantations for pruning was raised from 21.3 metres to 24.4 metres in the case of Slash Pine, and from 22.9 metres to 25.9 metres for Caribbean Pine. Considerable savings in cost will result from these new procedures and it is anticipated the future requirements of industry for pruned stems will be satisfactorily met.

Ground pruning using light-weight chain saws is cheaper than that using hand-saws, and by the end of the year chain saws were used for almost all ground pruning.

Treatment of Natural Forests

Areas treated during the year are shown in Appendix H by Districts and types of natural forest. The total area of natural forest treated during the year was 19 389 ha as compared with 13 676 ha in 1973-74. This increase occurred mainly in Eucalypt forest types.

| Forest Type | ha treated | |
|-----------------------------|---------------|---------------|
| | 1973-74 | 1974-75 |
| Eucalypt Forest | 3 780 | 8 299 |
| Cypress Pine Forest | 9 768 | 10 961 |
| Rain Forest | 128 | 129 |
| Total | 13 676 | 19 389 |

The figures quoted include areas given normal timber stand improvement treatment and high quality hardwood areas afforded enrichment planting.

Nurseries

The number of nurseries operated during 1974-75 remained unchanged. These, listed by the major species raised, were as follows:—

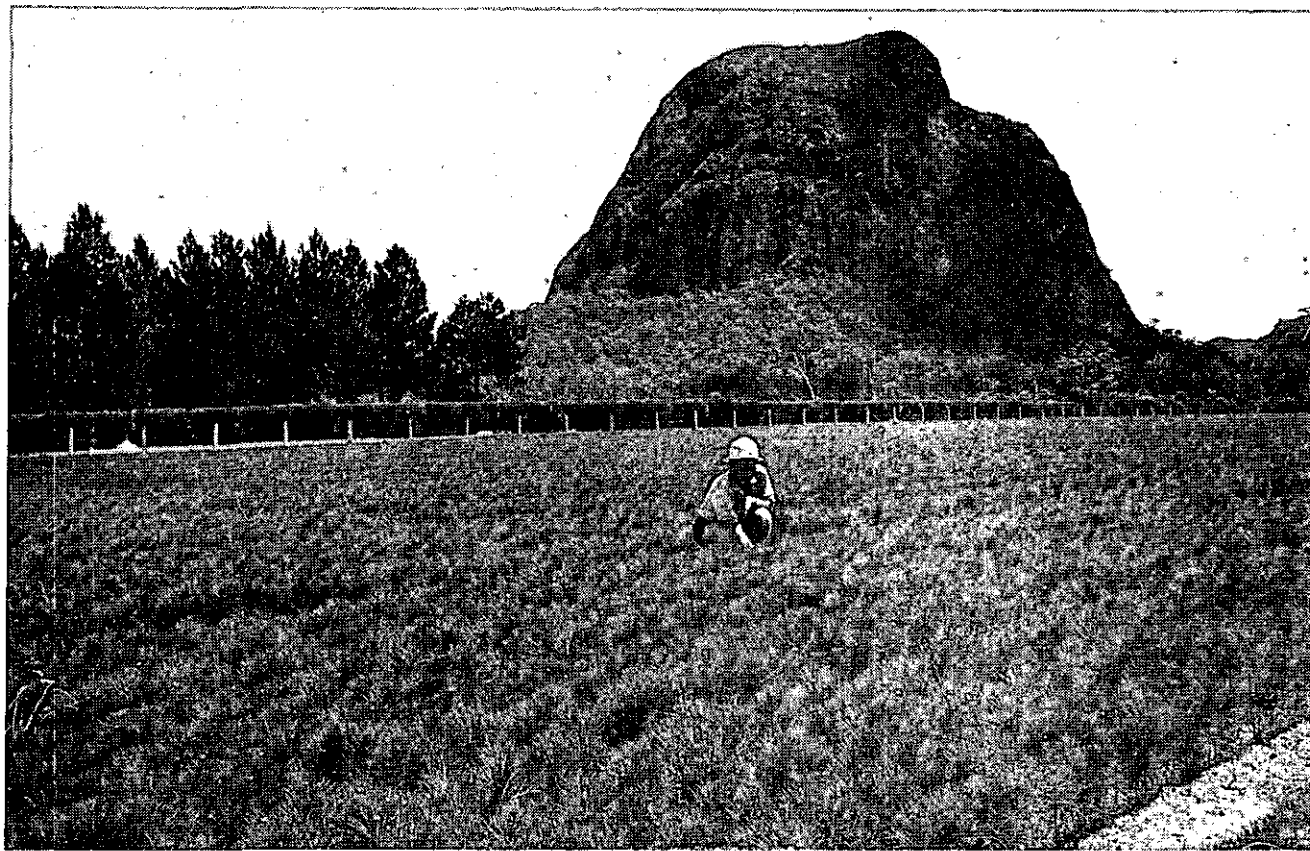
| Species | Number |
|--|-----------|
| Hoop Pine | 10 |
| Caribbean Pine | 3 |
| Slash Pine | 2 |
| Radiata and other Exotic Pines | 2 |
| Amenity | 3 |
| Total | 20 |

About 7 million plants were raised in these nurseries for planting in new Departmental plantations and for refills in established plantations. Plants were also sold to the public.

Following the success of trials in previous years with pre-emergence nursery weedicides, routine applications were made to Hoop Pine nursery beds at the 1974 Sowing. Considerable cost savings are expected from this treatment.

Sales of plants for windbreak, shade and ornamental purposes from the amenity nurseries at Dalby, Salisbury and Bunyaville were at the same level as for the previous year. Details of these were:—

| Nursery | Plants Sold | Value |
|----------------------|----------------|------------------|
| Salisbury | 83,084 | \$ 39,073.34 |
| Bunyaville | 18,957 | 9,113.99 |
| Dalby | 18,761 | 8,677.54 |
| Total | 120,802 | 56,864.87 |



Slash Pine Nursery—State Forest 589 Beerwah—Brisbane District.

The numbers of plants sold from all nurseries to the public, Government Departments and other instrumentalities were as follows:—

| | |
|--------------------------------------|----------------|
| Forest Plots | 79,463 |
| Schools and Government Dpts. | 20,050 |
| Other Sales | 144,198 |
| Total | 243,711 |

This compares with total sales in 1973-74 of 256,341. Forest plot sales at concessional rates comprised the following:—

| | |
|------------------------|---------------|
| Slash Pine | 42,450 |
| Caribbean Pine | 22,315 |
| Hoop Pine | 8,875 |
| Other Species | 5,823 |
| Total | 79,463 |

Seed Collection

Requirements of seed for Departmental sowings were met from the Department's seed collections, and seed of a number of species was sold, principally Honduras Caribbean Pine.

The quantities of seed of the major species collected in 1973-74 and 1974-75 were as follows:—

| Species | 1973-74 | 1974-75 |
|------------------------|---------|---------|
| | kg | kg |
| Hoop Pine | 484 | 2 288 |
| Bunya Pine | 956 | 5 430 |
| Slash Pine | 1 692 | Nil |
| Caribbean Pine | 236 | 716 |
| Radiata Pine | 12 | 70 |
| Patula Pine | Nil | 43 |
| Loblolly Pine | 7 | 10 |
| Eucalypts | 97 | 68 |
| Totals | 3 484 | 8 625 |

The overall increase reflects the sporadic nature of seed crops of Hoop and Bunya Pines for which species, requirements for the period between crops has to be held in cold storage. There is a brisk demand for seed of Honduras Caribbean Pine, and about 160 kg of the 1973-74 collection was sold at an attractive price, mainly to overseas buyers. World demand for this species exceeds supply but the amount which can be sold is limited at this stage by availability of seed from the department's relatively young plantations. Seed production areas are being developed to boost seed supplies as quickly as possible. The 1974-75 collection of Honduras Caribbean Pine Seed was a record 716 kg compared with 236 kg in 1973-74, and included for the first time sufficient seed from the Kennedy seed orchard to meet a significant part of Departmental needs. About 540 kg of the total collection is surplus to Departmental requirements and has been offered for sale. No collection of Slash Pine seed was made in 1975 because stocks on hand were adequate to meet Departmental and sale requirements.

FOREST ENTOMOLOGY

Plantation Pests

(i) *Hyleops glabratus*

Investigations of the bark beetle *Hyleops glabratus* in Hoop Pine plantations continued. The 1974 populations were extremely small and no tree deaths caused by this insect were reported or observed.

During 1975 the main population has occurred at Amamoor in the Gympie District and an examination of infested material has shown the population is increasing markedly.

With the major aspects of biology and behaviour now being understood, attention in future will focus on ecology and control. There appear to be relationships between *S. decoratus* and *H. glabratus* with respect to the provision of breeding material, and, with the exception of the enormous population outbreaks of the latter in 1971-72, the most extensive populations of both insects have occurred on the same forests. Apart from this relationship, normal logging operations do provide an enormous food resource for *H. glabratus* and it is proposed to assess some alternative ways of treating logging slash with a view to reducing its acceptability.

(ii) *Strongylurus decoratus*

Strongylurus decoratus activity has been found in all major Hoop Pine plantings in the Mary Valley and Upper and Middle Burnett Valley. With the exception of a few compartments at Imbil, Amamoor and Jimmy's Scrub, populations are low and little damage is evident. No *S. decoratus* has been reported from the Yarraman District although the insect occurs not far away at Jimna. A complex of natural controlling agents have been found which operate against larval and pupal stages of the insect. Several species of flies and wasps are parasitic on pupae of *S. decoratus* and a clerid predator of the larvae has been recorded. Cockatoos are important predators of pupating larvae in the plantations at Gallangowan, Jimna, Jimmy's Scrub, Imbil and Amamoor. Larvae and pupae of *S. decoratus* are also affected by the entomophagous fungus *Beauveria bassiana*.

As a result of laboratory and field studies the life-cycle and branch pruning mechanism of *S. decoratus* has been elucidated.

Natural Forest Pests

(i) *Cypress Pine*

An insect monitoring programme is being undertaken in connection with investigations into "Cypress Pine dieback" in the Dalby District.

(ii) *Rain Forest*

Ambrosia beetles (*Platypus* spp.) have been associated with Northern Silver Ash "dieback" in the Ingham region. The predisposing causes for insect attack have not been elucidated.

(iii) *Eucalypt and Sclerophyll Forest*

Extremely heavy defoliation occurred over wide areas of South East Queensland during the summer. Trees affected included *Syncarpia* sp., *Tristania* spp., *Casuarina* spp., *Eucalyptus* spp., *Banksia* spp., *Melaleuca* spp., *Angophora* spp., and a wide range of wallum shrubs. *Ctenomorphodes tessulatus* and other phasmatids; *Perga kirbyi* (sawflies); *Cardiaspina* spp. (lerp insects: *Hemiptera*); a range of longicorns; weevils, chrysomelids; several *Lepidoptera*; and leaf hoppers were associated with different hosts. It was apparent that in many instances insects were attacking trees predisposed by many other factors and while most trees have recovered, some have been killed and others are continuing to decline. Considerable branch death has occurred. An unidentified cerambycid beetle was again reported as causing tree death in Spotted Gum forests.

Ornamental Pests

During the year a total of 115 enquiries were received, the majority being concerned with insect pests of *Eucalyptus* spp. (wood boring moths and beetles and lepidopteran defoliators).

Zoology

There were moderately heavy populations of burrowing rats in young plantations of Hoop Pine in Yarraman and Murgon Districts and at Cathu near Proserpine. Investigations continued into the most effective means of controlling rat damage in plantation areas. At present any area showing evidence of population build-up or damage is baited with diced sweet potato treated with sodium fluoroacetate.

Although results were not wholly successful they did generally support the conclusion reached last year that this method of baiting could give effective immediate control of rat populations. However the number of burrowing rats in the following year has been found to be largely unaffected by even very successful control in the previous season.

Studies have been made of the food preferences of *Rattus tunneyi*, one of the principal species responsible for damage in Hoop Pine plantations. Examination of stomach contents is being made and these studies may lead to more effective control measures by either baiting or by cultural means.

Other animal damage which occurred during the year included chewing by possums of the bark of Loblolly Pine in plantations at Imbil and chewing above ground of the bark of young planted Hoop Pine at Imbil and in the Warwick District.

FOREST PATHOLOGY

Diseases and Pests

(1) *Phytophthora Root Rot*

The root rotting fungus *Phytophthora cinnamomi* is most active during periods of high rainfall such as have occurred in south-eastern Queensland during the summers of 1970-71 to 1973-74. The return to normal rainfall during the summer of 1974-75 did not favour high activity of the fungus, but rainfall was adequate to maintain some activity.

The isolation of *P. cinnamomi* from Sand Pine on Fraser Island mentioned in the previous report was followed up. The fungus was found associated with deaths in all plots of this species sampled at Cooloola, Elliott River, and Fraser Island. Evidence gathered suggested that the pathogen may have been present on the Sand Pine planting stock which was raised at the old Beerwah and Toolara nurseries. The fungus has been found to be present in those sites and the nurseries have since been closed.

Following the discovery of *P. cinnamomi* on Fraser Island, a survey was undertaken to establish the distribution of the fungus on the Island. The survey is still in progress but, to the end of June 1975, *P. cinnamomi* has been isolated from Sand Pine, Blackbutt seedlings in the Ungowa nursery, planted Blackbutt and three areas of native vegetation. These areas of native vegetation were all adjacent to roads, so the fungus may have been introduced to them in soil carried on machinery and motor vehicles but further work on this aspect is still required.

Phytophthora cinnamomi was also isolated from under Radiata Pine, mortalities occurring on water gaining sites in plantations at Passchendaele, and from a small number of tubed Honduras Caribbean Pines at the Beerburum nursery.

An investigation was undertaken into a defoliation and dieback of a wide range of *Eucalyptus* spp. in south-eastern Queensland. Most of the soil isolations were negative or yielded other Pythiaceae fungi. However, *P. cinnamomi* was isolated from under a mixed *Syncarpia-Eucalypt* stand and dead topped Blackbutt near Landsborough, and from under thin crowned Narrow Leaf Peppermint, near Bundaberg.

(2) *Basidiomycete Root and Butt Rot*

Several basidiomyceteous fungi which have been associated with root and/or butt rot of forest tree species elsewhere, occur in Queensland. Most records of the occurrence of these fungi have come from coniferous plantations, particularly those of Hoop Pine. Little is known of their hosts, distribution and impact in natural stands.

Phellinus (Fomes) noxius continues to be the most important root rot pathogen of plantation Hoop Pine. Trees of all age and vigour classes have succumbed to the disease. During the year, new records of the occurrence of *P. noxius* root rot came from several compartments in the Gympie and Atherton Forestry Districts. Further losses were recorded in other known infection centres scattered throughout Hoop Pine plantations in the north and south-east of the State.

Chaetoporus radulus was associated with further Hoop Pine root losses at Imbil.

A number of laboratory, glasshouse, and field experiments were initiated to investigate sporophore production and sporulation in *P. noxius*, and to test the pathogenic capability of *P. noxius* and *C. radulus* on young Hoop Pine.

Elfungia applanata was associated with root and trunk rot of plantation Hoop Pine in south-east Queensland. Other basidiomyceteous fungi also cause root and/or trunk rot of Hoop Pine in Queensland but as sporophores have been absent on affected trees, the identities of these organisms are not yet known.

In the 1973-74 Report, mention was made of a study which was initiated to determine if *Fomes annosus* was attacking living Patula Pine in a plantation near Atherton. At twelve months, no death or decline was recorded in trees remaining after the thinning. Sporophores of the fungus were located on four stumps and ten logs of the 27 trees felled in the thinning. Observations in the area are continuing.

(3) *Nursery Diseases*

Mention has already been made of *P. cinnamomi* causing root rot of nursery Blackbutt and Honduras Caribbean Pine. Another *Phytophthora*, probably *P. citricola* also caused root rot of seedling Blackbutt. Damping off, probably caused by *Pythium* spp. was reported from two Caribbean Pine nurseries. *Rhizoctonia Solani* (sens. lat.) caused serious damping off in one Hoop Pine nursery. Other Hoop Pine nursery disorders reported were losses due to insolation, and a stem canker blight probably caused by *Botryosphaeria ribis*.

(4) *Other Field Diseases*

An unusual type of attack by *Diplodia pinea* was recorded from Radiata Pine during the latter part of the summer. Normally in Queensland *D. pinea* disease follows infection during periods of rain through fresh wounds caused by hail. On this occasion branchlet and shoot dieback occurred at Passchendaele and other areas following dry weather and it is believed that the dry period of mid-January to mid-February created moisture stress cracks in the Radiata Pine, and that infection resulting in disease occurred during the extremely wet conditions of the latter half of February.

In the last report reference was made to a canker and dieback disease of young Blackbutt on Fraser Island. This is now believed to be due to *B. ribis*. An inspection in April 1975 of the affected stand showed that the incidence of canker was considerably lower than in the previous year. This may have been due to the drier conditions of summer 1974-75 compared with the previous summer.

Reference has been made in previous reports to the occurrence in 1971-72 of dieback in young Hoop Pine plantations in three Forestry Districts. Surveillance was maintained throughout the past year for any renewed outbreaks of the disorder, and, for the third year, none was recorded. During the year the three fungi which had been isolated most consistently from diseased tissues in 1971-72 (*Pestalotia* sp., *Alternaria* sp. and *B. ribis*), were tested for ability to cause dieback on young Hoop Pine in the glasshouse; positive results were obtained only with *B. ribis*.

The occurrence of dieback and death in Cypress Pine forests has been mentioned in previous reports. Following the commencement of the 1974-75 wet season, areas of Cypress

Pine decline on the Stretchworth-Dunmore-Western Creek complex were investigated to ascertain if some soil fungal pathogen might be implicated in the disorder. Laboratory work on numerous soil and root samples collected from 19 affected and unaffected compartments on the complex failed to bring to light any possible causal fungi. Examination of soil profiles indicated that the disorder was associated with soils with restricted vertical drainage.

FOREST RESEARCH

Atherton Regional Research Station

The main work of this station is research to determine silvicultural treatments for application to north Queensland rain forests. In addition it conducts research in plantations of Hoop Pine and Caribbean Pine on the Atherton Tableland and the tropical lowlands in the vicinity of Cardwell.

(i) RAIN FORESTS.—A compartment at Kuranda was logged and silviculturally treated in 1954-55. The compartment was sampled in 1964 and 1974. The latter sampling was to determine the need for a retreatment and to quantify the effects of treatment. Some results of the 1974 sampling are shown in the following Table.

STOCKING PER HECTARE (BY STOCKED QUADRATS, 400 FULL STOCKING)

| Size Class | Value Class 1* | Value Class 2† |
|---------------------|----------------|----------------|
| 0-1 m high | 6.0 | .. |
| 1-3 m high | 8.5 | 1.1 |
| 3-6 m high | 11.4 | .. |
| 6 m-10 cm d.b.h.‡ | 58.5 | 52.7 |
| 10-20 cm d.b.h. | 52.6 | 60.1 |
| 20-30 cm d.b.h. | 29.9 | 31.8 |
| 30-40 cm d.b.h. | 14.6 | 16.5 |
| 40-50 cm d.b.h. | 18.3 | 5.0 |
| 50-60 cm d.b.h. | 13.2 | 5.0 |
| 60-70 cm d.b.h. | 6.0 | 1.1 |
| 70-80 cm d.b.h. | 2.0 | .. |
| Total | 221.0 | 173.3 |
| Over 3 m | 206.5 | 172.2 |
| Over 6 m | 195.1 | 172.2 |
| Over 10 cm diameter | 136.6 | 119.5 |

* Class 1 species are the higher value species with good silvicultural characteristics. (Group A and most of Group B species in Departmental classification).

† Class 2 species are the remainder of the North Queensland rain forest species. (Some Group B species and all Group C and D species in Departmental classification).

‡ D.B.H. is abbreviation for "diameter breast high over bark"

These figures show that the best commercial tree species over 10 cm diameter on 136.6 quadrats out of 400 (1 hectare) are Class 1 species, and on 119.5 quadrats are Class 2 species, and that there are 256.1 quadrats (136.6 + 119.5) per ha with commercial species over 10 cm diameter. Similar sets of data for other size classes or size ranges are obtainable from the above basic data which refer to the single commercial tree best able to stock the quadrat. Smaller trees of more valuable species, that could be brought on, or possibly will do so naturally, are found on a further 164.9 making 385.9 quadrats per ha with Class 1 species (221.0 + 164.9). Total basal area stands at 41 m² per ha. Action is in hand to carry out a logging followed by a treatment. To gain some information on volume increment, data from the 1964 sampling was used. This showed that the volume increment for Class 1 trees 40 cm + d.b.h. for the 10 year period was 21 m³ per ha. This is equivalent to 2.1 m³ per ha per year and is in reasonable agreement with data from other treated areas. It is far in excess of the volume increment recorded on areas logged but not treated. Taken together with the large increase in stocking of Class 1 trees below 40 cm diameter, treatment has been very effective.

After logging in 1956 a small area of rain forest, approximately 4 ha, poorly stocked with commercial species was silviculturally treated and enrichment planted with a number of the more valuable species. The soil was derived from basalt. Plots were established to observe the growth of the planted stock and retained commercial species. The increments for the retained commercial species by groups, (based on value and silvicultural properties), are shown in the following Table. Most of the observations in the under 40 cm d.b.h. classes in Group A were derived from enrichment planted stock.

AVERAGE ANNUAL DIAMETER INCREMENTS (CM) FOR THE PERIOD 1969-1974

| Group | D.B.H. Classes (cm) | | | | | | | |
|---------|---------------------|---------------|--------------|--------------|--------------|-------------|-------------|-------------|
| | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 |
| A | 0.44 (199) | 0.93 (288) | 1.36 (17) | 1.54 (9) | 1.42 (2) | .. | .. | 0.93 (1) |
| B | 0.29 (9) | 0.54 (2) | 0.72 (23) | 0.74 (10) | 0.66 (19) | 0.62 (7) | 0.67 (3) | .. |
| C | 0.75 (31) | 0.93 (23) | 0.95 (18) | 0.89 (18) | 0.65 (17) | 0.57 (8) | 1.17 (3) | .. |
| D | 0.55 (20) | 0.97 (29) | 0.72 (6) | 1.21 (2) | 0.58 (1) | 1.11 (1) | 0.39 (1) | .. |

Figures in brackets are numbers of stems from which the averages were derived. There is now a good stand of prime cabinet species (Group A) on this experimental block.

Grafting continued in the Queensland Maple seed-orchard at Kuranda from which a total of just over 2 kg of seed was collected in December 1974.

(ii) PLANTATIONS.—An experiment was laid out in the Kennedy nursery (lowlands) in 1973 with the aim of improving the quality of tubed stock of Honduras Caribbean Pine. Inorganic fertilisers and filter press at various levels were mixed with sandy soil before tubing. Stock was outplanted in 1974. Results after one year in the field are:—

- Increments in height growth due to filter press was highly significant at six months. The trend was still evident at twelve months but differences had become statistically insignificant. The best response to 30 per cent. filter press was 15.71 per cent. at six months and a just non-significant 9.57 per cent. at twelve months.
- The data indicate that limited benefits were obtained by filter press rates exceeding the basic 10 per cent. level.
- The effect of mixing inorganic fertiliser with tubing soil was short lived.
- The mean field survival of 99.6 per cent. was not affected by treatments.

Beerwah Regional Research Station

Three sections at this station handle silvicultural, tree breeding and nutrition, research into the establishment and maintenance of exotic pine plantations on the coastal lowlands south of latitude 23 degrees. The silvicultural work is reported here, while the nutrition and tree breeding work are covered in the Forest Soils and Nutrition and Tree Breeding Sections of this report. The major concern is Slash Pine and the three varieties of Caribbean Pine.

The highlight of the year was the Research Routine Conference attended by representatives of Head Office, Brisbane, Gympie, Maryborough and Rockhampton Districts and local Research staff. The conference dealt with a number

of wide ranging subjects relating to the establishment, development, genetics, nutrition and harvesting of exotic pines on the coastal lowlands. In all 70 papers, of which 37 were written by Beerwah staff, were prepared for the conference.

As previously reported dipping of roots of Slash Pine seedlings in clay slurry soon after lifting improves field survival. It has also been shown that clay slurry is superior to sodium alginate as a dipping medium. The Table indicates that the optimum dipping mixture approaches 1 kg clay to 1 litre of water. The slurry at 1 kg/litre has a creamy texture whereas at 2 kg/litre the mixture is thick, and at 0.5 kg/litre watery.

PLANTING SURVIVAL—CLAY SLURRY STRENGTH

| Planting Month | Clay Slurry Strength | | |
|----------------|----------------------|-----------------------|---------------------|
| | 0.5 kg/litre Thin | 1.0 kg/litre Cream | 2 kg/litre Thick |
| May | 65.2 | 96.1 | 98.0 |
| June | 98.1 | 98.6 | 99.0 |
| July | 86.3 | 92.3 | 94.2 |
| Mean | 83.2 | 95.7 | 97.1 |

The purchase cost of potters clay used in trials to date is equivalent to 23c per 1,000 seedlings (at 1 kg/litre). This and the cost of transport is considerably reduced if suitable local clays are used instead. A series of laboratory screening tests have been conducted on a number of clay samples from the various districts. A few local clays appear to have physical properties as good as, if not better than, manufactured clays.

The planting of conditioned Caribbean Pine 1-0 open root stock routinely is now a very real prospect. Conditioning is achieved by frequent root wrenching. Results of a trial at Byfield (23°S) testing mechanical wrenching are shown in the Table. Weather conditions during the planting season were considered quite harsh.

SURVIVAL PERCENTAGE 23-7-75—CONDITIONED HONDURAS CARIBBEAN PINE STOCK

| Conditioning Treatment | May Sowing | | | | June Sowing | | | |
|--------------------------|------------------|----------|-----------------|----------|-----------------|----------|-----------------|----------|
| | Planted 23-12-75 | | Planted 21-1-75 | | Planted 22-1-75 | | Planted 17-2-75 | |
| | Dipped* | Undipped | Dipped | Undipped | Dipped | Undipped | Dipped | Undipped |
| Weekly Wrench | 89.3 | 98.5 | 83.8 | 89.5 | 80.5 | 67.0 | 77.7 | 71.4 |
| Fortnightly Wrench | 82.1 | 88.3 | 73.6 | 79.9 | 68.5 | 71.6 | 73.0 | 60.6 |
| Monthly Wrench | 72.6 | 79.5 | 74.7 | 62.8 | 63.7 | 45.6 | 59.4 | 55.0 |
| Tubed | 100 | | 93.3 | | 93.8 | | 98.2 | |

* Dipped in clay slurry (1 kg/litre).

Results of this trial indicate that the procedure adopted should be (i) May sowing, (ii) weekly horizontal wrenching—vertical knives monthly, (iii) clay dipping at lifting—planting commencing in December.

A review of site preparation trials was made for the routine research conference. There is a marked response to line mounding on the poorly drained soil types such as the low humic gleys and ground water podzols; but there seems to be no response on well drained lateritic podzolic soils. Shallow

clay and concretionary soils are commonly ripped to a depth of 45 cm prior to mounding. Experiments show there is no response to this ripping. It is possible there will be a response to deeper ripping to 90 cm on these soil types and this is now being tested.

No trial species other than Caribbean Pine has shown a growth potential better than that of Slash Pine, the current routine species planted in the sub-tropical coastal region. While measures on current species trials less than 10 years old will

generally be continued for the time being, most older trials containing species other than Slash and Caribbean Pines will henceforth be terminated. Accordingly, the following trials were finalized during the past year:—

- Three Shortleaf Pine trials on ground water podzol sites at Tuan (26°S).
- Two Haitian Pine trials on lateritic podzolic ridge sites at Tuan and one at Beerburrum (27°S).
- One Masson Pine and Yunnan Pine trial on a lateritic podzolic ridge site at Beerburrum.
- One Poplar trial on a poorly drained humic soil at Beerburrum.
- One Chir Pine trial at Byfield was terminated because of slow growth. Mean height was 8.4 m and d.b.h. 13.3 cm after 20 years.

Two experiments, testing the effect of the direction of thinning on the growth of the pruned section of the stand, were examined. Pruned stems are slightly larger where first thinning at about age 12 years is carried out from above instead of from below. The margin in diameter increment varies from 0.1 to 0.4 cm after about 5 years. Once second thinning is carried out no further loss is sustained. Another experiment comparing the removal of the largest stems with the smallest stems in the stand, thinning to the same standing basal area, shows that the stand thinned from above has the higher basal area increment. The increase is small and is not reflected in volume increment.

The Officer in Charge of the Station is responsible for the selection and management of Scientific Purposes Areas at each plantation centre located on the coastal lowlands from Byfield south. Suitable candidate areas considered to cover the diversity of vegetation and soil types have now been selected for each centre. These areas are managed to retain them as far as possible in their natural state but may be subjected to burning regimes varying from nil to frequent prescribed burning.

A number of scientific studies are being undertaken on the first Scientific Purposes Area of 570 ha set aside at Beerwah several years ago. One study, to observe changes in the

character of the vegetation under a range of prescribed burning systems is being carried out by the fire research section of the Department. Six other studies are being undertaken by students of the Zoology Department of the Queensland University under the supervision of Dr. P. Dwyer.

These studies cover:—

- Mammal Diversity in Wallum Habitat.
- Population Ecology of Grassland Melomys (*Melomys littoralis*).
- Ecology of the Cane Toad (*Bufo marinus*) in Wallum Habitats.
- The impact of Cane Toads upon Populations of Native Mammals.
- A study of the Water Rat (*Hydromys chrystogaster*).
- Habitat Utilization of Macropods in Wallum.

Gympie Research Station

The major work of this station is aimed at increasing the productivity of wet and dry sclerophyll forests in coastal south Queensland; it also embraces revegetation of sandmined areas and the multiple use of timber and pasture in Spotted Gum-Ironbark forests.

Work has continued on the timber and pasture multiple use trial at Neerdie (26°S). The area was logged and silviculturally thinned leaving a range of stocking intensities. Half of the experimental area was burnt in December, 1974 and seed of six grasses and six legumes aerially applied two days after the burn. Superphosphate (125 kg/ha) was applied in March, 1975.

Blackbutt planted on simulated sandmined sites on Fraser Island has continued to display excellent growth. Best survival and height growth to two years (90 per cent.; 6.6 m) have been obtained with stock raised in large polythene bags and with annual field application of a 10.6.10 fertilizer at the rate of 368 g per tree. The minimum treatment of 368 g of 10.6.10 per tree in the first year only on stock raised in the smallest planting container (jiffy pot) has produced a mean height of 4.4 m, which is a reasonable growth rate.



Trial planting of Blackbutt on simulated sand mined plots on Fraser Island.

Dalby Regional Research Station

This station carries out research in the White Cypress Pine, Ironbark and Spotted Gum forests in the area west of Dalby and Warwick with an annual rainfall of 500–750 mm and in rain forests and sclerophyll forests on the Dividing Range east of Warwick where the rainfall generally exceeds 1 200 mm per annum. Research is also carried out into the

growth of windbreak and shelterbelt trees suitable for planting on the agricultural and pastoral land west of the Dividing Range.

Investigations are continuing into the relationship between standing basal area and basal area increment in even aged Cypress Pine stands of merchantable size. Data from three experiments for the 1971–74 period were analysed. The

experiments sample stands in which mean select stem diameter ranged from 20.3 cm to 28.3 cm in 1971. Treatments cover a basal area range from 5 to 20 m²/ha. There was no relationship between standing basal area and basal area increment in the stand with mean select diameter of 20.3 cm, but there was a relatively strong positive relationship in the other two experiments. In an attempt to explain the variation between these experiments and the unexplained data variation within individual experiments, a major study of the effect of crown characteristics, site and the removal of associated vegetation on the growth of Cypress Pine stems has commenced. Early indications are that the removal of even a small quantity of associated vegetation in a Cypress Pine stand may have a disproportionately large effect on the growth of the remaining trees. The effect appears to be tied more closely to nutrition than to increased moisture availability.

Measure data for an experiment established to determine the effect of approximately 30 year old regrowth eucalypts on the growth of well spaced Cypress Pine select stems revealed that there was an increase of approximately 20 per cent. in basal area increment of the Cypress Pine following removal of the eucalypts. Basal area of eucalypts removed ranged from 4 to 10 m²/ha.

A die-back disorder has been recognised in Cypress Pine stands over a substantial part of S.F. 154 Western Creek. A study of detailed yield plot data for this reserve is being carried out to determine the extent and importance of losses of Cypress Pine, their fluctuation with time and their correlation with vegetation and edaphic factors. The study is being supported by pathological and entomological investigations.

The first of a series of experiments designed to determine costs, response and returns from routine silvicultural treatment operations in various stand types in Cypress Pine forests has been established. Each experiment in the series will investigate cost-benefit relationship for a particular stand type, covering the range of stand densities and stem sizes encountered within that type on a reasonably uniform and compact area which is scheduled for treatment.

Examination of data from a range of experiments and detailed yield plots in Spotted Gum forests revealed a trend towards substantially reduced diameter increments in stem classes larger than 50 cm d.b.h. in stands subject to current management techniques. Acceptable increments have been obtained to date in an experiment in which considerably higher retention standards were adopted for these large stems. A crown classification system being devised for coastal Spotted Gum is to be tested in western forests with a view to identifying during routine logging operations stems unlikely to produce acceptable growth rates over the next cutting cycle.

Imbil and Yarraman Research Stations

These stations are mainly concerned with research into the establishment and maintenance of plantations of Hoop Pine on rain forest sites in south Queensland. Imbil with an average annual rainfall of 1 260 mm, represents the warmer and wetter Hoop Pine plantation areas, while Yarraman, with an average annual rainfall of 800 mm, represents the drier and colder inland sites. The silvicultural work is reported here while the tree-breeding and nutrition work is reported in separate sections of the report.

Planting trials of open-root Hoop Pine at Imbil have given very encouraging results. Survival in the field has been excellent for many of the treatments designed to improve seedling root systems and stem rigidity. Seedlings were given varying numbers of root wrenchings and were topped once or twice or left untopped. Planting was carried out both by hand and machine and season of planting covered the months of December, March, April and July. All open-root plants had their roots dipped in a thick clay slurry of Imbil origin. Final assessment of the trials has not been made, but indications are that root wrenching should be at frequent, regular intervals during the spring-autumn months. Lateral root development improved markedly in the winter months.

An open-root planting trial at Yarraman gave inconclusive results. Survival of clay dipped stock was very low. The low survival probably is attributable to the nature of the clay (bentonite) used, as good survival was obtained in a nearby routine planting in which other clays were used. Survival of undipped stock was just over 70 per cent, but was not considered satisfactory in view of the ideal soil conditions at the time of planting. A further trial, in which a more suitable clay will be used, has been initiated.

A trial, designed to test the effects of various stand down/hardening-off procedures on the early field survival, growth and general health of a range of tubed Hoop Pine stock grades, was commenced in Yarraman nursery in 1973. Treatments involved were: full-time shade—50 per cent. overhead shade up to time of transfer to the field; partial shade—four weeks of 50 per cent. overhead shade after tubing; no shade—plants stood down directly in the open. Grades of stock used were: 18–25 cm, 25–36 cm and 36–48 cm (all heights at tubing). Nursery survival averaged 99 per cent., with a slight trend in favour of smaller stock grades and full-time shade. Very favourable weather conditions followed planting and

health and survival in the field were very good throughout all treatments. In both nursery and field, stock of intermediate size at tubing has shown the most vigorous growth. After 18 months in the field, it was taller than the 36–48 cm stock, suggesting that there may have been some setback in growth of the taller stock after field establishment. Results suggest that while hardening-off of tubed Hoop Pine stock is desirable before outplanting, particularly for taller stock grades, non-hardened stock will perform satisfactorily under favourable weather conditions.

FOREST HYDROLOGY

The main function of this work is to investigate the influence of forest vegetation on water and soil resources and to arrive at methods of forest management which will maintain soil and water values at a high level.

Most effort during the year was directed towards maintaining the experimental catchment project on the wet tropical coast near Babinda (17°20'S). The aim of this project is to investigate the hydrological effects of converting tropical rain forest to tropical pastures using a pair of experimental catchments instrumented to measure most facets of the water balance. One of the catchments was logged in June, 1971 and cleared in July, 1973. Unfortunately the economic downturn in the beef industry has prevented the sowing of pastures, and regrowth rain forest is now commencing to cover the cleared area.

A detailed report of all facets of this experiment up to the end of 1973 was prepared during the year, and a summary of these results follows. During the four year's 1970–1973 inclusive rainfall averaged 3 900 mm per annum. Of this rainfall, 1 525 mm returned to the atmosphere as evapotranspiration and 2 375 mm left the catchment as streamflow (almost half as quickflow).

The commercial logging operation in one of the catchments in 1971 caused little detectable change in the water balance. The main impact was on water quality where the peak suspended sediment level (during flood flows) increased from about 350 parts per million (ppm) to as high as 700 ppm. There was no detectable change in sediment levels at low flows.

The clearing which occurred in July, 1973 caused a further increase in suspended sediment levels to as high as 3 500 ppm during flood flows, but again there was no increase in the low flow levels. The clearing also had a number of other effects. Maximum stream temperatures increased by about 2°C, although no change occurred in the minimum temperature relationships.

The soil moisture studies showed that the reduced transpirational demand after clearing caused the soil moisture status to remain high during the dry season. This resulted in more water being available for movement to ground water and thence to streamflow. This caused a significant increase in the base flow and resulted in an increase in water yield of about 189 mm during the first five months after clearing. There was no detectable change in many of the other parameters measured such as volume of quickflow (stormflow), quickflow duration, time to peak and peak discharge. However changes may become apparent with time as the surface soils become compacted with cattle trampling and they lose the inherently high infiltration characteristics imparted by the rain forest vegetation.

A computer rainfall-runoff model was used to simulate daily runoff. This gave good results and shows promise as a tool for assessing the hydrological effects of land use manipulations.

FOREST SOILS AND NUTRITION SECTION

The main programme of this section is the nutrition of the Slash and Honduras Caribbean Pines in the coastal lowlands of south east and central Queensland. Long term nutrition trials are maintained in the Yarraman, Imbil, Kenilworth Hoop Pine nurseries, and in the Beerburum exotic pine nursery.

(i) EXOTIC PINES—SOUTH AND CENTRAL QUEENSLAND.—

A major proportion of the work load for the year has gone into preparatory work necessary for a major review of fertiliser needs of Slash and Honduras Caribbean Pines in the coastal lowlands. Foliage analyses for major nutrients and mensurational data are now being assessed to determine future fertilising needs.

Preliminary findings for Honduras Caribbean Pine are:—

- Foliar phosphorus levels are increased by .010 per cent. by the addition of 26 kg/ha phosphorus.
- The critical foliar level of phosphorus may be within the range .065–.070 per cent.
- Plantations with site index above 30 m will not respond to additions of phosphorus. The fertilizer response increases at low site index.
- The relationship between site index and foliar phosphorus levels is poor.

- (e) In general terms volume increment increases as foliar phosphorus levels increase but for any given level of foliar phosphorus there is a wide range of productivity. Some factor/s apart from the phosphorus status of the trees may be limiting growth.

A fifteen year old stand of Loblolly Pine has responded to fertilizing with a mixture of superphosphate and rock phosphate (53 kg/ha phosphorus). The magnitude of the response was most pronounced between ages 16 and 20 years, and has apparently continued to age 30 years. The merchantable volume advantage to fertilizing at age 15 is 56 m³/ha by age 30 years, representing an increase in volume of 31 per cent. Fertilizing at age 30 years has also produced a response in a previously unfertilized Loblolly Pine stand, and this response may be continuing at age 42 years. While the data suggest that fertilizing of established Loblolly Pine stands could be justified on economic grounds, recommendations for routine practice could not be based on these results alone because of limitations in experimental design and lack of a measure of site variation.

(ii) TROPICAL PINES—NORTH QUEENSLAND.—During the year a biosuperphosphate trial was established in a Honduras Caribbean Pine plantation at Cardwell.

(iii) HOOP PINE—BRISBANE VALLEY.—The incidence of malformation (Yarramania) was relatively low during 1974. The copper boron sulphur factorial experiment mentioned in

last year's report was again assessed, and while the same trend was clearly apparent, i.e. a lower incidence of malformation of current growth associated with the addition of boron, the difference was not statistically significant. More comprehensive assessments of form are being carried out at present in the major series of experiments established 2½ years ago to examine the malformation problem in more detail. The lower general incidence of malformation during the report period however makes useful results difficult to achieve.

(iv) HOOP PINE—MARY VALLEY.—Omission trials established in 1972, 1973, on eucalypt forest sites continue to show an outstanding response to site preparation and/or clear tending. The general appearance and height increment of the minus nitrogen and nil fertilized plants have deteriorated slightly and the early response to cultivation is now less evident. The surrounding routine plants are still suffering from grass competition and the absence of cultivation—however routine plants growing on ash heaps are performing as well as the plants within 1972 trial area.

Current increment pattern on the 1972 trial now indicates deficiencies of nitrogen and phosphorus and possibly traces, while the 1973 trial shows an overall response to fertilising ("all on") compared to "nil". The table illustrates the main points.

GROWTH OF HOOP PINE ON EUCALYPT FOREST SITES
(Height increment 1974-75, means of 3 replications, cm)

| Planted | All On | Nil | —N | —P | —K | —S | —Ca —Mg | —Traces | Routine* |
|--------------------|--------|-----|-----|-----|-----|-----|------------|---------|----------|
| Dec., 1972 | 142 | 99 | 111 | 128 | 141 | 150 | 150 | 135 | 17 |
| Oct., 1973 | 126 | 115 | 137 | 128 | 137 | 132 | 144 | 129 | 23 |

* No cultivation, no fertilizer, no tending.

(v) SOFTWOOD NURSERIES.—A report on soil nutrient studies in the new Beerburum exotic pine nursery was prepared. The major experiment tested several organic amendments alone and in combination with inorganic fertilisers. The organic amendments were supplied at a rate designed to supply the phosphorus requirements of the seedling crop and supplemented with inorganic nitrogen and potassium to provide a balanced addition of nutrients. The inorganic fertilizer treatment was designed to supply the nutrient requirements of the seedling crop. Yield and quality of stock were improved by the addition of farmyard manure, and filter press, and inorganic fertilisers. Survival after outplanting was not influenced by the nursery treatments whereas subsequent height growth was. Height growth was dependent upon height, needle phosphorus concentration and stem diameter of the stock at planting. The review indicated that the traditional use of farmyard manure could be replaced by additions of inorganic fertilisers supplied at a rate of 1.3 to 1.9 times the estimated crop removals.

(vi) MISCELLANEOUS.—Two papers discussing nursery nutrition and phosphate fertilising of Slash Pine were presented to the Departmental Research/Routine Conference.

TREE BREEDING SECTION

Tree breeding work is conducted at several field stations with overall supervision by the Section leader in Brisbane. Intensive work is confined to Slash and Caribbean Pines and the native Hoop Pine, but some work is also carried out on a few other coniferous species.

(i) Exotic Pines

(a) Slash Pine

Although the role of Slash Pine is declining in planting programmes in south east Queensland in favour of Caribbean Pines, it will continue to be the major plantation species for some years and will remain the chosen species for some sites indefinitely. In order to provide the best seed possible for such use, a new clonal seed orchard is being established. The net area is 5 ha and spacing is 5.6 m by 5.6 m. Field grafting will start late in 1975 when 81 clones will be established. Superior trees for inclusion in the orchard have been selected in plantations on a wide range of sites from Caboolture to Maryborough and include a number of full pedigree trees chosen within progeny trials.

(b) Caribbean Pines

(1) HONDURAS CARIBBEAN PINE.—Additional plus trees were selected in routine plantations and progeny trials, mainly at Byfield. The best 36 trees available were chosen for field grafting in Section 3 of the Kennedy Seed Orchard (18°S). The orchard will comprise 4 sections totalling 9 ha; it includes

72 select clones so far. Section 1 gave its first major seed harvest in 1975 just 7 years after field grafting. The yield was 55.6 kg of clean seed (5.15 kg in 1974) or about 22 kg per ha of net orchard area. On average 55 kg of green cones gave 1 kg of clean seed. In addition to the orchard seed, 94 kg of genetically improved seed was secured from less-well-isolated clonal stands of select trees and a thinned seed production area (54 kg from the same sources in 1974). This larger supply of seed of high genetic quality contributed to the decision to increase considerably the proportion of Caribbean Pine planted in south east Queensland.

Approximately 150 seedlots from local and co-operators' selected trees (110 open-pollinated, 40 control-pollinated) were sown for establishment of the third in a series of major progeny trials and selection populations. Samples of many of the seedlots were distributed to co-operators or buyers.

(2) BAHAMAS CARIBBEAN PINE.—A review of Caribbean Pine variety and provenance trials planted in south east Queensland between 1956 and 1966 revealed that Bahamas Caribbean Pine is well adapted, high-yielding and has good stem form, branching, and wind firmness, in the subtropical coastal low lands, although the variety has a disturbing amount of top defect. Wood quality is quite satisfactory (see Forest Products Research Section of this Report). Consequently the previously modest tree breeding effort with this variety is being increased. Fourteen additional "plus" trees were chosen, mainly at Elliott River (25°S). The clonal bank-seed production area at Byfield, in which field grafting was started in 1972, was extended and it now contains 44 select clones. A study of the effect of locality upon flowering and seed production was started with the grafting of 16 clones at both Byfield and Cardwell.

(c) Hybrids

Several families of the variety hybrid Honduras x Bahamas Caribbean Pines (and reciprocal) have reached 8 years of age and show great promise in south east Queensland. The parental varieties flower at the same time, the F₁ hybrid seed has high viability, and hybrid seed can be produced in mixed stands of the varieties. Plans are being made to produce hybrid seed in quantity. Also investigation of the performance of advanced-generation populations (seed of which is easier to produce than F₁ seed) has been started. Interest in some of the interspecific hybrids among varieties of Slash and Caribbean Pines continues.

(d) Loblolly Pine

The small clonal seed orchard of 1 ha that was started in 1969 gave an increased yield 10 kg in 1975 as compared to 7 kg in 1974.

(e) Radiata Pine

Work continues on development of a better adapted population through selection and progeny testing in the southern highlands. This dry cool sub-tropical region is marginal for Radiata Pine. A progeny trial of 30 clones of the Talleganda (N.S.W.) seed orchard and 5 local selections established at Pechey and Passchendaele was measured at age 4 years. The progeny of Talleganda clone 130A, followed closely by local R39 with Talleganda clones 956B and 994 next, had the tallest families over both locations. A somewhat different group of families was best at each site. Except for R39, and R35 at one site, performance of the local families was disappointing. This confirms observations in older trials in which an encouraging proportion of introduced families are superior to progeny of local selections.

(f) Miscellaneous Tropical Pines

Early results of state-wide trials of several species and provenances planted in 1971 indicate that some Central American provenances of Ocote Pine are very promising in the warm sub-tropical and tropical areas, but Benguet Pine is better adapted to the cool sub-tropical uplands where certain populations from Vietnam and Philippines are promising. The first local plus tree of Ocote Pine (Belize provenance) was marked and cloned at Cardwell.

(ii) Hoop Pine

(a) SOUTH EAST QUEENSLAND.—About 350 kg of seed was secured from the Imbil seed orchard. All but 70 kg of this seed was sown, resulting in the production of about one quarter of a million seedlings. Although the orchard ramets are 10 years old pollen production is still inadequate, so supplemental mass pollination was undertaken again in the Imbil and Taromeo (Yarraman District) orchards. A considerable routine collection of seed was made (see "Seed Collection") of which approximately 1 600 kg comprised seed from highly selected trees or thinned seed production areas, mostly in the Yarraman and Gympie districts. In addition collections were made from numerous individual trees of the selected breeding population as part of the programme to establish wide-ranging progeny trials of such trees.

Further crossing was done according to the plans for polycrossing and single crossing trees of the selected breeding population. Also crosses were made between early and late flowering trees and between provenances. For the latter purpose some pollen was secured from Papua New Guinea and north Queensland. Large progeny trials were sown and others prepared for field planting in 1975-76.

(b) CENTRAL AND NORTH QUEENSLAND.—An extensive provenance trial, planted at 5 localities in 1972 and 1973, was measured in 3 localities at ages 1.5 and 2.5 years. Northern provenances (especially Coen (14°S) and Papua New Guinea

populations) generally performed best, but some southern provenances are also showing early promise at some localities. More than 10,000 plants of 3 newly imported Papua New Guinea provenances were germinated as part of a continuing programme to introduce and conserve the valuable gene resources of this species.

(iii) Miscellaneous

Internal reports for the Departmental Conference on exotic pines in south east Queensland were prepared on the following topics: Assessments of Slash Pine progeny trials planted 1961 to 1963; establishment of the third Slash Pine seed orchard; potential value of various seed sources of Slash Pine for use in Queensland; results of variety and provenance trials of Caribbean Pines planted between 1956 and 1966 in south east Queensland; estimates of genetic gains likely in Honduras Caribbean Pine at Beerburum; potential value of various seed sources of Loblolly Pine for use in Queensland; opportunities for breeding progressively higher yielding "varieties" of Southern-Caribbean Pines for sub-tropical lowlands, and status of programmes for genetic improvement of Southern-Caribbean Pines in southern coastal Queensland.

MENSURATION AND BIOMETRICS SECTION

The biometrical service to research stations and other branches continued at high level, although somewhat reduced on the previous year. Analysis of variance and/or covariance was carried out on 73 experiments involving about 1,200 separate analyses, over half of which concerned nutrition experiments, with plantation silviculture and tree breeding sections as the other major users. In addition, 450 regression analyses were processed, usually associated with computer plotting of data and residuals.

Major projects in which biometrics staff were involved during the year included a continuation of the processing and analysis of Slash Pine nursery experiments to determine relationships between seedling parameters and field performance, and the development of basal area prediction functions for Slash Pine. In the latter case, attention has so far been concentrated on a re-examination of the data used by Bevege in 1965, updated by more recent measurements. This shows that the 1965 predictions were conservative. The work is continuing and will soon be able to concentrate on the revised data from major thinning experiments following metric conversion.

Previous work on the aerial distribution of fertilizer had shown that for an adequately even spread, a granulated fertilizer with about 95 per cent. by weight of the particles above 1 mm diameter is required. Production of "Super King", which met this specification, has now ceased, and further trials were required, using a granulated form of "production super". A satisfactory spread was obtained with this material using



Stand of Slash Pine 6 weeks after a Prescribed Burn, Compartment 43, Elliott Logging Area, Toolara—Gympie District.

an Ag-Cat aircraft fitted with a clam-shell spreader at swath widths of both 4.9 m and 6.7 m. As a result of this work, revised specifications were drawn up for use when calling tenders for aerial fertilizing.

Analysis of Spotted Gum increments from detailed yield plots indicates that satisfactory prediction of increment of individual trees can be derived from a crown assessment based on crown portion, crown size, crown density, presence of dead branches and presence of epicormic shoots, points being allotted for each feature and then added to give a total rating for the tree. The practical application of this assessment lies in the selection of good growing stock for retention during logging and silvicultural treatment, and work is continuing.

Virtually all experiment measure data are now processed by computer in Head Office. This work generally proceeded smoothly, although some delays were experienced in having data punched while the system for processing stumpage accounts for plantation timbers was being implemented. Amendments were made as necessary to the programs used in the data processing. In addition a program used by Forest Resources Branch for processing plantation yield plot data was converted to metric operation. The system of quarter chain linear sampling in north Queensland rain forests has also changed to metric units using lines of 5 metre square plots, and the two programs previously used to process this work have been combined into a single more efficient program while adjustments for metric units were being made.

New systems are under active development to process Cypress Pine detailed yield plot data and north Queensland rain forest yield plot data.

A revised volume table for Bunya Pine was prepared and issued. Several other volume tables for minor species were converted to metric units as the need arose during the year. As a result of changes in methods of sample tree measurement introduced with metrication, it has been necessary to reconsider the formulae used in calculation of sample tree volumes, and the prismoidal formula is now favoured.

The site index table for Caribbean Pine has been revised and indicates a more rapid fall-off in height increment with age than was predicted by the previous table. A criterion for a good site index function is that in a particular plot, successive estimates of site index should remain constant with increasing age, and applying this test to the revised table indicates that further adjustment is required in the younger ages. Even the revised table must still be regarded as provisional, since none of the available data has yet reached the index age of 25 years.

Miscellaneous projects carried out during the year included the development of a set of standing value equations for plantation conifers from the most recent metric log price list, processing neutron probe moisture readings for Forest Hydrology Section, and design of the planting plan for the third section of the Kennedy seed orchard.

NATIONAL PARKS

NATIONAL PARK MANAGEMENT (1906-1975)

With the establishment of the National Parks and Wildlife Service in May 1975, nigh on 70 years of Forestry administration of National Parks in Queensland drew to a close. It is appropriate therefore to review not only the activities of the last financial year but also to give some account of Forestry's stewardship of the National Park Estate down the years. Accordingly a brief statement has been prepared, based on Departmental Annual Reports, setting out the policies which have been formulated and the implementation of these policies in National Park administration over the period 1906 to 1975. I am happy to include this statement in this Report as a tribute to those Department of Forestry officers who have had the foresight necessary to establish the foundations of the growing National Park system of the State.

Early Beginnings

In October, 1903 the Inspector of Forests G. L. Board inspected the Bunya Mountains, and in his Annual Report referred to the very large quantities of commercial timber but recommended that the area be made National Park because of its special values, thus setting an important precedent which has been followed by successive Forestry administrators—that a National Park is a legitimate form of land use, deserving of equal consideration with other potential uses, and not to be ruled out merely by the existence of alternative uses including that of commercial forestry. This tradition has continued to the present day, with the Department actively seeking to include representative samples of high quality commercial forest in the park system as well as samples of other important natural ecosystems.

National Parks Estate

On 14th December, 1906, the State Forests and National Parks Act was assented to, with the earliest National Parks being declared during 1908. Witches Falls on Tamborine Mountain was the first, and the Bunya Mountains National Park was declared in the same year.

The following table gives an indication of the growth of the National Parks Estate down the years:—

| Year | Number of Parks | Area in Hectares |
|------|-----------------|------------------|
| 1908 | 5 | 9 379 |
| 1915 | 9 | 29 846 |
| 1920 | 14 | 29 939 |
| 1930 | 30 | 63 330 |
| 1940 | 183 | 217 301 |
| 1950 | 235 | 299 373 |
| 1960 | 255 | 341 172 |
| 1970 | 271 | 996 611 |
| 1975 | 292 | 1 117 297 |

(Data for 1908 and 1915 are for 31st December; subsequent years for 30th June).

Management Lead

In the past Queensland has given a lead to the rest of Australia in the matter of park management, and has been well to the fore amongst nations generally. This has been evidenced by many letters from interstate and overseas visitors complimenting the Department on the high standard of protection afforded the parks. It is confirmed by the actions of nations like the United States who are now moving towards the Queensland policy of restricting major developments to the margins of the parks, and strictly limiting the extent of roads and other developments within the parks.

To quote from one letter (Annual Report for 1964)—

"In every area under your control which we visited we were impressed by the organisation which supplied essential information to tourists, which provided shelter and picnic spots without spoiling the natural beauty of surroundings, which ensured that the forest and mountain tracks were kept open but remained unobtrusive and which appeared to be able to so influence the public that all spots were clean and free from litter".

General Policy

From the beginning, the Department maintained a strict policy of total protection from exploitation. In his 1950 Report, Director Grenning hints at the pressures the Department was under to allow exploitation, for example of timber alleged to be going to waste (one can only guess at the extent of these pressures, but particularly during war years they must have been heavy), and he spells out his policy in the matter:—

"The Department is often urged to exploit the natural resources of the parks—timber, it is alleged, is going to waste etc. The Department does not hold this view. It feels, on the contrary, that the virgin bushland serves the people amply in providing a haven of rest, recreation, interest, and education and will continue to do so. Timber removal operations cause irreparable damage. Falling trees open great scars, logging roads and snig tracks disfigure the scene, lantana and other foreign plants are introduced and the areas are rendered vulnerable to fire. Untouched bushland can and does uplift and re-create the jaded worker, but a scarred and marred countryside has only a depressing effect.

In the interests of national health alone, the preservation of National Parks is more than justified, apart altogether from educational and other values.

From the tourist viewpoint, it will surely be conceded that, to continue to attract visitors from other lands, our areas must be unique and must have character. If we remove our best trees and disfigure the landscape, we make our parks less than second-rate, and cannot hope to interest and delight visitors. These considerations make it more than ever desirable to preserve the essence of Australia represented in the parks. We can sell our 'wasted trees' over and over again to visitors".

Earlier (1947), he had given a more general statement of National Parks philosophy and policy:—

"The purpose of these reservations is cultural, and on a recognition of this fact the policy adopted by the Department has been based. Therefore, not only recreational and scenic but also the educational and scientific aspects have been considered, and in reconciliation of all these the aim has been to preserve unspoiled and intact some fragments of Australian bushland and to give protection to its denizens.

Perhaps the chief value of the National Parks ideal, however, is in the uplifting effect on the national tone, in offsetting the blatant commercialism all too prevalent. Truly there are commercial values in the National Parks; these can be 'cashed' and yet leave the country and its people immeasurably poorer. By wise use, these assets would not be squandered, but kept for all generations.

To achieve this, any 'development' of the parks must be based on the cardinal principle that they must be preserved as far as possible in that simplicity and unspoiled beauty that makes them unique, and not formalised and cheapened to the level of hundreds of 'tourist resorts' to be found everywhere throughout the world.

In this direction the policy of the National Parks Service of the United States of America—without doubt the most advanced in the world—is worthy of the most careful study, with a view to application of its successes and avoidance of its mistakes."

In that 1947 statement with its emphasis on cultural, educational and scientific values as well as scenic, and on the preservation of unspoiled, unexploited nature, we have a philosophy that is as well up with the thinking expressed at the Second World Conference on National Parks in 1972, as it is with the original statement of the National Park ideal made by Cornelius Hedges one hundred years earlier and quoted in the 1954 Report:—

"It seems to me that God made this region for all the people and all the world to see and enjoy forever. It is impossible that any individual should think that he could own any of this country for his own and in fee.

This great wilderness does not belong to us, but to America. Let us make a public park of it and set it aside for America, never to be changed, but kept sacred always just as it is now, so that Americans always may know how splendid this early America was, how beautiful, how wonderful."

The spirit of that ideal is also to be found expressed by the words of Secretary C. J. Trist, one of the ablest of Australia's National Park administrators, whose untimely death was recorded in the 1954 Report. Trist described our National Parks as "fragments of the original Australia, reserved so that they may be preserved in their primeval condition, for the recreation, health, enjoyment and education of the people as a whole", and he stated:—

"By reservation as National Parks, areas of scenic, scientific or recreational interest can be maintained as nearly as possible in their original condition so that some fragments of Australia will be kept unspoiled and untouched, not only for our enjoyment, but that of our children and their children for all time. It is easy to realise that with the passing of time and the increasing destruction of natural vegetation by fire and the axe these remnants of Australian bushland and the denizens who find sustenance and sanctuary in them will be of great and evergrowing delight to, and value for the community."

Track Standards

The Queensland Department of Forestry can truly claim to have given a lead not only to Australia but to the rest of the world in the standard of its walking tracks. Work commenced in 1937 to develop a system of pathways constructed on easy grades with smooth surfaces and designed to fit unobtrusively into the landscape. In recording the construction of the 200th mile of graded track in 1952, the comment was offered that:—

"The policy of preserving parks, as far as possible, in their original condition has been strictly maintained. Work therefore has been confined, in the main, to opening up graded pathways which while interfering little with the parks give easy access to all who wish to see the beauty of these areas."

These high standard tracks are at once both a service to the visitor and a tool of management. Their easy grade and smooth surface greatly facilitate enjoyment of the parks and by so doing, reduce the need for roads and other major disturbances of the environment. This ensures that areas away from the tracks receive minimum human intrusion without the necessity to directly restrict the freedom of movement of the park visitor.

Habitat Preservation

At the 1972 World Conference considerable emphasis was placed on the need to secure maximum ecosystem representation in the National Parks of the world. This was already a firmly established policy in Queensland, which had been stated in 1964:—

"There is a tendency to value National Parks primarily for their scenic attraction, but these areas also play a valuable role as undisturbed natural museums, and as such, they are extremely valuable for scientific study and for fauna conservation. An important object of National Park administration must therefore be to reserve permanently, typical examples of all the main environments, including the less scenic."

Some years later, the Ministers of all Australian States meeting in formal Conference accepted as a basic responsibility of National Park administration this need for ecosystem preservation.

Interpretive Services

Limited finance has precluded development of major visitor information centres, but in other respects there have been some note-worthy activities. Name-plating of trees in picnic grounds and along walking tracks has proved popular; information signs, unobtrusive yet attractive and easily read, have been a major feature of Queensland National Parks and are especially noteworthy for their standard colour scheme of lemon lettering on chocolate ground; public lecturing by National Parks officers was commenced in 1940, weekend patrols to inform and assist the park visitor in 1963; a self-guiding track, opened in 1965, is thought to be the first on any Australian National Park.

Marine Environment

Legislation to provide for National Parks in the marine environment was enacted in 1971. In the words of the Minister for Lands in his first reading speech:—

"It recognises the need for the application of additional conservation measures to offshore areas, and it recognises the recreation potential and the scientific and historic values which exist in such areas.

In essence it recognises the immeasurable value of our National Parks and opens up new horizons to them."

Earlier, however, Queensland had already established Australia's first National Park in the marine environment, with the declaration of the Hinchinbrook Channel National Park in 1968.

Public Involvement

Public interest in National Parks is now so great that it is hard to realise that this was not always so. The 1964 Report records that the Department actively canvassed for public involvement in park management:—

"A further important development was the action taken to invite other Administrations interested in land use, together with scientists and scientific institutions concerned with the preservation of our native flora and fauna, to contribute their help and advice in furthering the better management of National Parks in this State. It is pleasing to record that the replies received indicate that the ready co-operation and advice of a large body of experts seem assured."

The Administrators

The main reason for the successful administration of the parks by the Department of Forestry has been the calibre of the administrators. For some 50 years the destiny of Queensland's National Parks was in the hands of four men: C. J. Trist, Secretary of the Department from 1921 to 1954; V. P. Grenning, Conservator from 1932 to 1964; A. R. Trist, Deputy Conservator from 1947 to 1964 and Conservator from 1964 to 1969; and W. Wilkes, Secretary from 1954 to 1970, who justly earned the affectionate sobriquet of "Mr. National Parks".

To quote from the 1971 Report:—

"These four men shared a deep and abiding love for the Australian bush and their wisdom and their dedication to the National Parks concept have given Queensland the basis of a parks system of which its people can be justly proud and which provides a clear lead to future administrations."

Perhaps the basic management philosophy of these men and of my predecessor, C. Haley, Conservator from 1970 to 1975, can best be stated in the words of Freeman Tilden, so often quoted by Wilkes:—

"It is management of the land for the perpetuation of the country's natural and historic heritage un tarnished by invasion and depletion other than that of invincible time."

The action of the Government in establishing a National Parks and Wildlife Service gives recognition to the importance of nature conservation in Australia today, and to the desirability, in view of the public interest in conservation, of having a Service which is seen to be separate from any organisation with prime responsibilities in the field of commercial production.

The Department of Forestry has always regarded the administration of the National Parks as a sacred trust. This trust I now hand on to the Director of National Parks and Wildlife, G. W. Saunders, and offer him my congratulations on his appointment. Our two organisations have much in common, with State Forests making a major contribution to the production of wildlife habitat and the provision of outdoor recreation space. I look forward to close co-operation in the years ahead.

NATIONAL PARKS REPORT 1974-75

Four National Parks were declared during the year:—

| N.P. No. | Parish | Area | Date of Gazettal |
|----------|------------------------------------|-------------------|------------------|
| 435 | Degalgil | Hectares 454.7 | 28-9-74 |
| 1001 | Hercules | 5 498 | 16-11-74 |
| 206 | Cook, Endeavour, Hann, Solander | 1 840 | 26-4-75 |
| 1559 | Trinity | 3 | 21-6-75 |

Additions to existing parks amounted to 2 517 ha; 31 ha were revoked; and re-compilation of boundaries resulted in an increase of 136 ha. As at 30-6-75 there were 292 National Parks with a total area of about 1 117 297 ha. Brief notes on the four new National Parks follow:—

NATIONAL PARK 435, PARISH OF DEGALGIL is located in the Calliope Range near Gladstone. The park includes scenically attractive closed forest with Hoop Pine, cliffs up to 100 metres high and a running creek with several small waterfalls.

NATIONAL PARK 1001, PARISH OF HERCULES is an important sample of wallum landscape adjacent to the township of Woodgate (south of Bundaberg). The nucleus is formed by a State Forest which was revoked to enable the park to be declared and which included some 700 ha of coastal Cypress forest, a vegetation type not previously represented in the park system.

The new park also features typical wallum wildflowers, and mangroves, and has frontage to both the Burrum River and Hervey Bay. A series of dune formations parallel to the present beach and extending inland for up to six kilometres is of particular interest in that it represents earlier shore-lines.

NATIONAL PARK 206, PARISHES OF COOK, ENDEAVOUR, HANN and SOLANDER affords protection to both banks of the Endeavour River near Cooktown and extends north to the boundary of the Reserve for the benefit of the Aboriginal inhabitants of the State. It is of major scientific and historical interest, including as it does the type locality for a number of plant taxa described from specimens collected while the ship "Endeavour" was being repaired.

NATIONAL PARK 155, PARISH OF TRINITY although of small size, is of considerable value. It comprises two small coral cays, Michaelmas and Upolo, situated about 30 kilometres north east from Cairns, which are important sea-bird rookeries. The adjacent reefs and waters have been given complementary protection by declaration of a Habitat Reserve under The Fisheries Act.

Park Proposals

The initial stage of work on Cape York Peninsula was completed during the year, with the preparation of a detailed report setting out a series of park proposals which would give representation of the major biological, scenic and recreational values of the Peninsula, in a minimum number of discrete areas. More detailed work may show additional areas worthy of reservation, but if those now proposed can be preserved, a major step forward in the conservation of the main features of this most interesting region will have been achieved.

Work also continued in the central highlands region and the Fitzroy basin, C.S.I.R.O. Land Systems data was of considerable help in this work.

The coastal lowlands from the New South Wales border to the Daintree River have, in the main, been severely disturbed in the past and development pressure there is continuing to increase more rapidly than elsewhere in the State. These areas have been closely investigated over the past five years and a number of relatively undisturbed areas of importance for wildlife habitat, scenic values or recreation have been nominated for preservation as National Parks. Owing to land use conflicts in this zone few of these areas have been gazetted as National Parks at this stage. It now becomes the responsibility of the new Service to ensure that adequate samples of these ecosystems are included in the park system of the State.

Land Acquisition

The offer of Commonwealth Government finance under the States Grants (Nature Conservation) Act added a new and exciting dimension to park proposal work: for the first time it was possible to contemplate land acquisitions involving major expenditure over and above that available from State funding. A programme of land acquisitions was prepared and has been approved in principle by both State and Commonwealth. Implementation awaits preparation by the Commonwealth Authorities, of the necessary Agreements under the Act.

Commonwealth reimbursement of the cost of acquisition of Egg Rock adjacent to Lamington National Park and Portion 49, Parish of Samsonvale adjoining Maijala National Park, which had been purchased from State funds, is acknowledged.

Marine National Parks

A considerable amount of park proposal inspection work was carried out during 1974-75 resulting in a number of major marine park proposals being defined between Lizard Island in the north and Peel Island (Moreton Bay) in the south. However, because of proposed administrative changes and legal matters relating to offshore jurisdiction, further action towards declaration has been suspended.

A preliminary management plan for the islands and reefs in the Capricorn and Bunker Groups was prepared. This is the first step in a continuing programme to develop a master plan for this region taking into account all aspects of resource conservation and utilisation. In keeping with the importance placed on this area of the Great Barrier Reef, staff accommodation was established on Heron Island in order to step up research, interpretation and law enforcement activities.

Interpretation is an important aspect of National Park endeavour. This is particularly true of the coral reef environment where a background knowledge of the natural history of an area can greatly enhance a visitor's appreciation of his surroundings. A reef walk booklet has been prepared for the Heron-Wistari Reefs Marine National Park and a number of talks were presented on Heron Island by a staff marine biologist and his wife. Several conducted reef walks were arranged by National Park staff during the year. The preparation of a management programme for the Green Island Marine National Park is well advanced. It takes into account such matters as recreational and commercial fishing, small boat usage, reef walking, swimming, safety factors and underwater guided trails. The turtle research programme concentrated on the Hervey Bay area continued and was expanded to include Heron Island along with other islands and reefs in the Capricorn and Bunker Groups.

National Park Zoologist, Mr. P. Ogilvie, attended the International Conference on Marine Parks and Reserves in Japan during May as official representative of the Queensland Government. He reports that with thirty countries represented, the Conference offered an excellent forum for discussing and planning marine park activities in a global context. One matter arising from the Conference which is of particular significance to Queensland in view of the administrative changes under consideration, is the recommendation, unanimously passed by all delegates, that "Governments assess the adequacy of existing administrative arrangements and, where necessary, take action to ensure co-ordinated conservation policies and to achieve the establishment and effective management of Marine Parks and Reserves, associated wherever possible with Terrestrial Parks and Reserves."

Fauna Studies

Fauna survey work has continued on several National Parks including Girraween, Bunya Mountains, Lake Eacham and Lake Barrine. Additional surveys have commenced on Robinson Gorge, Eungella and Cape Hillsborough National Parks. Fauna surveys of National Park proposals were also carried out, the most significant being on Collaroy Holding, Central Queensland. The monitoring of sea bird nesting on selected Barrier Reef islands has continued. Research work has continued on the distribution of north Queensland possums in relation to habitat, the distribution of the Yellow-bellied Glider in Queensland, the taxonomic differentiation of the Sugar and Squirrel Gliders and aspects of the Taxonomy of Queensland's reptile fauna.

Botany

During the year the major botanical endeavour was associated with the continuing survey of Cape York Peninsula and resulted in a comprehensive report proposing a series of reserves for the conservation of representative samples of the vegetation of the Peninsula. Fieldwork mostly concerned with park proposals was also carried out on areas adjoining Lamington, in the Conondale Ranges, and in the Moreton Bay region.

A short scientific paper describing a new species of orchid from North Queensland was published. One officer was seconded for several months to work on the Moreton Region Growth Study which recognises wildlife conservation and outdoor recreation as valid land uses to be given consideration on equal footing with other forms of land use such as urban development and commercial production.

Visitor Facilities and Park Management

Shortage of funds severely curtailed the number of new projects that could be undertaken during the year. Field programmes were largely restricted to maintenance of existing facilities, but the following new works were implemented:—

- (i) Construction of approximately 6 km of graded walking track in Lamington National Park linking the park entrance at O'Reilly's to the Blue Pool on West Canungra Creek.
- (ii) Construction of a septic toilet block at O'Reilly's, Lamington National Park.
- (iii) Construction of accommodation for research and management staff on Heron Island.

- (iv) The extension of lighting within the Donna Cave System at Chillagoe.
- (v) The initiation of patrol and general maintenance activities in the Brook Group of Islands.

Increased attention was given to the necessity for public information and law enforcement patrols during normal weekends and public holidays. Particular efforts were made to have extra staff in attendance at Carnarvon, Girraween and Bunya Mountains National Parks during the Easter holiday period when above average visitation places considerable stress on the park resources and facilities.

Successful submissions were made seeking financial assistance from the Commonwealth Government to construct public information centres, additional shower and toilet facilities and to upgrade the water supply systems at Girraween and Carnarvon National Parks. These works will be undertaken during the 1975-76 financial year.

Park Interpretive Services

A number of new pamphlets were prepared during the year though publication has been postponed while the new Service is getting established. Included are a series of publications covering the main features, the location and facilities of all the parks. The first of these covering south east Queensland is expected to be printed before the end of 1975.

Close liaison with the Education Department has been maintained by the Interpretive Officer during the year, and two short informal teacher guides were produced to assist teachers in explaining to children what there is to see in the parks, and in developing environmental appreciation.

The Lamington Natural History Association, based on the American concept, and involving co-operative efforts between interested private individuals and park administration staff was formed during the year. The Association has developed two self-guiding walks with printed leaflets and together with National Parks Branch officers has conducted an interpretive training weekend for honorary rangers and park overseers.

Honorary Rangers

Indicative of growing public interest in National Parks, was the appointment, during the year, of 54 private citizens as honorary rangers. While honorary rangers have certain powers to act on breaches of "The Regulations", the Department has continued to emphasise their value in complementing its own staff as a source of information about the park and park values. During the year contact was made with every honorary ranger through a short quarterly newsletter (originally limited to south-east Queensland), which continues to receive favourable comment from the recipients.

Throughout the year two voluntary groups of honorary rangers have conducted regular meetings. One group has been meeting in Brisbane for many years while the other comprising members primarily interested in Lamington and adjacent National Parks has organised regular public information patrols at these areas each weekend. Honorary rangers organised a discussion weekend at Lamington National Park which was attended by more than 60 people.

South Pacific Conference

Two officers of the Department attended the South Pacific Conference on National Parks and Reserves held in New Zealand in February, 1975. The Conference was hosted by the New Zealand Government and organised jointly by New Zealand and the International Union for the Conservation of Nature and Natural Resources. Its outstanding success is a tribute to the officers of the New Zealand National Parks Service and the Department of Lands and Survey who carried the major burden of the work.

The Conference, and more particularly the activities which have flowed from it, represent acceptance by western nations of the responsibility at the practical level to assist developing nations to protect and conserve their outstanding scenic attractions and indigenous forms of plant and animal life.

Representatives of both the New Zealand and Australian Governments promised financial and technical aid, and the wide representation of the Australian State Governments at the Conference was indicative of their support of the Commonwealth in assisting the nations of the South Pacific region in nature conservation programmes. The South Pacific nations for their part indicated the tremendous problems that they face as small communities with limited resources, and welcomed the assistance being offered.

Expenditure

During 1974-75 an amount of \$742,739 was spent on National Parks excluding payment of salaries. Of this amount \$68,216 was spent on Marine National Park work, and \$674,523 was spent on Terrestrial Parks.

An overall breakdown of expenditure on Terrestrial National Parks is as follows:—

| Works Description | Expenditure | |
|---|-------------|---------|
| | 1973-74 | 1974-75 |
| | \$ | \$ |
| 1. General overheads. (Non productive time, supervision, tools and equipment) | 159,157 | 184,975 |
| 2. Fire detention, fire fighting and patrol | 791 | 3,891 |
| 3. Establishment of trees, eradication of noxious wildlife | 2,208 | 7,188 |
| 4. Track location and survey | 1,257 | 7,414 |
| 5. Track construction and improvements | 17,793 | 10,812 |
| 6. Track maintenance | 61,904 | 75,137 |
| 7. Construction of picnic ground facilities | 28,328 | 40,371 |
| 8. Maintenance of picnic facilities | 95,560 | 132,391 |
| 9. Miscellaneous construction works | 19,697 | 44,673 |
| 10. Maintenance of miscellaneous improvements | 4,006 | 6,017 |
| 11. Construction of camping area facilities | 2,387 | 2,964 |
| 12. Maintenance of camping areas | 14,020 | 20,377 |
| 13. Erection of general signs | 3,840 | 9,536 |
| 14. Maintenance of general signs | 3,279 | Nil |
| 15. Construction of accommodation facilities for staff | 7,249 | Nil |
| 16. Maintenance of accommodation and facilities for staff | 5,507 | 6,156 |
| 17. Maintenance of Aboriginal relics | 96 | 123 |
| 18. Special research projects | 851 | 3,145 |
| 19. Construction of interpretive facilities | 112 | 1,481 |
| 20. Maintenance of interpretive facilities | 1,111 | Nil |
| 21. Law enforcement and information patrols | 23,411 | 23,276 |
| 22. Boundary surveys | 1,818 | 3,840 |
| 23. Construction and maintenance of fire lines | 5,372 | 8,869 |
| 24. Issue of permits Rural Fires Act | 279 | 464 |
| 25. Subsidies to Shire Councils | 6,000 | 204 |
| 26. General costings not applicable to any particular park | 120,174 | 81,219 |
| | 586,207 | 674,523 |
| Less vote adjustment credit | 478 | Nil |
| Total Terrestrial National Parks | 585,729 | 674,523 |
| Marine National Parks | 24,281 | 68,216 |
| Total—All National Parks | 610,010 | 742,739 |

HARVESTING AND MARKETING

General

Due to adverse trading conditions there was an overall fall in the yield of Crown log timber, as illustrated by the accompanying charts and tables.

The yield of Cypress Pine log timber however moved ahead of the record of the previous year and the demand for natural Hoop, Bunya and Kauri Pine continued strongly with the cut slightly ahead of last year also.

Following the successful sale last year of 8 lots of Cypress Pine milling timber to give 8 existing sawmillers the opportunity to increase their levels of production for more efficient operation, a further lot of about 3 000 m³ in the Injune area was likewise offered and purchased at upset by a sawmiller who did not purchase a lot at the previous sale.

Automatic Data Processing

Further progress has been made in the computerisation of log timber stumpage accounts, by the inclusion in the system of natural grown log timber in the Dalby and Warwick Districts from 1st July, 1974 and in the Rockhampton Sub-District from 1st January, 1975. This completes the computerisation of stumpage accounts for all natural grown log timber in South Queensland.

A new computer system to process stumpage accounts for plantation timber was also implemented on 1st January, 1975, in all Districts except Atherton.

Investigation work is underway into a system to computerise stumpage accounts for North Queensland and Mackay log timber.

Logging Roads

The Department's road programme for the year involved 67 km of construction and 40 km of location and working surveys.



Hardwood log hauling, D'Aguiar Range area, west of Dayboro.

Expenditure on logging roads was as follows:—

| | \$ |
|------------------------------------|------------|
| New Construction | 507,792.69 |
| Maintenance | 311,418.53 |
| Subsidies to Shire Council | 104,673.21 |
| Pay Roll Tax | 23,283.75 |
| Workers Compensation | 11,726.17 |
| Fares and freights | 3,554.16 |
| | 962,448.51 |

Included in these totals is a major arterial road connecting a southern section of the Toolara State Forest across two large creeks with the Gympie-Tin Can Bay Road. This road now provides more direct and improved access to about 3 200 ha of established plantation pine which are expected to yield an annual volume of about 18 000 m³ of log timber.

Work was also commenced on an access logging road to serve Timber Reserve 209 in the Parishes of Bowman and Cressbrook. This Reserve is a high plateau-type forest containing an estimated 6 000 m³ of loggable hardwood, scrubwood and Hoop Pine milling timber. Vantage points on this road provide panoramic views of the Somerset Dam and the proposed Wyvenhoe Dam inundation area. With appropriate improvement for private motor vehicles, this road would add to the tourist attractions of the area.

In an effort to minimise erosion and maintenance of logging roads, the Department is using an "outward canting" method of formation of side-cutting, whereby water from direct rainfall or seepage is drained evenly off the road surface all along the pavement. This technique also reduces construction costs by deletion of under-road drainage pipes whose maintenance tends to be neglected due to shortage of staff for this activity. The outward gradient needs to be only about 3% and is satisfactory for relatively slow moving timber trucks.

Rosewood

Three container loads of Rosewood (*Eremophila mitchelli*) were exported to Hong Kong by this Department in the M.V. "Australian Enterprise" on the inaugural Voyage of ANLINE, the new container fortnightly shipping service from Brisbane to Manila, Inchon and Hong Kong.

This trial shipment in sea-containers of about 32.315 tonnes was harvested for the Department by Mr. W. R. Adcock of Ayr from Crown timber areas about 40 km south of Home Hill where, after removing the bark and the sapwood, the billets were put into three mesh-sided shipping containers fastened on rail wagons.

The sale of the Rosewood to three merchants in Hong Kong was arranged through the Australian Sandalwood Company Limited of Claremont, Western Australia.

Rosewood is a small shrubby tree which grows to a height of only about 6 m. It occurs more or less in clumps or patches usually associated with Bimble Box, Wilga and odd Cypress Pine in low rainfall areas extending from near Wilcannia in New South Wales to near Charters Towers.

The wood burns fairly readily with a spicy fragrance. The Chinese convert the billets into chips which are ground to powder, then made into a paste and formed into joss sticks for burning as incense, on ceremonial occasions.

There is a big demand for aromatic wood in the Far East but because of the labour intensive removal of the bark and sapwood and the handling of the small logs it has been difficult for Queensland to compete with other sources of supply such as Indonesia.

However, with the use of sea-containers and modern handling methods, it is hoped that the reduced handling costs will permit this trade to continue and expand and provide additional employment for a limited number of people in areas which are currently suffering from depressed cattle prices.

Minimum log sizes prescribed help ensure that immature trees are retained for periodic harvesting provided they are not destroyed by ringbarking or by clearing operations.

Harvesting Research

As a follow up of the Australian Forestry and Wood Based Industries Development (Forwood) Conference in Canberra last year, and in co-operation with the Harvesting Research Working Group of the Australian Forestry Council, a seminar was held in Brisbane and Gympie in August, 1974 on Slash Pine plantation establishment and harvesting techniques. It was attended by Industry representatives as well as State and Australian Government forestry officers and a committee was set up to undertake studies of various harvesting techniques.

Evaluation of equipment such as forwarders, light skyline systems, feller-bunchers and tree-harvesters is being undertaken.

These investigations involve active co-operation of the industry and the general results of the studies are to be made available to interested persons regardless of direct participation or not.

Similar co-operative studies of Hoop Pine plantations timber harvesting methods are also being undertaken and extension into the field of harvesting of natural grown timbers is being investigated.

The co-ordination of the States' Industry and Departmental co-operative harvesting research was organised by the Australian Forestry Council when an Australia-wide Harvesting

Research Working Group held its inaugural meeting in November, 1974. One of the main functions of this Group in which there are Industry and Departmental representatives from Queensland, is to advise the Australian Forestry Council on aspects of timber harvesting requiring investigation and research. The Group comprises about 25 persons selected from all States and these members are either actively engaged in timber harvesting research or are well acquainted by personal experience with the problems of the logging industry.

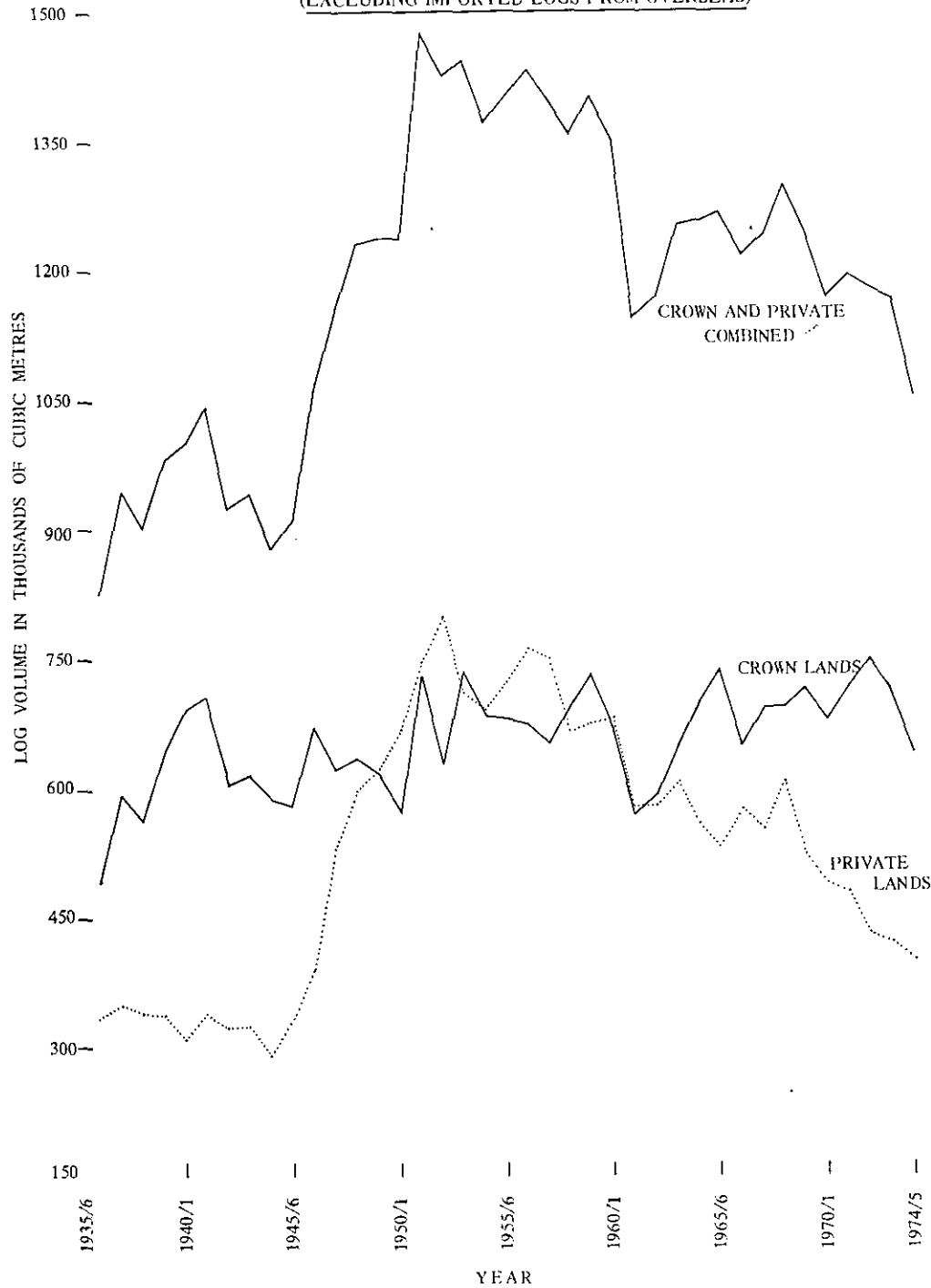
Mill Logs—Crown Forests

Annual quantities of Mill Logs harvested from Crown Forests for the past ten years are as follows:—

| Year | m ³ | Year | m ³ |
|---------------|----------------|---------------|----------------|
| 1965-66 | 737 000 | 1970-71 | 682 000 |
| 1966-67 | 648 000 | 1971-72 | 716 000 |
| 1967-68 | 694 000 | 1972-73 | 750 000 |
| 1968-69 | 694 000 | 1973-74 | 716 000 |
| 1969-70 | 716 000 | 1974-75 | 644 000 |

MILL LOG HARVEST FROM CROWN AND PRIVATE LANDS

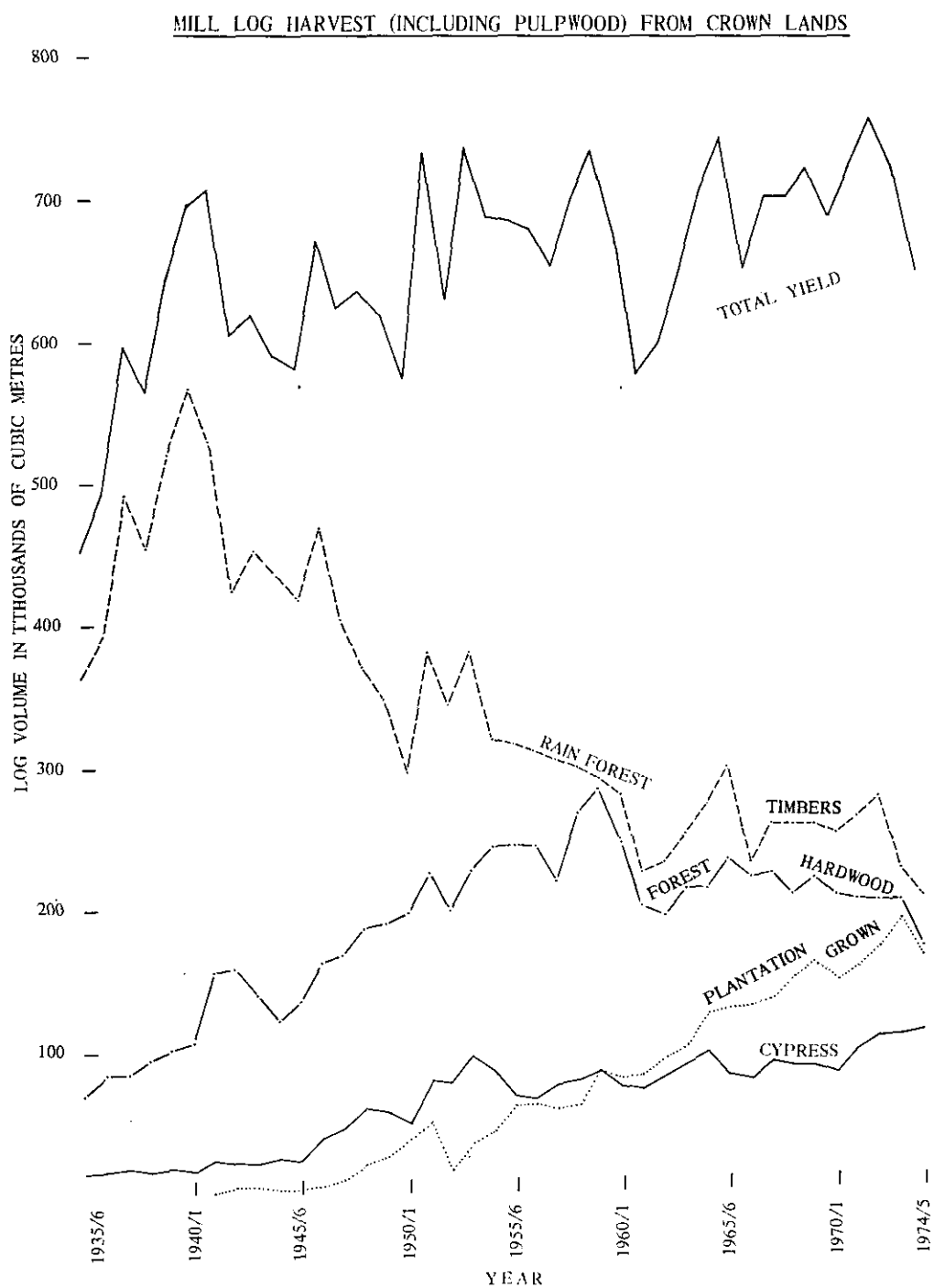
(EXCLUDING IMPORTED LOGS FROM OVERSEAS)



MILL LOGS PROCESSED FROM CROWN AND PRIVATE FORESTS

Volumes in m³

| Year | Queensland Grown | | | | | | | | | | Imported from Overseas | Total |
|------------|---------------------|------------|--------------------|------------------|----------|-----------------|---------------|-----------------------|--------------------|----------|------------------------|-----------|
| | Hoop and Bunya Pine | Kauri Pine | White Cypress Pine | Forest Hardwoods | | Scrub Hardwoods | Cabinet Woods | Miscellaneous Species | Plantation Timbers | | | |
| | | | | Saw Logs | Pulpwood | | | | Saw Logs | Pulpwood | | |
| 1970-71 .. | 48 440 | 8 630 | 177 830 | 554 050 | .. | 49 474 | 62 146 | 128 606 | 126 073 | 24 594 | 50 117 | 1 229 960 |
| 1971-72 .. | 59 913 | 7 110 | 190 736 | 546 140 | .. | 54 736 | 63 999 | 125 265 | 125 003 | 30 282 | 42 743 | 1 245 927 |
| 1972-73 .. | 64 549 | 8 795 | 202 479 | 447 823 | 43 957 | 70 481 | 53 426 | 125 799 | 124 820 | 48 996 | 44 534 | 1 235 659 |
| 1973-74 .. | 45 201 | 4 885 | 196 504 | 446 819 | 37 566 | 55 738 | 41 243 | 113 422 | 136 035 | 59 862 | 35 056 | 1 172 331 |
| (Estimate) | | | | | | | | | | | | |
| 1974-75 .. | 45 763 | 4 817 | 210 628 | 380 357 | 37 010 | 56 177 | 37 856 | 105 151 | 122 964 | 45 622 | 13 734 | 1 060 079 |



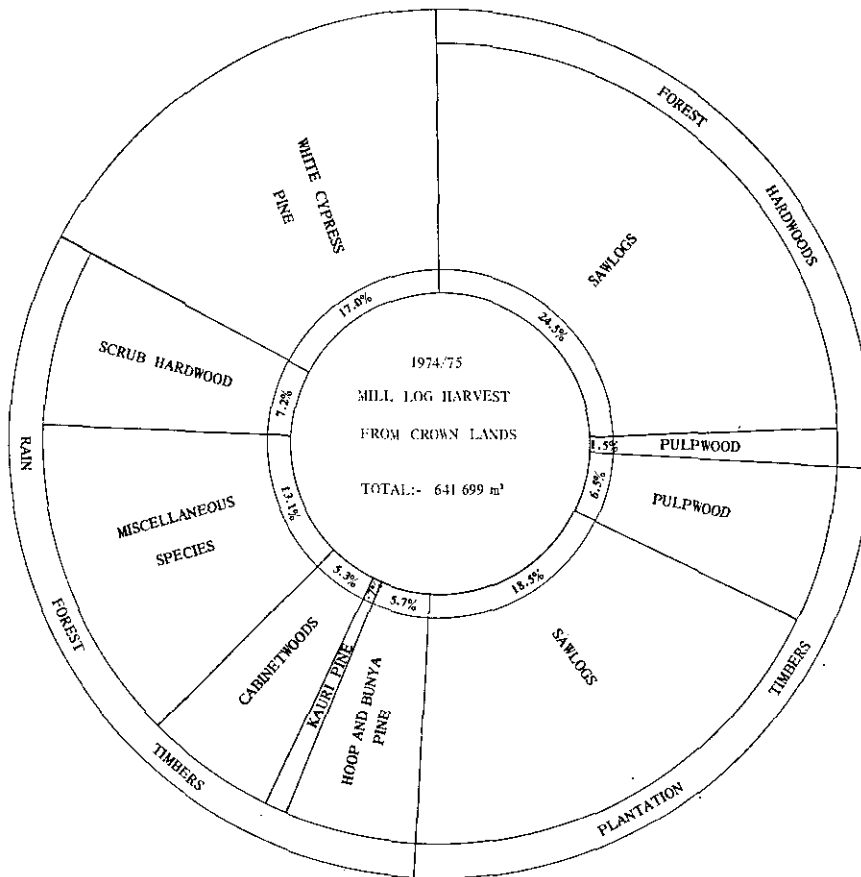
MILL LOG YIELD FROM CROWN FORESTS

Volumes in m³

| Year | Hoop and Bunya Pine | Kauri Pine | White Cypress Pine | Forest Hardwoods | | Scrub Hardwoods | Cabinet Woods | Miscellaneous Species | Plantation Timbers | | Total |
|---------|---------------------|------------|--------------------|------------------|----------|-----------------|---------------|-----------------------|--------------------|----------|---------|
| | | | | Saw Logs | Pulpwood | | | | Saw Logs | Pulpwood | |
| 1970-71 | 44 510 | 7 215 | 79 651 | 205 660 | .. | 47 323 | 51 695 | 97 867 | 121 385 | 24 594 | 679 900 |
| 1971-72 | 51 584 | 6 049 | 96 788 | 203 000 | .. | 51 728 | 52 749 | 97 416 | 124 477 | 30 282 | 714 073 |
| 1972-73 | 57 079 | 8 158 | 105 610 | 191 029 | 10 306 | 58 816 | 48 011 | 102 587 | 121 226 | 47 091 | 749 913 |
| 1973-74 | 36 575 | 4 290 | 106 259 | 196 290 | 5 222 | 47 200 | 37 220 | 95 659 | 129 664 | 57 469 | 715 848 |
| 1974-75 | 36 449 | 4 716 | 109 720 | 157 912 | 9 462 | 46 383 | 33 844 | 84 563 | 118 882 | 41 824 | 643 755 |

MILL LOG YIELD FROM PRIVATE FORESTS
Volumes in m³

| Year | Hoop and Bunya Pine | Kauri Pine | White Cypress Pine | Forest Hardwoods | | Scrub Hardwoods | Cabinet Woods | Miscellaneous Species | Plantation Timbers | | Total |
|---------------------------|---------------------|------------|--------------------|------------------|----------|-----------------|---------------|-----------------------|--------------------|----------|---------|
| | | | | Saw Logs | Pulpwood | | | | Saw Logs | Pulpwood | |
| 1970-71 .. | 3 930 | 1 415 | 98 179 | 348 390 | .. | 2 151 | 10 451 | 30 739 | 4 688 | .. | 499 943 |
| 1971-72 .. | 8 329 | 1 061 | 93 948 | 343 140 | .. | 3 008 | 11 250 | 27 849 | 526 | .. | 489 111 |
| 1972-73 .. | 7 470 | 637 | 96 869 | 256 794 | 33 561 | 11 665 | 5 415 | 23 212 | 3 594 | 1 905 | 441 212 |
| 1973-74 .. | 8 626 | 595 | 90 245 | 250 529 | 32 344 | 8 538 | 4 023 | 17 763 | 6 371 | 2 393 | 421 427 |
| (Estimates) 1974-75 .. | 9 314 | 101 | 100 908 | 222 445 | 27 548 | 9 794 | 4 012 | 20 588 | 4 082 | 3 798 | 402 590 |



The Timber Business (Crown Forests)

| | | | |
|--|---------|------------------------------|------------------------------|
| (a) Mill Logs— | | 1973-74 | 1974-75 |
| Hoop and Bunya Pine | .. .. . | 36 575 m ³ | 36 449 m ³ |
| Forest Hardwoods— | | | |
| Saw Logs | .. .. . | 196 290 m ³ | 157 912 m ³ |
| Pulpwood | .. .. . | 5 222 m ³ | 9 462 m ³ |
| Scrub Hardwoods | .. .. . | 47 200 m ³ | 46 383 m ³ |
| White Cypress Pine | .. .. . | 106 259 m ³ | 109 720 m ³ |
| Kauri Pine | .. .. . | 4 290 m ³ | 4 716 m ³ |
| Cabinet Woods | .. .. . | 37 220 m ³ | 33 844 m ³ |
| Miscellaneous Species | .. .. . | 95 659 m ³ | 84 563 m ³ |
| Plantation Timbers— | | | |
| Saw Logs | .. .. . | 129 664 m ³ | 118 882 m ³ |
| Pulpwood | .. .. . | 57 469 m ³ | 41 824 m ³ |
| Limb Logs, Head Logs, Stumps and Flitches | .. .. . | 2 m ³ | Nil m ³ |
| | | 715 850 m³ | 643 755 m³ |
| (b) Constructional Timbers— | | | |
| Headstocks, Transoms, Crossings, Braces, &c. | .. .. . | 743 m ³ | 1 116 m ³ |
| Sleepers | .. .. . | 286,650 pieces | 392,004 pieces |
| Girders, Corbels, Piles, Sills | .. .. . | 24 046 m | 20 358 m |
| Girder Logs | .. .. . | 213 m ³ | 904 m ³ |
| Poles | .. .. . | 38 670 m | 19 101 m |
| House Blocks | .. .. . | 1 662 m | 228 m |
| Mining Timbers—Round | .. .. . | 185 976 m | 160 394 m |
| Mining Timbers—Sawn | .. .. . | 699 m ³ | 962 m ³ |
| (c) Gross Receipts from Timber Sales, &c. | .. .. . | \$5,607,137.41 | \$8,384,757.68 |
| (d) Net Revenue | .. .. . | \$2,704,828.80 | \$2,515,515.67 |

Imports of Sawn Timber from Overseas

Imports of sawn timber from overseas for the last three years were:—

| | Log Equivalent* |
|-------------------------------|------------------------|
| 1972-73—49 280 m ³ | 109 510 m ³ |
| 1973-74—75 050 m ³ | 166 780 m ³ |
| 1974-75—57 950 m ³ | 128 780 m ³ |

* Assuming 45 per cent. recovery.

The following table shows the major species or species groups imported, the countries of origin and quantities in m³ sawn volume for the three years indicated:—

| Species | Volume in m ³ | | | Countries of Origin |
|-----------------------|--------------------------|---------|-------------------|---|
| | 1972-73 | 1973-74 | Estimated 1974-75 | |
| Douglas Fir .. | 13 058 | 15 283 | 13 059 | United States of America, New Zealand, Canada |
| Klinki Pine .. | 2 993 | 2 205 | 4 256 | |
| Kauri Pine .. | 2 138 | 2 773 | 1 129 | Papua New Guinea, Fiji, Malaysia |
| Other Conifers | 4 732 | 4 392 | 4 863 | Brazil, Papua New Guinea |
| Meranti .. | 8 568 | 16 589 | 16 898 | Malaysia, Singapore |
| Other Non-conifers .. | 13 579 | 25 324 | 12 240 | Malaysia, Papua New Guinea |

Constructional Timbers—Departmental Contracts

Below are shown the yield of constructional timbers from Crown forests for the year 1974-75, in comparison with that for the previous two years:—

| Class of Timber | 1972-73 | 1973-74 | 1974-75 |
|-----------------------|--------------------|--------------------|--------------------|
| Sleepers .. | 315,952 pieces | 134,311 pieces | 155,854 pieces |
| Crossings .. | 96 m ³ | 361 m ³ | 485 m ³ |
| Transoms .. | 292 m ³ | 335 m ³ | 282 m ³ |
| Bridge Timbers | | | |
| —Girders and Piles .. | 8 579 m | 14 635 m | 9 888 m |
| Girder logs .. | 116 m ³ | 213 m ³ | 904 m ³ |

Logging

The table below shows the quantities of log timber harvested during 1974-75 by contractors to the Department and the payment made to them for this work.

| Class | Quantities | Payments |
|------------------------|----------------|------------|
| | m ³ | \$ |
| South Queensland— | | |
| Hoop and Bunya Pine .. | 21 870 | .. |
| Scrub Hardwoods .. | 226 | .. |
| Forest Hardwoods .. | 2 | 281,803.48 |
| Miscellaneous .. | 470 | .. |
| Red Cedar .. | 102 | .. |
| | 22 670 | 281,803.48 |
| North Queensland— | | |
| Cabinet Woods .. | 1 688 | 24,883.31 |
| | 1 688 | 24,883.31 |

BREACHES OF ACTS

Reported were 89 breaches of the Forestry Act and three breaches of the Sawmills Licensing Act and prosecution proceedings were successfully pursued against 15 offenders, fines totalling \$923 being imposed.

Appropriately worded letters were directed to other offenders, warning them that further breaches must be regarded more seriously.

From action taken in cases involving unauthorised interference with timber or other forest products, a total amount of \$12,949.43 was recovered for royalty and for costs of investigations.

In their capacity as Fire Wardens, Forest Officers investigated 13 breaches of the Rural Fires Act.

SAWMILLS LICENSING

The Sawmills Licensing Committee met at regular intervals during the year to consider matters relating to Sawmills Licensing and submitted recommendations as required.

During the year the number of licensed sawmills increased from 433 to 435 and of these, 368 mills actually operated during the first three quarters.

The following table shows the position in respect to Sawmill Licenses as at 30th June, 1975:—

| Number of Licenses as at 30-6-74 | Classification | New Licenses Issued | Licenses not Renewed | | | Licenses as at 30-6-75 |
|----------------------------------|----------------------------------|---------------------|-----------------------------|----------|----------------|------------------------|
| | | | With-drawn for Amalgamation | Re-fused | Refin- quished | |
| 374 | General Purpose Mills | 3 | 14 | 1 | 2 | 360 |
| 59 | Other than General Purpose Mills | 6 | .. | 1 | 6 | 58 |
| .. | Portable Mills | 17 | .. | .. | .. | 17 |
| 433 | | 26 | 14 | 2 | 8 | 435 |

Of the new sawmills licensed, 17 covered plants of the Forestmil type which have been classified as portable mills. The licensing of such plants became necessary following amendment to the Sawmills Licensing Act. The majority of these plants are located in North Queensland.

Industry has continued to take advantage of the Department's amalgamation policy and a further fourteen licenses have been withdrawn following participation of the mills concerned in amalgamation.

TECHNICAL AND FIELD STAFF TRAINING

(i) A further five State Scholarships were awarded in 1975, one to a new matriculant and four to students who had completed one or more years of the degree course in Forestry. The first year of the Course is taken at the University of Queensland, or at the James Cook University North Queensland. A further three years are then taken at the Australian National University, Canberra.

The number of undergraduates holding State Forestry Scholarships as at 20th June, 1975 were—First Year 1; Second Year 5; Third Year 5; Fourth Year 6.

One State Scholarship holder graduated at the end of the 1974 Academic year and took up duty as Forester within the Department in January, 1975.

(ii) Twelve Forest Trainees completed three years practical field training in January. After serving probationary periods as gangers they were appointed field overseers. A further 15 trainees selected from applicants with at least Junior Examination passes commenced training in 1975. At the end of June the total number in training was 47.

(iii) The system of Adult Training introduced in 1970 to supplement the Forest Trainee Scheme and provide an avenue of advancement for field employees with potential ability was continued in 1975. The number of Adult Trainees at 30th June, 1975, totalled 17. Four completed training during the year and took up positions as Field Overseers.

FOREST PRODUCTS RESEARCH

The downturn in activity in the timber industry gained momentum dramatically in the second half of 1974 and, in contrast to the boom conditions which applied earlier in the year, the industry is presently operating well below its capacity. This sudden change caused a considerable amount of market and product readjustment within the industry which in turn led to an increase in demand on the Department for technical advice and assistance in many areas. The demand for extension work is likely to continue to increase with the increasing sophistication of the timber industry, and as a result of the competitive pressures from alternative building materials. The Branch is developing its advisory sections to better meet these requirements and is accepting an increasing amount of inspection work at the request of the timber industry and the public generally.

Applied research in the field of timber utilisation is being developed where particular problems have become apparent and to reappraise our recommended utilisation practices to meet the current needs of industry. The collaboration and assistance of the Timber Research & Development Advisory Council facilitate some of this work and the close contacts developed in this area are of mutual benefit. The results of this work will be embodied in revised and up-dated advisory literature being prepared by both bodies.

Despite the application of stringent quarantine measures a close watch must be maintained for introduced timber pests which are often difficult to detect and which may gain entry



Hoop Pine Plantations at Kenilworth viewed from Sunday Creek Road.

and become established in this country. Provided prompt measures can be taken in such cases the pest may be successfully eradicated before it becomes widespread but adequate authority must exist to enable the necessary measures to be effected with a minimum of delay.

A case in point has been the continued problem with the West Indian Dry-wood Termite, *Cryptotermes brevis*, in the Maryborough area where the eradication programme financed jointly by the Queensland and Commonwealth Governments had to be deferred pending the introduction of supplementary legislative measures.

The insect has since been detected in Bundaberg and two related exotic species, *Cryptotermes domesticus* and *Cryptotermes cynocephalus*, have been located at Mossman in North Queensland. Investigation of the extent of these infestations is proceeding to determine whether eradication is still practicable.

During the year the 17th Forest Products Research Conference was held in Melbourne and was attended by three officers of the Branch. Officers also participated actively in the operation of numerous bodies and committees, particularly in the fields of timber standard preparation and timber utilisation, many of which involved interstate travel.

We were fortunate to receive a visit during October from Dr. Peter Koch a leading American timber research scientist.

The work of the individual sections of the Branch is reported in more detail below:

The Timber Users' Protection Act

During the past year, complaints received under The Timber Users' Protection Act reached a record total of 72 complaints which is nine greater than the 1973-74 total of 63. As well there was a carry over of 29 cases from the previous year.

Out of these 101 cases 41 complaints were satisfactorily resolved, five were classed as "no case" and two concerned wood species that were not covered by the Act prior to the gazettal of the additional species in March, 1974. No action was taken in seven cases where samples could not be removed because they were either behind wall sheeting or in a prominent position where the removal of samples would have caused disfigurement. The complaints which were classified as "no case" were the results of borers other than *Lyctus*.

One prosecution resulted in a verdict in favour of the complainant and a fine of \$60 plus costs was awarded. Two other cases have been set down for hearing and three others are with the Solicitor General's Department awaiting advice.

The inclusion of 261 species in the Schedule of the Act in March, 1974 has proved to be a great help in the administration of the Act. Only two cases were declared "no case" because the timber was not covered by the Act, the species inspected being used prior to 7th March, 1974.

Routine T.U.P.A. inspections were carried out on buildings in the country and in the Greater Brisbane area but on a somewhat smaller scale than in previous years. Inspections were made of about 150 buildings as well as timber suppliers yards mills and wood working factories. It would appear that there have been about 10,500 houses completed in the Greater Brisbane area over the past twelve months and possibly 16,000 have been started. About 1 per cent. are only being inspected in routine T.U.P.A. inspections.

5,364 samples were submitted by millers, builders, lending authorities, and architects for "spot" and moisture tests. This is a good indication of how the Act is being used. Of 2,687 samples submitted 0.7 per cent. failed to satisfy the preservation retention requirements of the Act. In each case the treatment source was notified. Moisture tests were carried out on 2,677 samples with a 17.4 per cent. failure rate. However most of these samples were actually under 10 per cent. moisture content, drier than equilibrium moisture content.

Much of the susceptible timber which has been removed for examination in T.U.P.A. cases has originated from N.S.W. This situation is likely to continue whilst considerable volumes of interstate timber is used in the Brisbane market and whilst requirements for immunisation or preservation under the N.S.W. and Queensland legislation differ.

Complaints were investigated and inspections made in other parts of the State. In far North Queensland, Atherton District staff handled three complaints under the Act and one has been set down for court hearing. The other two are still being investigated.

Maryborough District registered two complaints under the Act. It appears that these will be satisfactorily resolved without resort to court action.

Two visits were made to Gympie District for T.U.P.A. inspections, but no serious breaches of the Act were found.

Brisbane Forestry District, which covers the more closely settled Moreton Region, naturally provides the bulk of the complaints and inspections. Sixty-seven complaints originated in this District and routine T.U.P.A. inspections were carried out in most of the main centres.

GENERAL

A reprint of the T.U.P.A. Act incorporating revisions and amendments is being issued. Inspection of treatment plants, and instruction on preservation procedures and analysis of samples were provided by the laboratory section under the control of Mr. Cokley.

Instruction in the administration of T.U.P.A. as well as actual inspections were given to Mr. Kadii of Malaysia, Forest Trainees and Technical Assistants. In addition lectures on the provisions of T.U.P.A. were given by Mr. Kynaston and Mr. McDonald to various public bodies.

WOOD CHEMISTRY AND PRESERVATION SECTION

During the year, six wood preservation plants were amalgamated with larger firms while two additional plants were installed and registered.

Quality control procedures, carried out by officers of this section, on evidence furnished by samples from treatment plants show that closer control of preservation techniques is needed by the industry. Emphasis has again been placed on the need for the industry to assume responsibility for the training of plant operators and for the control of the quality of preservation procedures.

After attendance at a training school held in Brisbane electricity power line inspection personnel have implemented a programme aimed at improving field detection of "Soft Rot" in power poles in their respective districts. Two pole stub trials have been installed at Dalby and Innisfail to examine the performance of water soluble "fixed" multi-salt preservative formulations against "Soft Rot" effected standing poles with remedial butt treatments.

The use of preservative treatments in marine piling is now based on the examination of each individual application on its merit before approval is given. This followed the withdrawal of the general approval for C.C.A. treated hardwoods for marine use under the Timber Users' Protection Acts.

Officers of this section completed field inspections relative to "Soft Rot" and preservative practices during the year. Conferences, interstate and local, were also attended by representatives of this section.

Some 8,600 chemical determinations were made during the year. 2,500 samples were for preservative treatment on behalf of industrial and governmental authorities. 2,600 samples were analysed for the Silvicultural branch of this department.

Updating of laboratory equipment and the provision of more space for the laboratory are required to enable the section to fulfil its role, as present accommodation is very unsatisfactory.

TIMBER CONVERSION SECTION

(1) Sawmill Economics

During the year, the first full year's information on the movement of sawn timber has been obtained from the surveys which had been arranged with Industry through the State Committee of the Australian Timber Industry Stabilisation Conference. To date, consolidated information on the market patterns for Cypress Pine has been completed and passed on to industry. Patterns have changed considerably since the last surveys were carried out in the early 1960's. Market patterns for other species will be finalised in the near future.

The series of sawing studies to compare the productivity of Slash and Caribbean Pines from paired even-aged plots of the two species has been taken to its final stage by inclusion of stems from Beerwah. Stems had previously been studied from Toolara and Tuan areas. The results for the Beerwah material have not yet been fully analysed. However the general patterns found in the Tuan and Toolara material are being repeated, to some extent, in the Beerwah material. These general patterns are that, in equivalent sized stems, Caribbean Pine, by reason of poorer form gave a lower recovery, but overall it gave a higher recovery and better grade distribution of the seasoned product, by reason of the larger average stem size for stems of the same age on equivalent sites.

Sawing studies were carried out at Rocklea on *Pinus patula* from three plantation areas in the Yarraman district. These studies had been requested by members of industry in view of lower recoveries which had been obtained in sawing this species in this area. Samples consisted of about 50 stems from each of the Yarraman, Googa and Pechey State Forests.

The study results, when compared with recent studies on Slash Pine of similar size indicated considerably lower recovery in *Pinus patula* in smaller stems but higher in the larger stems. However, recovery generally in this material, although showing considerable variation, was lower at Yarraman and

Googa than the recoveries on which log pricing was based, and it was considered that some relief to industry was warranted.

Acceptable material in these studies was determined by Australian Standard 108 (1969). A big factor in the grade of sawn output was the bark and resin pockets which are often found in this species. Record was made of the degree of occurrence of this defect and its effect on sawn grade. The percentage of sawn output downgraded because of bark and resin pockets was as follows:—

| | |
|------------------|-------|
| Yarraman | 48.9% |
| Googa | 44.7% |
| Pechey | 54.0% |

This is a serious defect in the species and there is evidence also that the percentage of material downgraded increases with increasing stem size.

(2) Seasoning and Timber Mechanics

In the year under review, no further experimental work in the field of high temperature seasoning has been initiated. However, assistance has been given to industry with problems associated with high temperature kilns and other seasoning problems. Visits to mills to discuss air-seasoning and kiln seasoning practices have been made as opportunity offers, and assistance given when required.

During the year, 2,677 samples of seasoned timber were submitted for moisture content determination by constructing authorities and others. The Department has provided this service for the building industry for many years, but advantage accrues to the Department also in being able to check on the standard of seasoning generally and to offer help to suppliers who appear to be having seasoning difficulties.

In the timber mechanics field, the major emphasis has been on quality control testing of mechanically stress graded Slash and Loblolly Pine for one major producer, and Radiata Pine for another. The quantity of work undertaken in this field will increase considerably in the coming year. Because of the increasing interest in mechanically stress graded timber, research is being conducted into the comparative strength-stiffness relationship of the above three species.

Data on the mechanical properties of timber from plantation-grown *Pinus* species continue to be accumulated. The objectives of this long term study are:—

- (i) to relate the mechanical properties of each species to the anatomical properties,
- (ii) to compare the strength properties of each species with defect assessments with a view to possibly modifying visual grading rules.

WOOD STRUCTURE AND UTILIZATION SECTION

Wood Structure and Timber Physics

(1) TIMBER IDENTIFICATION

A near-record total of 7,650 wood, plywood and veneer samples and wooden articles was identified during the year. This represented an increase of 12 per cent. on the previous year and undoubtedly reflected the wide use of imported timbers on the local market.

More use is being made of this service for legislative purposes, particularly in relation to consumer protection.

For a continuing anthropological study by the Queensland Museum, a suitable procedure was developed for the identification of species used in Aboriginal wooden artifacts. 550 spear-throwers were identified and, in collaboration with Museum staff, an article on this aspect of the study was prepared for publication. The project is continuing.

Valuable reference collection exchanges were effected with Indonesia, South Africa and Mexico.

(2) WOOD QUALITY ASSESSMENT AND IMPROVEMENT

(a) Seed Orchard Tree Evaluation

There has been a temporary lull in this sphere of activity, only eight potential candidates for inclusion in the Honduras Caribbean Pine orchard at Kennedy being nominated for wood quality evaluation.

(b) Variety and Provenance Trials

A major study has been commenced of the wood productivity and quality of three varieties of *Pinus caribaea* and five provenances of one of them in a replicated trial at age 12 years at two locations, Beerburum (south-east Queensland) and Byfield (central Queensland). The varieties involved are vars. *bahamensis*, *caribaea*, and *hondurensis* with five seed-sources (including two local ones) of the lastmentioned.

Comparative evaluations for Beerburum have been completed. In this trial, an improved local seed-source (open-pollinated Byfield "plus" trees) gave the best values for the wood volume productivity parameters, diameter breast height, total height and average ring width, followed by the other unimproved var. *hondurensis* sources, then var. *caribaea* and *bahamensis* in that order, despite thinner bark for the last two

varieties than for all var. *hondurensis* sources. Thinnest and thickest bark values were recorded for var. *bahamensis* and the imported Mountain Pine Ridge provenance, respectively.

Wood quality parameters, while generally good for all varieties and sources, varied appreciably. The improved Byfield seed-tree var. *hondurensis* stock had excellent wood properties, to complement its high volume productivity, with the best mean grain spirality of all sources, no doubt associated with the superior form of the preselected parental stock.

Republic of Honduras var. *hondurensis* wood had the lowest basic density, at 397 kg/m³, and the worst grain spirality of the seven sources, but was, nevertheless, of acceptable quality in all respects. A Mountain Pine Ridge source had the longest tracheids. Apart from relatively low but adequate tracheid length, the fast-growing Coastal Plain provenance had good wood properties. So also did the other "local" var. *hondurensis* source from Woree, North Queensland.

Vars. *caribaea* and *bahamensis* had the highest density and least uniformly textured wood. The former had a mean basic density of 434 kg/m³, relatively low tracheid length and relatively poorer cell wall organization. The latter gave very high basic density (616 kg/m³) and percent latewood (45%) values for the tenth ring which, if indicative of a trend, are considered undesirable.

Of the unimproved seed-sources in this trial, var. *hondurensis* Mountain Pine Ridge and Coastal Plain provenances appear to offer the best prospects for high-volume production of good quality wood on sites similar to the trial location at Beerburum, with even better performance and wood properties immediately available from the use of stock from open-pollinated Byfield "plus" trees.

Preliminary incomplete results for Byfield indicate similar results for the same taxa at that central Queensland location. In this trial, productivity at Byfield, as indicated by ring width, appears to be lower than at Beerburum and basic density and percent latewood generally higher. However, the site quality at Byfield has been found to be below average for that locality, invalidating "between locality" comparisons in this particular study.

(c) Estimation of Genetic Parameters

The effect of genetic gains in vigour and stem straightness obtained in *P. elliotii* on wood properties is being investigated. In one such study involving 12 years old open-pollinated families, a generally depreciative effect on certain wood quality parameters has been found as a correlated response to selection for high volume production parameters and generally beneficial correlated response to selection for improved stem form. Simultaneous selection for vigour and straightness generate counter-responses on some wood features. There are difficulties in determining the net correlated response, but the results suggest that selection for genetic improvements in growth rate and form without wood property screening could adversely affect some important wood properties and that more emphasis on selection for straightness could improve wood quality parameters.

(d) Juvenile/Mature Relationships

Wood property early-age/late-age correlations calculated for *P. taeda* aged 18 years suggest that selection for several important wood properties can be most efficiently carried out at or just prior to age 8–10 years, by which time seed-set in quantity is prevalent. Analyses indicate the predictive value of early-age/late-age property relationships to be sufficiently high to more than offset any improvement to be gained from deferment of evaluation beyond 8–10 years in the population studied, in terms of rate of gain per unit time throughout a breeding programme.

(e) Physiology of Wood Formation

Studies of the physiology of wood formation in *Pinus caribaea* var. *hondurensis* have entered their third year at Byfield, central Queensland and second year at Danbulla, north Queensland. Earlywood initiation has been found to be in mid to late winter, and slightly later at Danbulla than Byfield in the past year. Latewood production commences in late summer to early autumn, giving about eight months earlywood and four months latewood production, compared with three months earlywood, six months latewood and three months dormancy for *P. elliotii* and *P. taeda* at Beerburum.

P. caribaea's superior increment is apparently due predominantly to its longer growing season and larger mean cell diameter compared with the other two species, with a faster rate of cell division playing a lesser but significant role.

The type of wood being formed has been found definitely related to changes in appearance and physiological behaviour of the apical meristem, providing a capacity for practical application in the visual external selection of Caribbean Pine stock with growth patterns giving maximum productivity of wood with preferred features by relation to known site factors.

Extension of this work to south-east Queensland is planned.

(f) Timber Defects

In continuing work on the incidence and cause of resin pockets in *Pinus patula* at three south-east Queensland locations, this defect has been found to occur on at least one face of about 50 per cent. of sawn board volume and to average nearly 50 mm in length.

The defects are exclusively located in the first half of earlywood bands and it is inferred they probably arise as a response to moisture stress during this period of rapid growth. Climatic factors such as precipitation are possibly limiting in generating such stress. Older, larger trees from Pechey had a higher percentage of the sawn recovery affected, but Benarkin the highest incidence per unit board area. Between locality differences were of little economic significance under the current grading rules. Percentage degrade due to this defect increased with log size at Pechey, suggesting a probable increased incidence at Benarkin and Yarraman as the size range in the younger stands there extends with age. This could affect management decisions in these areas.

The incidence and cause of pitch-streaks and associated heart shakes in *P. elliotii* has been further examined in an attempt to relate these defects to externally visible morphological features. From multiple regression analysis of data for 30–38 years old slash pine at Passchendaele, pitch-streaks are more prevalent in larger trees with steep-angled, small-diameter branches and a low crown-length/total-height ratio (the last being an indicator of high form-point).

In species/locality performance comparisons between Slash and Honduras Caribbean Pine aged 18–19 years at three localities in south-east Queensland, a generally higher incidence of pitch-streaks, resin pockets and defective knots has been observed in *P. caribaea* than in *P. elliotii*, and particularly at Toolara as compared with Tuan and Beerburum. There are indications that this higher defect incidence in *P. caribaea* and at this location could be related to its apparent faster diameter growth and locality-associated factors influencing both green crown/stem length and slenderness ratios and moisture stress. The observations merit further attention in relation to pruning procedures, the effect of locality influenced variation in form on volume tables, and factors determining limiting physiological stress reactions, particularly in *P. caribaea* as its southern ecological limits are approached.

(g) Bark Properties

In view of the increasing interest in residue utilization, work on bark properties of our more important softwoods has continued. Variational trends within trees and between species are being established. Early results show *P. elliotii* has thicker bark with longer tracheids, lower basic density and lower green moisture content than that of *Araucaria cunninghamii*. Although variable, the fibrous component percentage is significantly higher in the bark of tops from older Slash Pine stems than from younger Slash and both age-classes in Hoop Pine.

UTILIZATION

Over 800 enquiries for information on the properties and utilization of indigenous and imported timbers were handled during the year.

Despite a drop in the volume and value of timber imports into Queensland from overseas, reflecting depressed conditions in the industry generally, the volume of logs imported for processing in the State continued to decrease disproportionately to the trend for sawn timber imports, favoured by tariff policy changes referred to last year.

(1) General Building

The demand for timber, as for competitive materials, has been generally depressed during the year due to economic restrictions and last year's supply delays have now largely disappeared.

There are indications that north Queensland producers are beginning to realise the advantages of species or species group differentiation for constructional use, but the beneficial effect of this will be minimal unless accompanied by a well supervised uniformly applied system of grading. As yet, central and north Queensland producers are still failing to realize the full utilization potential of their structural material. Pre-seasoning to gain higher stress-rated framing and to ensure its dimensional stability in use is long overdue in these areas.

Problems continue to be encountered with the use of imported woods in use conditions for which they are not suitable.

Seasoned, generally stress-rated softwood and rain forest timber framing are firmly entrenched in south-east Queensland, and competing with locally produced materials at least as far north as Townsville. Cypress Pine is maintaining its large share of the framing market and producers and users of this material should be further assisted by the introduction during the year of a revised Australian Standard providing three stress-grades instead of one.

An architectural trend towards the use of exposed timber beams and feature panelling reflects a popular demand for the natural look in timber.

In collaboration with the Division of Building Research, C.S.I.R.O., estimated strength-classifications have been allocated to a large number of previously unclassified rain forest timbers, pending their experimental evaluation.

Metrication of the timber and building industries has resulted in an unprecedented volume of work in revising and metricating Australian Standard Specifications for timber and timber products and for Codes of Practice relevant to their use, particularly in building and engineering fields. Work is currently in progress on Standards aimed at amalgamating currently separate sets of Standards for Australian open-forest hardwoods, local rain forest timbers and imported structural hardwoods.

Following the Darwin cyclone disaster, assistance was given to timber industry organizations in framing specifications for the use of timber in the construction of dwellings in that city, to provide for its efficient use not only in competition with alternative materials but particularly to ensure that Queensland's timber resources could be utilized to advantage in meeting this urgent need for large quantities of building material. Early specifications seen had been unnecessarily restrictive.

Revised recommendations for the use of several north Queensland timbers were issued, enabling their use in certain exposed joinery applications from which they had previously been excluded. This resulted from a survey of the serviceability of timbers in building in the north commenced last year.

A study of external wall framing and wall cavity moisture content changes was initiated, using simulated external wall panels with unseasoned framing timbers including a softwood, rain forest timbers and an open-forest hardwood, and a representative range of conventional cladding and sheeting materials and finishes. After nine months, the moisture content of the 75 x 50 mm Slash Pine framing had reached equilibrium, the Tulip Oak was approaching it, but the Bollywood and Blackbutt were still around 20 per cent. Cladding and sheeting effects will not be checked until all framing has stabilised.

A study was undertaken in collaboration with TRADAC to assess the effect of the common building practice of laying a seasoned floor as a working platform before protecting walls and roof are erected. Four representative timber species and a locally-produced structural grade particleboard were used, with three commonly used "sealants" and an unprotected panel of each flooring material as a control.

It was concluded that in general, "platform-type" construction cannot be recommended as good building practice.

However, higher-density hardwoods such as Brush Box can, particularly with the application of certain commercial "sealants", give an acceptable finished floor when laid in this manner and allowed to fully re-season before sanding and polishing. Lower-density softwoods and rain forest timbers similarly "sealed" may or may not give a satisfactory floor, depending on the efficiency of the "sealant", the timber species, and whether the floor is to be covered or not. The particleboard tested appeared suitable for covered but not uncovered floors and gave best results without the sealants tested.

Recommendations for platform-type construction are being prepared for dissemination to industry.

Assistance was given to TRADAC (North Queensland) in the preparation of advisory brochures on boat-building timbers, building practices in the tropics and strength grades and recommended uses for rain forest timbers.

(2) Structural Engineering

A high demand persists for railway sleepers and mining timbers but is still being met from normal supply sources.

To increase the availability of suitable pole timbers, recommendations have been made to Electrical Authorities which, if adopted, will extend the number of acceptable species from 18 to 54 without depreciating quality standards.

The increasing use of inadequately treated round timbers for retaining walls and other landscaping applications is a matter for concern. Superficial treatments frequently used in often very expensive projects are not suitable for weather-exposed, in-ground use. The only suitable treatment for round timbers involves complete impregnation of any sapwood to prescribed retentions.

(3) Panel Products

The demand for particleboard for structural flooring, joinery and furniture applications has been maintained at a high level in the difficult economic circumstances, with considerable initiative being shown by the industry in the development of natural wood and synthetic decorative finishes. To meet an anticipated increased demand, a second production plant in south-east Queensland is nearing completion. There is scope for the use of a large volume of coniferous bark

residue in particleboard. Up to 30 per cent. has been used in the stock overseas and preliminary trials have been conducted here.

Structural grades continue to sustain the plywood industry, currently produced in this State largely from rain forest timbers. Industry initiative in pursuing an active research and development programme is proving fruitful, with an apparently good reaction by construction planning authorities in cyclone-prone areas to an engineered plywood-clad, timber framed house designed for high wind resistance. Random-grooved plywood wall panelling is gaining popularity, assisted by the trend to natural timber finishes.

Trials of structural plywood and protective finishes for truck trays are continuing, with early results indicating some likely limitation of this material to trays not subject to high indentation loading. An early ranking order for the finishes tested has also emerged, favouring the high-density overlay.

Hardboard production is providing a useful outlet for a large volume of sawmilling residues in south-east Queensland.

(4) Mill Residues

With a view to achieving more complete utilization of the State's forest resources, preliminary estimates have been made of the volumes of wood and bark residues from sawmilling operations. On incomplete data, these are estimated at more than 676 000 tonnes per annum, based on 1973-74 production. Categorized estimates have been made for slabs and edgings, sawdust, shavings, dockage and bark. Work is continuing to prepare regional estimates using a broadly-based approach developed and then refine these later. To these processing residues must be added the large volume of unused forest residues, under estimation by the Forest Resources Branch.

(5) Pulpwood

Pulpwood utilization decreased by 18 per cent. from the previous year to 51 000 m³, despite an increase of 81 per cent. in the volume of the hardwood component. The softwood component decreased by 27 per cent.

In overseas evaluations of the pulping potential of 28 south-east Queensland open-forest hardwoods, these have been found satisfactory for bleached and unbleached kraft pulps and for dissolving pulp, both as a separate resource or in composite mixes with northern New South Wales timbers including rain forest timbers. Dissolving pulps are used in the manufacture of a wide range of products including rayon and cellophane.

(6) Resource Utilization Potential

A comprehensive review was undertaken of the productivity and utilization potential of Australian-grown softwoods other than Radiata Pine, with the emphasis on Queensland's softwood resource. Among the more important findings were the conclusions that:—

- the species with the highest productivity and utilization potential were Queensland-grown Caribbean Pine and Cypress Pine from Queensland and New South Wales; the former because of its high productivity throughout coastal Queensland and as the only other softwood rivaling Radiata Pine's volume increment rate; the latter because of its high availability, currently unnecessarily restricted use applications, and regeneration rates in excess of removals even in areas of current operation;
- the 30 per cent. contribution made by the non-Radiata softwoods to Australia's total softwoods production justifies a commensurate share of the national research effort not received to date;
- there is considerable scope for improvement of the productivity and utilization potential of our softwoods resource. Inhibiting factors and means for minimising their influence have been detailed; and
- salvage of the sawmill residues alone would increase Australia's total softwood pulpwood production by 38 per cent. (58 per cent. if bark was included). An increase of 20 per cent. would come from the woody residues of present Cypress Pine milling operations alone in Queensland and New South Wales.

(7) Other Forest Products

The export value of *Duboisia* leaf from Queensland is now approaching \$1,000,000 per annum, as estimated from the figure of \$872,000 for ten months of the year. The continued high demand is now known to be largely for a particular pharmacological application.

The cost of pine oil, resins and related products imported into Australia is now over \$4,500,000. A collaborative trial with industry has been initiated to check the effects of a resin stimulation technique on Queensland-grown Slash Pine, with a view to evaluating its commercial implications.

(8) General

Lecturers were provided for technical education courses at Technical Colleges, the Technical Correspondence School, industry seminars and intra-Departmental training courses.

Assistance was given to TRADAC directly and through Committee service. Officers attended and presented papers at the 17th Forest Products Research Conference in Melbourne (including an Invited Paper on "The Productivity and Utilization Potential of Australian-Grown Softwoods other than Radiata Pine") and at the Departmental Routine Research Conference.

A Pamphlet (No. 13) on "The Nomenclature, Density and Lyctus—Susceptibility of Queensland Timbers", covering 750 species, was published.

FOREST PRODUCTS ENTOMOLOGY**General**

A substantial increase occurred in extension enquiries received during the latter half of the year and, as forecast in the previous report, Lyctus damage was prominent as a cause of concern among users of timber following the excessive demand which existed for timber last year.

Reports of damage by subterranean termites were also prominent, particularly associated with slab-on-ground construction, and inspections reveal how rapidly serious damage may occur under these conditions and the need for treatment of the ground before laying the slab.

Other points of interest were attack by *Heterobostrychus aequalis* in doors manufactured in South Australia from imported sawn timber of *Shorea* spp., and two instances of damage to *Eucalyptus* spp., by *Notoplatypus elongatus*, an ambrosia beetle which is normally encountered only rarely.

The most common species of auger beetle usually reported is *Mesoxylion cylindricus* but this year *Xylopsocus gibbicellus* has featured in identification in equal numbers. *Anobium punctatum* was again reported from Toowoomba but still has not been found further north and the Darling Downs may well be the northern limit of its distribution in Queensland.

Introduced Insects

In this field the entry of overseas species of drywood termites continues to cause most concern. Work has continued on the infestation of *Cryptotermes brevis* at Maryborough with a further resurvey of the area which has been under close surveillance, and the fumigation of three infested premises located in this survey. Two additional infestations were located early in 1975 however, one at Bundaberg and the other at nearby Elliott Heads. To date neither of these can be directly related to the Maryborough infestation but both were well established attacks when found and, although there is no evidence to date that they are widespread in area, they do necessitate a review of the overall situation.

Additionally two further exotic species of drywood termites were located at Mossman in North Queensland in April last. These are *C. domesticus* and *C. cynocephalus* and a survey is still in progress to determine the extent of the problem. It is possible however that *C. domesticus* at least may be widespread in the area. This species from South East Asia is regarded as approaching *C. brevis* in potential seriousness as a pest of lower density sawn timber in service.

During the year further discussions were held with officers of the Commonwealth Government to discuss the situation and to consider the most appropriate action to be taken on a joint basis if complete eradication appears to be practicable. Meanwhile individual infestations are being treated as they are detected in an effort to contain the spread of the insects while investigations continue.

These and some other pests of timber are at times extremely difficult to detect by inspection on a ship or wharf and insects may thus gain entry despite the stringent quarantine measures which are in force. Shipments of sawn timber which have been apparently free of insect attack at time of entry have subsequently been found to contain numerous species of insects some of which are potentially serious, as for example *Stromatium fulvum* which was detected in made up furniture. This cerambycid borer is a close relative of the European House Borer, *Hytotrupes ligulis*, and like it usually shows no evidence of attack until it emerges from the timber. It is hoped to have legislation enacted shortly to enable control measures to be instituted as required in such cases.

STAFF

As at 30th June, 1975, there was an approved salaried staff establishment of 632 positions. The actual number of wages staff employed at that date was 1,739. These figures do not include members of the National Parks staff who have been transferred to the National Parks and Wildlife Service.

Sixty-five salaried officers left the Department during the year, including 12 officers who retired after long and meritorious service, namely:—

- Mr. C. Haley, Conservator of Forests, Brisbane (46 years),
- Mr. R. G. Scells, Senior Clerk, Harvesting and Marketing Branch, Brisbane, (50 years),
- Mr. A. G. W. Anderson, District Forester Division I Maryborough (46 years),
- Mr. W. J. Mulholland, Senior Forest Ranger, Yarraman (42 years),
- Mr. C. T. McConnell, Forest Ranger Division II, Beerburrum (38 years),
- Mr. R. T. Jones, Forest Ranger Division II, Maryborough (35 years),
- Mr. V. J. Ronlund, Forest Ranger Division I, Mackay (33 years),
- Mr. A. L. H. Head, Forest Ranger Division II, Benarkin (29 years),
- Mr. B. J. Dobe, Forest Ranger Division II, Maryborough (28 years),
- Mr. A. N. Hansen, Forest Ranger Division II, Kalpowar (27 years),
- Mr. G. E. Hooper, Forest Ranger Division II, Tuan (21 years),
- Mr. W. C. List, Forest Ranger Division II, Maryborough (17 years).

We wish these officers a long and happy retirement.

It is with deep regret that the deaths are recorded of:—

- Mr. B. M. Evans (Forest Ranger Division I, Western Creek), and
- Mr. J. G. Sorensen (Forest Ranger Division II, Millaa Millaa).

These officers had served the Department faithfully and efficiently and their untimely deaths will be greatly felt by all who have served with them. Deepest sympathy is extended to their bereaved families.

ACKNOWLEDGEMENTS

I desire to record my appreciation of the loyal and efficient service of all members of the staff during the past year.

W. BRYAN,
Conservator of Forests.

APPENDICES

APPENDIX A

Return of Forest Products and Quarry Material removed from Crown Lands during the Year ended 30th June, 1975

| SPECIES | QUANTITY | | |
|--|-----------------------|--|---------|
| | m ³ | m ³ | |
| Milling Timber— | | | |
| (a) Native Forests— | | | |
| Hoop and Bunya Pine— | | | |
| Ply | 2 982 | | |
| Logs | 17 499 | | |
| Tops | 15 968 | | 36 449 |
| Kauri Pine | 4 716 | | |
| White Cypress Pine | 109 720 | | |
| Forest Hardwoods— | | | |
| Saw Logs | 157 912 | | |
| Pulpwood | 9 462 | | |
| Scrub Hardwoods | 46 383 | | |
| Cabinet Woods | 33 844 | | |
| Miscellaneous Species | 84 563 | | 446 600 |
| (b) Plantation Thinnings— | | | |
| Hoop Pine | 74 902 | | |
| Bunya Pine | 303 | | |
| Loblolly Pine | 7 170 | | |
| Slash Pine | 27 149 | | |
| Patula Pine | 5 069 | | |
| Radiata Pine | 3 565 | | |
| Silky Oak | 267 | | |
| Caribbean Pine | 385 | | |
| Pond Pine | 1 | | |
| Arizona Cypress Pine | 18 | | |
| Kauri Pine | 25 | | |
| Shortleaf Pine | 11 | | |
| Longleaf Pine | 17 | | 118 882 |
| (c) Pulpwood— | | | |
| Hoop Pine | 12 924 | | |
| Slash Pine | 23 790 | | |
| Loblolly Pine | 1 991 | | |
| Patula Pine | 989 | | |
| Radiata Pine | 253 | | |
| Caribbean Pine | 1 710 | | |
| Kauri Pine | 4 | | |
| Longleaf Pine | 127 | | |
| Chir Pine | 4 | | |
| Pond Pine | 3 | | |
| Mixed Exotic Pines | 29 | | 41 824 |
| | | | 643 755 |
| | | Expressed as m ³ (True Log measure) | |
| Other Classes— | | | |
| Sleepers Hewn | 655 pieces | 79 | |
| Sleepers Sawn—1.5m | 152 291 pieces | 9 899 | |
| Sleepers Sawn—2.15m | 238 629 pieces | 28 635 | |
| Sleeper Blocks (as Sleepers contained) | 429 pieces | 51 | |
| Transoms, Crossings, Headstocks, Longitudinals | 1 116 m ³ | 1 116 | |
| Girders, Corbels, Piles, Sills, Kerb Logs | 20 358 m ³ | 3 603 | |
| Girder Logs | 904 m ³ | 904 | |
| Poles | 19 101 m | 1 318 | |
| House Blocks | 228 m | 13 | |
| Fencing Material—Round | 90 559 m | 2 173 | |
| Fencing Materials—Split | 123 348 pieces | 2 619 | |
| Mining Timbers—Round | 160 394 m | 3 047 | |
| Mining Timbers—Sawn | 962 m ³ | 962 | |
| Offcuts—Pallet and Short Length Sawn Timber | 90 m ³ | 90 | |
| Fuel | 7 951 tonnes | | |

Other Classes—continued

| | |
|--|--------------------------|
| Quarry Material—Sand, Gravel, Soil, &c. .. | 1 452 668 m ³ |
| Fibre, Bark, Dry Leaves, Reeds | 26 bags |
| Flora | 4 603 pieces |
| Peat | 248 bags |
| Poling Timber (Copper Refining) | 1 571 tonnes |
| Lawyer Cane | 13 tonnes |
| Boat Knees | 120 pieces |
| Bee Hives | 10 hives |
| Black Wattle | 754 stems |
| Charcoal | 84 tonnes |
| Trees and Plants (number) | 243 711 |
| Brush material (Brush fence) | 91 tonnes |
| Freestone | 164 m ³ |

APPENDIX B

Total Receipts, Department of Forestry, for the Year ended 30th June, 1975

| RECEIPTS FROM DISTRICTS | TOTALS |
|--|----------------|
| Group 1—South Queensland (Brisbane, Beerburum, Beerwah, Benarkin, Bundaberg, Fraser Island, Gallangowan, Gympie, Imbil, Jimna, Kalpowar, Maryborough, Monto, Murgon, Yarraman) | 2,518,896.17 |
| Group 2—North Queensland (Atherton, Cairns, Cooktown, Charters Towers, Herberton, Hughenden, Ingham, Innisfail, Port Douglas, Ravenshoe, Townsville) | 1,411,107.85 |
| Group 3—Dalby, Roma, Taroom, Charleville, Mitchell, Quilpie | 547,087.90 |
| Group 4—Warwick, Goondiwindi, Inglewood, St. George, Stanthorpe, Cunnamulla | 263,665.57 |
| Group 5—Mackay, Rockhampton, Clermont, Bowen, Proserpine, Emerald, Springsure, Theodore, Winton | 283,562.56 |
| Group 6—Bacaldine, Blackall, Jundah, Longreach, Muttaburra, Stonehenge, Aramac, Isisford, Jericho | 248.36 |
| Group 7—Cloncurry, Boulia, Kynuna, Mackinlay, Richmond | 3,386.32 |
| Group 8—Burketown, Coen, Croydon, Georgetown, Normanton, Thursday Island | 285.00 |
| | \$5,028,239.73 |
| OTHER RECEIPTS | |
| Forestry and Lumbering | 624,831.25 |
| Sale of Plants, Materials, &c. | 107,881.81 |
| Licences (see note after Appendix C) | 36,740.48 |
| Rents | 35,897.58 |
| Grazing dues | 62,729.24 |
| Miscellaneous (Salisbury Area Timber Account, Forfeit Wages, Expenditure Recoveries, &c.) | 410,718.38 |
| Miscellaneous TRADAC | 23,769.78 |
| Sale of U.S. tractors, trucks, &c. | 288,274.33 |
| | \$6,619,082.58 |
| Plant Hire— | |
| Charges to Works Projects | 1,765,675.10 |
| | \$8,384,757.68 |
| The above receipts were disposed of as follows:— | |
| Regional Employment Development Scheme | 356,234.68 |
| To Consolidated Revenue Fund as repayment of previous expenditure | 1,860.20 |
| To Loan Fund as repayment of previous expenditure and surplus plant hire | 288,274.33 |
| To Forestry and Lumbering Fund:— | |
| As expenditure on marketing of log timber, maintenance of access roads, capital improvements, plant, TRADAC, &c. | 5,222,879.80 |
| As Interest and Redemption on Loans | 2,515,508.67 |
| | \$8,384,757.68 |

APPENDIX C

Proceeds of Sales of Timber, &c., for the period 1st July, 1971 to 30th June, 1975 (Financial Years)

| Groups | 1971-72 | 1972-73 | 1973-74 | 1974-75 |
|--|-----------------|----------------|----------------|----------------|
| Group 1 | \$ 2,204,307.41 | 2,490,215.17 | 2,345,146.31 | 2,446,876.14 |
| Group 2 | 1,329,330.26 | 1,363,224.19 | 1,188,048.58 | 1,384,359.17 |
| Group 3 | 348,381.93 | 397,017.77 | 442,893.72 | 522,305.63 |
| Group 4 | 216,149.29 | 268,993.90 | 245,077.36 | 254,714.34 |
| Group 5 | 157,693.29 | 221,016.70 | 230,477.40 | 272,325.18 |
| Group 6 | 207.73 | 102.71 | 157.65 | 248.36 |
| Group 7 | 1,128.51 | 484.57 | 616.12 | 3,386.32 |
| Group 8 | 325.50 | Cr. 73.30 | 43.90 | 285.00 |
| | \$4,257,523.92 | \$4,740,981.71 | \$4,452,461.04 | \$4,884,500.14 |
| Timber Research and Development Advisory Council | 113,692.91 | 112,997.50 | 148,631.34 | 143,739.69 |
| | \$4,371,216.83 | \$4,853,979.21 | \$4,601,092.38 | \$5,028,239.83 |
| Receipts—Forestry and Lumbering | 676,130.72 | 849,462.50 | 427,287.26 | 624,831.25 |
| Sale of Plants, Material, &c. | 53,290.06 | 61,273.39 | 82,339.46 | 107,881.81 |
| Licences | 20,531.45 | 23,539.30 | 32,879.30 | 36,740.48 |
| Rents and Grazing Dues | 85,853.73 | 91,501.35 | 96,908.80 | 98,626.82 |
| Miscellaneous (TRADAC Miscellaneous Account, Forfeit Wages, Expenditure Recoveries, &c.) | 180,804.83 | 47,452.30 | 53,484.39 | 434,488.16 |
| Sale of U.S. Tractors, Trucks, &c. | 136,555.00 | 137,897.51 | 313,145.82 | 228,274.33 |
| | \$5,524,382.62 | \$6,065,105.56 | \$5,607,137.41 | \$6,559,082.68 |

APPENDIX D

Constructional Timbers Supplied During Financial Year 1974-75
under Forestry and Lumbering Operations

| Class of Timber | Quantity | Sales Value |
|---|--------------------|--------------|
| | | \$ |
| Crossings | 485 m ³ | 39,210.22 |
| Headstocks and Braces | 1 m ³ | 89.55 |
| Transoms | 282 m ³ | 24,578.80 |
| Piles | 3 924 m | 17,735.87 |
| Girders—Dressed | 5 964 m | 73,393.87 |
| Sleepers (2.15 m x 150 mm) | 18,961 pieces | 68,512.56 |
| Sleepers (2.15 m x 115 mm) | 136,774 pieces | 387,904.64 |
| Sleepers—Tramway | 119 pieces | 201.70 |
| Split Posts and Rail offcuts, &c. | 470 pieces | 298.54 |
| House Blocks | .. | .. |
| Guide Posts | 17 m ³ | 1,710.82 |
| Hewn Bridge Timbers | 355 m ³ | 35,059.60 |
| Sills | 96 m | 462.00 |
| Total | .. | \$649,158.17 |

APPENDIX E

Comparative Statement of Expenditure for Years 1973-74 and
1974-75

| | 1973-74 | 1974-75 |
|--|--------------|-----------------|
| | \$ | \$ |
| Revenue Fund— | | |
| Salaries | 4,006,660 | 5,179,054.41 |
| Cryptotermes brevis Investigation | 10,778 | 5,508.32 |
| Fares, Printing, Stores, &c. | 19,164 | 20,654.75 |
| Travelling Expenses and Incidentals | 293,017 | 414,164.81 |
| National Parks | 331,910 | 418,496.33 |
| Cash Equivalent of Long Service Leave | 31,509 | 116,084.76 |
| Total | 4,693,038 | 6,153,963.38 |
| Loan Fund— | | |
| National Parks | 269,084 | 324,242.37 |
| Recreational Facilities—State Forests | 25,593 | 98,528.09 |
| Total | 294,677 | 422,770.46 |
| Trust and Special Funds Forestry and Lumbering Fund— | | |
| Interest and Redemption on Loans | 2,704,829 | 2,515,508.67 |
| Hardwood Supplies to Railway Department and Others | 370,921 | 590,073.86 |
| Harvesting and Marketing Timber | 1,662,090 | 2,094,509.48 |
| Access Roads—Maintenance and Subsidies | 315,685 | 431,540.75 |
| Maintenance of Plant | 1,187,065 | 1,647,868.53 |
| Maintenance of Capital Improvements | 224,461 | 291,370.71 |
| T.R.A.D.A.C. | 161,426 | 177,559.89 |
| Total | 6,626,477 | 7,748,431.89 |
| Reforestation Trust Fund— | | |
| Reforestation | 8,140,993 | 10,741,040.41 |
| Land Acquisitions | 15,985 | 42,353.20 |
| Purchase of Plant | 252,191 | 1,109,767.51 |
| Access Roads | 342,750 | 782,163.69 |
| Purchase of Radio Equipment | 15,018 | 13,383.96 |
| Purchase of Firefighting Equipment | 21,787 | 38,857.31 |
| Total | 8,788,724 | 12,727,566.08 |
| Grand Total | \$20,402,916 | \$27,052,731.81 |

APPENDIX F

Net Area of Plantation Established 1st April, 1974, to 31st March, 1975

| Species | Brisbane | Gympie | Rockhampton | Maryborough | Monto | Murgon | North Queensland | Warwick | Yarraman | Totals |
|---|----------|---------|-------------|-------------|-------|--------|------------------|---------|----------|---------|
| | ha | ha | ha | ha | ha | ha | ha | ha | ha | ha |
| 1. Conifers | | | | | | | | | | |
| A. Native Conifers— | | | | | | | | | | |
| Hoop Pine | 139.9 | 330.5 | 46.9 | 120.7 | 66.2 | 192.1 | 52.8 | .. | 267.8 | 1 216.9 |
| Kauri Pine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Bunya Pine | .. | .. | .. | .. | .. | 19.3 | .. | 2.0 | 5.6 | 26.9 |
| Other Native Conifers | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Total—Native Conifers | 139.9 | 330.5 | 46.9 | 120.7 | 66.2 | 211.4 | 52.8 | 2.0 | 273.4 | 1 243.8 |
| B. Exotic Conifers— | | | | | | | | | | |
| Slash Pine | 619.9 | 1 333.2 | .. | 1 304.5 | .. | .. | .. | .. | 53.9 | 3 311.5 |
| Loblolly Pine | 7.3 | 31.7 | .. | .. | .. | .. | .. | .. | .. | 39.0 |
| Patula Pine | .. | .. | .. | .. | .. | .. | .. | .. | 10.8 | 10.8 |
| Caribbean Pine | 22.3 | 25.9 | 316.3 | 109.2 | .. | .. | 261.0 | .. | 32.6 | 767.3 |
| Radiata Pine | .. | .. | .. | .. | .. | .. | .. | 56.2 | 22.3 | 78.5 |
| Long Leaf Pine | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Other Exotic Conifers | .. | .. | 0.8 | 0.9 | .. | .. | 3.9 | .. | .. | 5.6 |
| Total—Exotic Conifers | 649.5 | 1 390.8 | 317.1 | 1 414.6 | .. | .. | 264.9 | 56.2 | 119.6 | 4 212.7 |
| Total—Conifers | 789.4 | 1 721.3 | 364.0 | 1 535.3 | 66.2 | 211.4 | 317.7 | 58.2 | 393.0 | 5 456.5 |
| 2. Broadleaved Species | | | | | | | | | | |
| A. Native Forest Hardwoods— | | | | | | | | | | |
| Rose Gum | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Grey Ironbark | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Tallowwood | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Blackbutt | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Gympie Messmate | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Others | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Total—Native Forest Hardwoods | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| B. Other Broadleaved Species— | | | | | | | | | | |
| Silky Oak | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Queensland Maple | .. | .. | .. | .. | .. | .. | 1.8 | .. | .. | 1.8 |
| Red Cedar | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Others | .. | .. | .. | .. | .. | .. | 1.8 | .. | .. | 1.8 |
| Total—Other Broadleaved Species | .. | .. | .. | .. | .. | .. | 3.6 | .. | .. | 3.6 |
| Total—Broadleaved Species | .. | .. | .. | .. | .. | .. | 3.6 | .. | .. | 3.6 |
| Miscellaneous Experimental | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Total—All Species | 789.4 | 1 721.3 | 364.0 | 1 535.3 | 66.2 | 211.4 | 321.3 | 58.2 | 393.0 | 5,460.1 |

APPENDIX G

Net Area of Effective Plantation Classified into Forestry Districts to 31st March, 1975

| Species | Brisbane | Gympie | Rock-hampton | Mary-borough | Monto | Murgon | North Queensland | Warwick | Yarraman | Totals |
|----------------------------------|----------|----------|--------------|--------------|---------|---------|------------------|---------|----------|----------|
| | ha | ha | ha | ha | ha | ha | ha | ha | ha | ha |
| <i>1. Conifers</i> | | | | | | | | | | |
| A. Native Conifers— | | | | | | | | | | |
| Hoop Pine | 1 184.3 | 10 521.3 | 217.3 | 1 327.9 | 2 429.2 | 6 803.8 | 951.3 | 13.0 | 12 353.9 | 35 802.0 |
| Kauri Pine | 2.6 | 62.8 | 1.2 | 28.2 | 1.4 | 1.3 | 118.5 | 0.3 | 2.9 | 219.2 |
| Bunya Pine | 3.4 | 252.6 | .. | 0.4 | 0.5 | 113.6 | 1.3 | 2.0 | 108.2 | 482.0 |
| Other Native Conifers | 2.1 | 3.2 | 0.4 | 0.7 | .. | .. | 5.6 | 0.4 | 0.1 | 12.5 |
| Total—Native Conifers | 1 192.4 | 10 839.9 | 218.9 | 1 357.2 | 2 431.1 | 6 918.7 | 1 076.7 | 15.7 | 12 465.1 | 36 515.7 |
| B. Exotic Conifers— | | | | | | | | | | |
| Slash Pine | 10 646.6 | 15 197.4 | 1 031.8 | 16 169.0 | 21.7 | 1.0 | 4.6 | 341.6 | 534.0 | 43 947.7 |
| Loblolly Pine | 1 736.8 | 204.4 | 4.3 | 22.7 | 1.1 | 3.8 | 5.7 | 98.7 | 17.2 | 2 094.7 |
| Patula Pine | 6.8 | 8.1 | 3.7 | 3.3 | 9.9 | 41.5 | 14.1 | 196.6 | 1 379.5 | 1 663.5 |
| Caribbean Pine | 262.6 | 320.3 | 3 743.8 | 1 463.5 | 0.6 | 0.3 | 1 459.0 | .. | 67.1 | 7 317.2 |
| Radiata Pine | 0.3 | 58.3 | .. | .. | .. | 4.8 | .. | 1 791.6 | 520.6 | 2 375.6 |
| Longleaf Pine | 97.4 | 1.6 | 2.3 | 0.9 | .. | .. | .. | 3.4 | 0.8 | 106.4 |
| Other Exotic Conifers | 33.2 | 17.8 | 44.2 | 10.9 | 4.0 | 1.6 | 30.1 | 19.0 | 34.7 | 195.5 |
| Total—Exotic Conifers | 12 783.7 | 15 807.9 | 4 830.1 | 17 670.3 | 37.3 | 53.0 | 1 513.5 | 2 450.9 | 2 553.9 | 57 700.6 |
| Total—Conifers .. | 13 976.1 | 26 647.8 | 5 049.0 | 19 027.5 | 2 468.4 | 6 971.7 | 2 590.2 | 2 466.6 | 15 019.0 | 94 216.3 |
| <i>2. Broadleaved Species</i> | | | | | | | | | | |
| A. Native Forest Hardwoods— | | | | | | | | | | |
| Rose Gum | 126.4 | 488.2 | 0.2 | .. | .. | 8.6 | 0.7 | .. | 71.4 | 695.5 |
| Grey Ironbark | 86.1 | 94.8 | 0.1 | .. | .. | 5.8 | 15.3 | .. | 190.1 | 392.2 |
| Tallowwood | 42.1 | 7.7 | 0.1 | 0.2 | .. | 0.2 | 11.7 | .. | 2.0 | 64.0 |
| Blackbutt | 96.0 | 100.9 | 0.1 | 47.6 | .. | 3.5 | 0.1 | .. | 0.2 | 248.4 |
| Gympie Messmate | .. | 113.9 | .. | .. | .. | .. | .. | .. | .. | 113.9 |
| Others | 5.4 | 31.4 | 0.5 | 0.7 | .. | .. | 4.5 | .. | 1.2 | 43.7 |
| Total—Native Forest Hardwoods | 356.0 | 836.9 | 1.0 | 48.5 | .. | 18.1 | 32.3 | .. | 264.9 | 1 557.7 |
| B. Other Broadleaved Species— | | | | | | | | | | |
| Silky Oak | .. | 28.3 | .. | 0.2 | .. | 10.2 | 10.6 | .. | 196.4 | 245.7 |
| Queensland Maple | .. | 28.6 | .. | .. | 0.3 | .. | 102.3 | .. | .. | 131.2 |
| Red Cedar | .. | 2.8 | .. | .. | .. | .. | 12.8 | .. | .. | 15.6 |
| Others | 1.4 | 32.6 | 0.3 | 0.3 | 0.1 | .. | 16.1 | .. | 0.7 | 51.5 |
| Total—Other Broadleaved Species | 1.4 | 92.3 | 0.3 | 0.5 | 0.4 | 10.2 | 141.8 | .. | 197.1 | 444.0 |
| Total—Broadleaved Species | 357.4 | 929.2 | 1.3 | 49.0 | 0.4 | 28.3 | 174.1 | .. | 462.0 | 2 001.7 |
| Miscellaneous Experimental | 33.6 | 13.1 | 5.9 | 22.3 | 0.2 | 0.7 | 18.4 | 9.6 | 23.5 | 127.3 |
| Total—All Species .. | 14 367.1 | 27 590.1 | 5 056.2 | 19 098.8 | 2 469.0 | 7 000.7 | 2 782.7 | 2 476.2 | 15 504.5 | 96 345.3 |

APPENDIX H
Areas of Natural Forest Treated
A.—EUCALYPTS

| Sub-District | Treated 1974-75 | First Treatment 1974-75 | Total as at 30th June, 1975 |
|--------------------------------|--------------------|-------------------------------|-----------------------------------|
| | ha | ha | ha |
| Brisbane | 117 | 117 | 13 531 |
| Beerburum | 325 | 224 | 9 785 |
| Gympie | 1 674 | 1 634 | 10 666 |
| Imbil | 284 | 284 | 486 |
| Mackay/Emerald/ Rockhampton | 1 620 | 1 620 | 21 577 |
| Maryborough | 2 169 | 1 023 | 50 010 |
| Bundaberg | 318 | 100 | 16 243 |
| Fraser Island | 792 | 360 | 11 328 |
| Monto | 413 | 214 | 11 640 |
| Murgon/Jimna | 587 | 110 | 19 428 |
| Atherton | .. | .. | 1 502 |
| Ingham | .. | .. | 1 208 |
| Warwick | .. | .. | 4 271 |
| Inglewood | .. | .. | 6 352 |
| Yarraman | .. | .. | 2 596 |
| Benarkin | .. | .. | 837 |
| Dalby/Chinchilla | .. | .. | 33 510 |
| Total—Eucalypts | 8 299 | 5 686 | 214 970 |

APPENDIX H—continued

B.—CYPRESS PINE

| Sub-District | Treated 1974-75 | First Treatment 1974-75 | Total as at 30th June, 1975 |
|---------------------------|--------------------|-------------------------------|-----------------------------------|
| | ha | ha | ha |
| Bundaberg | .. | .. | 871 |
| Fraser Island | .. | .. | 1 790 |
| Monto | .. | .. | 1 010 |
| Inglewood | 2 176 | 1 139 | 51 324 |
| Dalby/Chinchilla/ Roma | 8 785 | 6 197 | 126 815 |
| Total—Cypress Pine | 10 961 | 7 336 | 181 810 |

APPENDIX H—continued

C—RAIN FOREST

| Sub-District | Subsequent Treatment 1974-75 | First Treatment 1974-75 | | | First Treatment Completed 1974-75 | Total as at 30th June, 1975 |
|---|------------------------------------|-------------------------|-------------------------------|-----------------------|--|-----------------------------------|
| | | Brushed | Ring-barked and Thinned | Trees Interplanted | | |
| | ha | ha | ha | ha | ha | ha |
| Natural Hoop Pine— Maryborough | .. | .. | .. | .. | .. | 26 |
| Bundaberg | .. | .. | .. | .. | .. | 4 036 |
| Total—Natural Hoop Pine | .. | .. | .. | .. | .. | 4 062 |
| Natural Rain-Forest— Atherton | .. | 127 | 127 | 72 | .. | 4 562 |
| Ingham | .. | .. | .. | .. | .. | 552 |
| Warwick | .. | .. | 2 | 9 | 2 | 10 |
| Total—Natural Rain-Forest | .. | 127 | 129 | 81 | 2 | 5 124 |
| Total—Rain-Forest | .. | 127 | 129 | 81 | 2 | 9 186 |

APPENDIX H—continued

| | |
|--------------------------------|---------------------------------|
| Grand Total—All Forests | Total at 30th June, 1975 |
| | ha |
| Eucalypts | 214 970 |
| Cypress Pine | 181 810 |
| Rain Forest | 9 186 |
| | <hr/> |
| | 405 966 |

APPENDIX I

State Forests, Timber Reserves and National Parks listed by Forestry Districts and Sub-Districts as at 30th June, 1975

| District | Sub-District | State Forests | | Timber Reserves | | National Parks | |
|--------------------------|-----------------------------|---------------|---------------|-----------------|--------------|----------------|----------------|
| | | No. | Area | No. | Area | No. | Area |
| | | | ha | | ha | | ha |
| Brisbane | Beerburrum | 27 | 51 999-198 | 3 | 386-018 | 13 | 1 759-998 |
| | Brisbane | 25 | 49 602-95 | 11 | 5 629-7291 | 31 | 34 697-8096 |
| | Totals | 52 | 101 602-148 | 14 | 6 015-7471 | 44 | 36 457-8076 |
| Dalby | Chinchilla-Barakula | 16 | 356 966-882 | 3 | 7 249-1 | 1 | 10 510-0 |
| | Dalby | 21 | 224 636-3 | 3 | 415-3033 | 1 | 12 765-0 |
| | Roma | 30 | 200 465-278 | 3 | 33 910-08 | 1 | 1 760-0 |
| | Totals | 67 | 782 068-460 | 9 | 41 574-4833 | 3 | 25 035-0 |
| Gympie | Gympie | 30 | 117 533-908 | 2 | 581-2 | 4 | 869-215 |
| | Imbil | 9 | 58 533-0 | 1 | 0-2094 | 1 | 259-0 |
| | Totals | 39 | 176 066-908 | 3 | 581-4094 | 5 | 1 128-215 |
| Maryborough | Bundaberg | 19 | 96 163-326 | 20 | 26 008-221 | 1 | 5 498-0 |
| | Fraser Island | 1 | 118 200-0 | .. | .. | 1 | 33 640-0 |
| | Maryborough | 36 | 157 847-699 | 14 | 10 419-654 | 6 | 5 638-97 |
| | Totals | 56 | 372 211-025 | 34 | 36 427-875 | 8 | 44 776-97 |
| Monto | Kalpowar | 7 | 16 777-266 | 13 | 25 748-6929 | 1 | 454-7 |
| | Monto | 42 | 262 100-283 | 15 | 12 284-902 | 7 | 12 647-215 |
| | Totals | 49 | 278 877-549 | 28 | 38 033-5949 | 8 | 13 101-915 |
| Murgon | Gallangowan | 3 | 15 481-0 | .. | .. | .. | .. |
| | Jimna | 4 | 47 108-0 | .. | .. | .. | .. |
| | Murgon | 15 | 63 480-869 | 7 | 6 122-1983 | .. | .. |
| | Totals | 22 | 126 069-869 | 7 | 6 122-1983 | .. | .. |
| North Queensland | Atherton | 35 | 349 514-279 | 33 | 326 864-9786 | 70 | 151 598-7177 |
| | Ingham | 16 | 233 849-0 | 3 | 3 348-4 | 30 | 99 131-924 |
| | Totals | 51 | 583 363-279 | 36 | 330 213-3786 | 100 | 250 730-6417 |
| Rockhampton | Emerald | 7 | 74 993-371 | 10 | 106 927-8 | 7 | 604 688-0 |
| | Mackay | 11 | 70 226-921 | 16 | 39 336-22 | 91 | 128 143-526 |
| | Rockhampton | 40 | 407 488-257 | 10 | 39 934-87 | 14 | 5 987-428 |
| | Totals | 58 | 552 708-549 | 36 | 186 198-89 | 112 | 738 798-954 |
| Warwick | Inglewood | 28 | 192 842-457 | 1 | 69-59 | 1 | 558-213 |
| | Warwick | 20 | 45 199-786 | 5 | 3 145-597 | 11 | 10 813-217 |
| | Totals | 48 | 238 042-243 | 6 | 3 215-187 | 12 | 11 371-43 |
| Yarraman | Benarkin | 4 | 28 732-0 | 3 | 1 798-324 | .. | .. |
| | Yarraman | 20 | 52 548-5 | 10 | 8 778-713 | 4 | 6 313-94 |
| | Totals | 24 | 81 280-5 | 13 | 10 577-037 | 4 | 6 319-94 |
| State Totals | | 466 | 3 292 290-530 | 186 | 658 959-8006 | 296 | 1 127 714-8733 |

APPENDIX J

Reservations for the Year Ending 30th June, 1975

1st July, 1974 to 30th June, 1975

STATE FORESTS

| | No. | ha |
|--|-----|---------------|
| As at 1st July, 1974 | 481 | 3 263 088-245 |
| Declared | 5 | 7 568-368 |
| Declared and added to existing State Forests | | 17 879-516 |
| Timber Reserves declared State Forests | 3 | 2 993-05 |
| Timber Reserves declared State Forests and amalgamated with existing State Forests | | 6 038-555 |
| Reservation revoked | -1 | -1 688 |
| Areas released | | -509-243 |
| Recomputation of Boundary | | -3 079-961 |
| Amalgamation of existing State Forests | -22 | .. |
| Total as at 30th June, 1975 | 466 | 3 292 290-530 |

TIMBER RESERVES

| | | |
|---|-----|--------------|
| As at 1st July, 1974 | 195 | 667 997-8103 |
| Timber Reserves declared State Forest | -3 | -2 993-05 |
| Timber Reserves declared State Forest and added to existing State Forests | -5 | -6 038-555 |
| Reservation revoked | -1 | -0-405 |
| Areas released | | -2-5 |
| Recomputation of boundary | | -3-4997 |
| Total as at 30th June, 1975 | 186 | 658 959-8006 |

NATIONAL PARKS

| | | |
|---|-----|----------------|
| As at 1st July, 1974 | 292 | 1 117 297-0243 |
| Declared | 4 | 7 795-7 |
| Declared and added to existing National Parks | | 2 517-762 |
| Areas released | | -31-765 |
| Recomputation of boundary | | +136-152 |
| Total as at 30th June, 1975 | 296 | 1 127 714-8733 |

APPENDIX K

Distribution of Personnel, 30th June, 1975

| | Head Office | District Centres | Total |
|-----------------------|-------------|------------------|-------|
| Salaried Officers— | | | |
| Professional | 55 | 60 | 115 |
| Technical | 80 | 25 | 105 |
| Field | 10 | 99 | 109 |
| Clerical | 136 | 120 | 256 |
| Miscellaneous | 12 | 1 | 13 |
| Sub Totals | 293 | 305 | 598 |
| Wages Staff | 29 | 1,710 | 1,739 |
| Totals | 322 | 2,015 | 2,337 |

APPENDIX L

Tree Species Mentioned in Annual Report

Botanical Names

A. NATIVE CONIFERS

| | |
|-------------------------------------|---|
| Bunya Pine | <i>Araucaria bidwillii</i> |
| Coastal Cypress Pine | <i>Callitris columellaris</i> syn. <i>arenosa</i> |
| Cypress Pine | <i>Callitris columellaris</i> syn. <i>glauca</i> |
| Hoop Pine | <i>Araucaria cunninghamii</i> |
| Kauri Pine | <i>Agathis robusta</i> |
| South Queensland Kauri Pine | <i>Agathis robusta</i> |
| White Cypress Pine | <i>Callitris columellaris</i> syn. <i>glauca</i> |

B. EXOTIC CONIFERS

| | |
|----------------------------------|---|
| Arizona Cypress Pine | <i>Cupressus arizonica</i> |
| Bahamas Caribbean Pine | <i>Pinus caribaea</i> var. <i>bahamensis</i> |
| Caribbean Pine | <i>Pinus caribaea</i> (3 varieties) |
| Chinese Fir | <i>Cunninghamia lanceolata</i> |
| Chir Pine | <i>Pinus roxburghii</i> |
| Cuban Caribbean Pine | <i>Pinus caribaea</i> var. <i>caribaea</i> |
| Douglas Fir | <i>Pseudotsuga menziesii</i> |
| Haitian Pine | <i>Pinus occidentalis</i> |
| Honduras Caribbean Pine | <i>Pinus caribaea</i> var. <i>hondurensis</i> |
| Klinki Pine | <i>Araucaria hunsteinii</i> |
| Loblolly Pine | <i>Pinus taeda</i> |
| Longleaf Pine | <i>Pinus palustris</i> |
| Masson Pine | <i>Pinus massoniana</i> |
| North Florida Slash Pine | <i>Pinus elliotii</i> var. <i>elliottii</i> |
| Ocote Pine | <i>Pinus oocarpa</i> |
| Patula Pine | <i>Pinus patula</i> |
| Pinaster Pine | <i>Pinus pinaster</i> |
| Pond Pine | <i>Pinus serotina</i> |
| Radiata Pine | <i>Pinus radiata</i> |
| Sand Pine | <i>Pinus clausa</i> |
| Shortleaf Pine | <i>Pinus echinata</i> |
| Slash Pine | <i>Pinus elliotii</i> var. <i>elliottii</i> |
| South Florida Slash Pine | <i>Pinus elliotii</i> var. <i>densa</i> |
| Yunnan Pine | <i>Pinus yunnanensis</i> |

C. EUCALYPTUS

| | |
|-----------------------------|---------------------------------|
| Bancrofts Red Gum | <i>Eucalyptus bancroftii</i> |
| Blackbutt | <i>Eucalyptus pilularis</i> |
| Carbeen | <i>Eucalyptus tessellaris</i> |
| Flooded Gum | <i>Eucalyptus grandis</i> |
| Forest Red Gum | <i>Eucalyptus tereticornis</i> |
| Grey Box | <i>Eucalyptus moluccana</i> |
| Grey Gum | <i>Eucalyptus propinqua</i> |
| Grey Ironbark | <i>Eucalyptus drepanophylla</i> |
| Gympie Messmate | <i>Eucalyptus cloeziana</i> |
| Narrowleaf Ironbark | <i>Eucalyptus crebra</i> |
| Rose Gum | <i>Eucalyptus grandis</i> |
| Spotted Gum | <i>Eucalyptus maculata</i> |
| Tallowood | <i>Eucalyptus microcorys</i> |
| White Mahogany | <i>Eucalyptus acmenioides</i> |

D. OTHER BROADLEAFED TREE SPECIES

| | |
|-------------------------------|--------------------------------|
| Bonewood | <i>Macropteranthea</i> sp. |
| Bulloak | <i>Casuarina luehmannii</i> |
| Meranti | <i>Shorea</i> spp. |
| Poplar | <i>Populus</i> species |
| Queensland Maple | <i>Flindersia brayleyana</i> |
| Queensland Silver Ash | <i>Flindersia bourjotiana</i> |
| Red Cedar | <i>Toona australis</i> |
| Rosewood | <i>Eremophila mitchellii</i> |
| Sandlewood | <i>Santalum lanceolatum</i> |
| Silky Oak | <i>Grevillea robusta</i> |
| Silkwood | <i>Flindersia pimenteliana</i> |
| Wattle | <i>Acacia</i> spp. |
| White Cedar | <i>Melia azederach</i> |

E. WEEDS, GRASSES, PALMS, ETC.

| | |
|--------------------------|---|
| Gatton Panic | <i>Panicum maximum</i> cv <i>gatton</i> |
| Moonlight Cactus | <i>Eriocereus tortuosus</i> |
| Lantana | <i>Lantana camara</i> |