

1966

QUEENSLAND

ANNUAL REPORT

OF THE

DEPARTMENT OF FORESTRY

FOR THE

YEAR 1965-66

PRESENTED TO PARLIAMENT BY COMMAND

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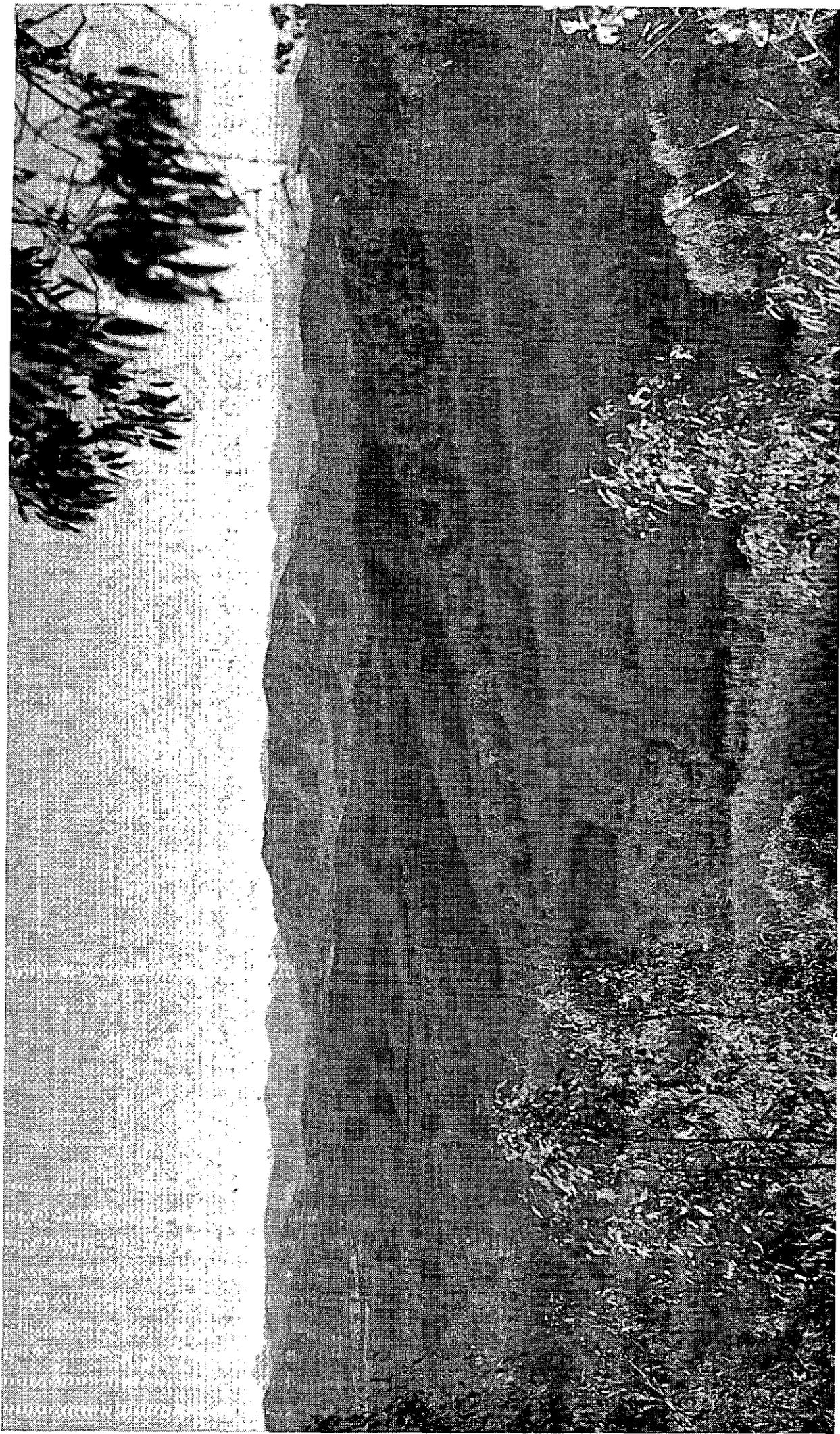
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View of Hoop Pine Plantations—Imbil.

REPORT OF THE CONSERVATOR OF FORESTS

For the Year ended 30th June, 1966

INTRODUCTION

The action of the Government in providing new offices for the Department during the year is recorded with appreciation. The thanks of the Department are expressed also to the Public Service Commissioner's Department and the Department of Works for their assistance in the securing of the new offices and in preparing the new offices for occupancy by this Department. For the first time in many years all of the major Branches of the Department are situated under the one roof, and in addition to this the officers are not overcrowded. This will greatly facilitate the work, and will be conducive to greater efficiency.

The volume of milling timber (including pulpwood) cut from Crown land during the year under review was 240,621,000 superficial feet hoppus. This has been exceeded once only, in the peak year of 1953-54. The increase in demand for log timber was general with the notable exception of Cypress Pine, the cut of which was appreciably less than for the previous year. An increase in the cut of plantation timber for both milling and pulpwood is recorded.

Towards the end of the year tenders were invited, closing 30th June 1966, for the purchase (for utilisation) of pulpwood from plantations in South East Queensland at the rate of 44,600,000 super. feet hoppus per annum. Tenders received are at present under consideration.

It has been Departmental practice to insist on the use of horses in the snagging of thinnings from plantations. The objective has been the avoidance of damage to the remaining higher quality trees that are left for the production of later thinnings and the final crop. During the latter part of the year the Department purchased a small crawler tractor with a specially designed logging winch and "tag line" equipment for log assembly. It is proposed to use this machine in plantation areas for demonstrations of logging technique and for logging research. This research will cover the economics of mechanical log extraction under varying conditions and using a range of techniques. A comparison with extraction by horses will be possible and damage to the remaining stand will be carefully examined and appraised.

Bearing in mind the desirability of establishing more training facilities for the Timber Industry the Department has rendered whatever assistance possible towards the establishment of a Diploma course in Wood Technology at the Eagle Farm Technical College. This course was commenced in March, 1966 and is at present being taken by about 30 members of the Timber Industry. It is hoped that the interest will extend among all users of wood, particularly carpenters, at a later date. The majority of the lectures are given by officers of this Department.

At the Royal National Association Exhibition in August 1965, the Department's exhibit featured the use of plantation grown timbers particularly for building purposes. Plantation grown timber is becoming increasingly significant to the timber industry in Queensland and it is of great importance that it should be put to proper use. New features in building techniques were incorporated and the exhibit received very favourable comment.

The Australian Forestry Council after considering the softwood requirements of Australia and of each State and the actual rate of planting of softwoods came to the conclusion that the Softwood planting programme in Queensland should be increased to 10,000 acres annually. Every endeavour was made during the year to progress towards this objective. Three new nurseries were sown for the first time. The slash pine nursery at State Forest 779 Gregory was sown in July, 1965, and produced 440,000 plants for transfer to the field in winter 1966. The Woocoo nursery was sown with Hoop Pine in October 1965; germination was excellent and subsequent development of the stock has been good. There are in the nursery plants for 350 acres to be part of the 1967-68 planting programme. In April 1966 the initial sowing of *P. caribaea* was made in the Kennedy nursery. A good strike resulted and it is expected that the stock will be adequate for 220 acres to be planted in the 1966-67, summer.

It is pleasing to record that there has been a substantial increase in the public demand for plants for forest establishment. This resulted in the clearing of all excess *P. caribaea* available from the Cathu and Danbulla nurseries and sufficient orders are held for Slash Pine to ensure the utilisation of all plants surplus to the Department's requirements this winter. It is expected that sales of these species will amount to about 450,000 plants during the calendar year 1966.

The response to the calling of tenders for both manual and machine clearing of areas for planting with softwoods was entirely satisfactory and figures at which contracts for machine clearing were entered into were in general slightly lower than for the previous year. In all, contracts were let to cover 4,841 acres of which 4,128 acres was machine clearing.

Collection of orchard seed in the Beerburum sub-district was 675 lb which is more than sufficient for the Department's annual planting of Slash Pine even when the overall programme of 10,000 acres per year is attained. This will permit a reserve of orchard seed to be established and it is expected that there will soon be available a surplus of orchard seed which could be sold. The improved seed from this orchard has caused much interest, both in some other Australian States and Overseas.

A significant event in National Park activities during the year was the appointment of a Zoologist, a graduate of the University of Queensland, for the purpose of studying Park fauna. Very little of this work has been carried out to date in Queensland and the first Park selected for a fauna survey was Lamington where already interesting results have been obtained. The information gained will be used in the production of literature which will not only be of interest to the Park visitor but also of scientific value.

The effect of forests in regulation of stream flow, and control of soil erosion which would otherwise cause silting of reservoirs and streams has long been established in a general way. Because forested areas comprise large sectors of catchments and because of the importance of water supplies to the Queensland of the future, the Department allotted an officer, who has undertaken a course of study in this speciality, to carry out detailed research on the effect of various treatments of forested areas on the allied subjects of stream flow, water absorption and soil erosion. Initial work has commenced in North Queensland, and the co-operation of the Irrigation and Water Supply Commission in providing facilities is gratefully acknowledged.

The support and sympathetic understanding of the Minister, the Honourable Harold Richter, M.L.A., his ever ready accessibility and his willingness to see at first hand operations in the field are recorded with appreciation.

MANAGEMENT

General

The area of State Forests at the end of the year was 6,553,344 acres, a net increase of 350,747 acres.

Expenditure

Expenditure under the Reforestation Vote was \$3,983,980 compared with the equivalent of \$3,752,000 in 1964-65. Expenditure from Trust Funds on maintenance of capital improvements was \$112,944.

Expenditure is itemised as follows:—

Item	Expenditure	Percentage of Total
Direct Expenditure on projects—	\$	
Plantations	861,706	21.0
Natural Regeneration	165,167	4.0
Nursery Expenses	133,677	3.3
Research	138,592	3.4
Protection	591,808	14.5
Surveys	128,475	3.2
New Construction	239,202	5.8
Maintenance of Capital Improvements	112,944	2.8
Total direct expenditure	\$2,371,571	58.0
Indirect Expenditure—		
Wet time, Holidays and Leave	466,726	11.4
Supervision, Tools, Cartage, &c.	733,658	17.9
Camping Allowance	220,279	5.4
Pay Roll Tax	69,486	1.7
Workers' Compensation	51,691	1.2
Administration	127,440	3.1
Miscellaneous	39,983	0.9
Stores Suspense	16,090	0.4
Total indirect expenditure	\$1,725,353	42.0
Total expenditure	\$4,096,924	100.0

Employment

The number of men engaged on Reforestation work was 1,543 at 1st July 1965 compared with 1,332 at the end of June 1966.

The average level of employment on this work was 1,316 compared with 1,401 in 1964-65.

Average expenditure per man year was \$3,113 compared with the equivalent of \$2,756 in 1964-65.

Timber Assessment

The pattern of assessment work has been similar to previous years with steady progress in the assessment of State Forests by plot establishment with supplementary stripping for volume information and site index mapping.

A total of 620 new plots were established mainly in the North Queensland rain forest and South Queensland coastal hardwood reserves, bringing the total to 19,540 plots sampling 2,550,000 acres.

Remeasurement work was continued in the western cypress, plantations and coastal hardwood areas.

A further 230,000 acres of grazing selection country was estimated by strip survey where it was considered timber areas suitable for State Forest reservation existed.

Valuation of Timber on Land for Conversion of Tenure

The table below sets out the current position in comparison with previous years.

It will be seen that in the twelve month period the work to be done was increased by 509 new applications totalling almost 4,500,000 acres.

Despite the strain which this increase has thrown on the Department's field staff the amount of field work and inspections covered was equal to that covered in the previous 2 years.

The major single factor in allowing this increase to be achieved was the use of a light aircraft in conjunction with aerial photographs on a high-flying scale, to determine the boundaries of merchantable timber types.

Some 1,000,000 acres were covered and the associated follow-up ground work is still being done.

Further work on this basis is being planned and should facilitate future assessment work by eliminating the need for inspection of large areas of non-productive country.

FREEHOLDING POSITION IN RELATION TO PREVIOUS YEARS

	As at 30th June, 1964		As at 30th June, 1965		As at 30th June, 1966	
	No.	Area	No.	Area	No.	Area
Total applications made	880	3,592,000	1,226	7,152,000	1,730	11,742,000
Withdrawn before valuation	39	108,000	32	103,000	27	120,000
Total requiring valuation	841	3,484,000	1,194	7,049,000	1,703	11,622,000
Valuation complete and determined by Land Court	171	484,000	239	799,000	380	1,418,000
Valuation complete and awaiting determination*	278	1,044,000	458	1,848,000	722	4,186,000
Field assessment complete but not yet valued	230	1,096,000	182	1,036,000	134	910,000
To be assessed in field	162	860,000	315	3,366,000	467	5,108,000
Totals	841	3,484,000	1,194	7,049,000	1,703	11,622,000

* Includes Blocks with Nil Timber Value.

Protection

Overall the fire-season was below average in severity, with a total of 114 fires. July was very cold (snow falling north of the Tropic of Capricorn for the first time in living memory) and was also a wet month. However, no follow-up rains occurred in spring and the northern Forestry centres in particular were very badly affected by drought and frost. The only factor which seemed likely to have a mitigating effect on the fire season was the lack of fuel in general due to the long drought. This was not so in plantations, where

drought-induced leaf fall or needle fall increases fuel quantity, and in fact two relatively large plantation fires occurred in November. Districts with plantations were warned to be particularly vigilant for fire; but happily an extremely wet December virtually terminated the fire season. Though the wet season was below average, there was no resurgence of danger. A study of the following table will demonstrate support for the above summary. More than half the fires occurred in one month—November, which was marked by squally winds and dust storms, restricting lookout visibility.

Month	Number of Fires	Size of Fires in acres*				
		0-10	11-100	101-1,000	1,001-10,000	10,001+
July	3	1	..	1	1	..
August	2	..	2	..	..	..
September	14	2	4	8	..	..
October	12	6	2	4	..	..
November	58	17	13	20	6	2
December	5	1	1	2	1	..
January	9	4	3	..	2	..
February	3	3	..	..	..	..
March	2	1	1	..	1	..
April	3	..	1	2	..	..
May	3	1	1	1	..	..
June	0	..	..	..	..	..
Total	114†	36	28	38	10	2

* The areas are totals, and include all private and Crown tenure country covered as well as Forestry areas.

† Includes 5 restarts of fires.

Plantation losses were fairly high, two fires (130 acres at S.F. 779 near Childers and 40 acres at S.F. 909 Pechey) accounting for the bulk of the 204 acres lost. Atherton district lost about 2 acres of old plantation in a fire which crowned in open forest—an indication of the severity of the season in the northern part of the State, where crown fires are a rare occurrence. Five plantation fires gave a loss estimated at \$8,450.

The most damaging single fire was that in Waaje Logging Area, Barakula State Forest which cost \$2,620 to suppress and caused damage to the standing crop estimated at \$6,500. Thick dust haze caused experienced lookout observers to over-estimate grossly the distance of this fire, and it was not fought until it was quite large after ground reconnaissance had established its location. This dearly bought type of experience is now being shared by the institution of "post mortem" type discussions after major fires. District officers with common fire problems meet on the fire area to assess all aspects of the fire and the way it was handled. The idea, approved on a recommendation by the Fire Protection Officer following his overseas study tour, is being well-received by district officers, whose experience should widen greatly

from the practice. Various types of hand tools purchased from overseas as a result of the tour are now on district trial, and could become part of the standard equipment if they prove successful.

Radio and 'phone equipment is being installed as received, and about half the districts now have a good radio network, which is invaluable in administration as well as for fire work.

Three fire towers in excess of 70 feet have been completed in Murgon, Gympie and Warwick districts entirely by Departmental labour. Work has commenced on a structure of 120 feet in the Roma sub-district, where flat terrain necessitated a tall structure.

Units of an improved design of slip-on unit are on delivery and the only major part of equipment replacement which is lagging is a suitable engine-pumper. Specification difficulties are expected to be resolved in the new financial year.

Breakdown of fire occurrence by districts is shown in the accompanying table.

District	No. of Fires	Area Burnt Over (acres)			
		Crown Timber Areas		Private	Total
		Inside Protection Systems	Partly Protected or Unprotected		
Atherton	6	4,227	300	10,540	15,067
Brisbane	21	399	1,346	2,054	3,799
Dalby	7	25	10,814	1	10,840
Gympie	17	142	16,900	267	17,309
Mackay	5	577	1,092	500	2,169
Maryborough	19	2,098	3,942	712	6,752
Monto	3	480	2,102	1,700	4,282
Murgon	9	321	1,519	284	2,124
Warwick	13	368	6,200	115	6,683
Yarraman	3	60	8	..	68
National Parks	11	813	13,500	3	14,316
Total (including restarts)	114	9,510	57,723	16,176	83,409

Major known causes of outbreaks by percentages were:

	%
Unauthorised burning off	30.7
Government and Semi-Government authorities	9.7
Smokers	7.0
Recreationists' camp fires	6.1
Lightning	6.1
All other known causes	7.9
Restarts of fires	4.4
Unknown causes	28.1
Total	100.0

Total expenditure on fire-fighting, including patrol and detention was \$111,168 (\$142,252 in 1964-65). Direct costs being \$12,645 (\$28,500). Prescribed burning for protection purposes covered 33,181 acres (93,433) at a cost of \$4,443 (\$10,722). Burning of logging debris cost \$2,426 (\$2,872). Co-operative protection burning with neighbours cost \$5,999 (\$8,828).

Expenditure on new fire roads was \$223,268 (\$212,212) and maintenance of fire roads cost \$207,148 (\$217,412).

The section secured another forester, whose duties apart from routine help will include fire research projects. In particular, fire damage appraisal and fire weather studies will be undertaken.

Industrial Safety

Shortage of time of staff available meant that only one training course (covering 10 supervisors) was given during the year. However, the long term effects of previous work are commencing to show up in improved accident frequency rate figures. The quarterly safety newsletter is widely distributed and read, and new employees are given a copy of the Department's Job Safety Handbook and a First Aid Book. Figures for the last half of the year show a drop in employment numbers, and this would contribute to an improvement, since the proportion of new employees—who tend to have more accidents—would be lower.

Nevertheless, we have achieved a Frequency Rate of less than 100 for the whole year.

Year	Frequency Rate (accidents per 1,000,000 man hours worked)
1961-62	150.6
1962-63	150.1
1963-64	132.6
1964-65	120.5
1965-66	93.3

This result though by no means in the vanguard of industry shows consistent improvement, and continuing efforts will be made to improve the position still further.

MECHANICAL EQUIPMENT

General

It was not possible during the financial year to implement the full programme of proposed replacement of over-age units and the purchase of additional units of mechanical equipment. As a result the Department is still using at least 4 power graders which should have been replaced by new machines, plus a number of over mileage motor vehicles.

The heavier units of the dozer fleet are relatively new machines and are in reasonably good condition. Some of the up to 50 H.P. machines are from 12 to 15 years of age and it is hoped to replace a number of these machines during 1966-67.

Staff

During the year a fourth Plant Inspector was appointed to South Queensland and took up duties with headquarters in Brisbane. Other appointments were 1 Clerk, 1 Clerk-Typist and 2 Driving Instructors. Total staff of the Section is now—

- 1 Mechanical Equipment Officer.
- 4 Plant Inspectors.
- 2 Driving Instructors.
- 2 Clerks.
- 2 Clerk-Typists.
- 26 Mechanics.

Training of mechanics at manufacturer's service schools has continued on a reduced scale. Eighteen mechanics were given one week's training at the G.M.H. training school at Strathpine and the Plant Inspectors attended several one-day schools on specialised equipment. All four Plant Inspectors attended a one-week school conducted by the Main Roads Department for Plant Inspectors.

Plant Hire Rates

It was pointed out in the report for 1964-65 that plant hire rates on heavy equipment now take into account interest on the cost of purchase, and depreciation and that a usage rate for dozers of 1,000 hours per year and of 1,200 hours for graders had been adopted. Unless these usage rates are achieved the machines cannot pay their way on the hire rates adopted. Work within a District should be so organised that the maximum amount of work possible is performed by each machine.

Expenditure

Details of expenditure are—	1964-65	1965-66
	\$	\$
Purchase of Plant	419,126	375,944
Maintenance of Plant	504,508	559,944
Plant Hire Credits	674,828	792,187
Sales of Plant	30,124	34,121

The difference between Maintenance of Plant expenditure and Plant Hire Credits for each year is 1964-65 \$170,320 and 1965-66—\$232,243.

Increased plant hire rates applied as from 1st January 1965.

Purchases

Major items of plant purchased—

- Five (5) 160 D.B.H.P. Tractor/Dozers.
- One (1) 39 D.B.H.P. Tractor with Winch.
- 19 Replacement Motor Vehicles.
- 25 Additional Motor Vehicles.

Census of Plant as at 30th June, 1966

Motor Vehicles—

Sedan and Station Sedans	26
Panel Vans, Utilities and 4-wheel drive vehicles	238
Trucks from 1 to 7-ton	179
Total	443

Tractors (D.B.H.P.)—

(a) Track Type—

Up to 50 H.P. with blade	25
50 to 100 H.P. with blade	22
Over 100 H.P. with blade	21
Total	68

A check has been made on the correct D.B.H.P. for various machines so that the above figures will not agree with those shown in previous reports.

(b) Wheel Type 37

Power Graders—

40 to 80 H.P.	12
80 to 100 H.P.	14
Over 100 H.P.	7
Total	33

Other Equipment—

Road Compressors	10
Light Weight Rockdrills	21
Rotary Hoes	33
Rippers	13
Tilt Bed Trailers	6
Caravans	42
Concrete Mixers	36
Disc Ploughs	4
Welding Plants	11
Chain Saws	222
Fire Tanks—Slip on type	102
Fire Tanks—Various types	44
Road Rollers	6
Disc Harrows	7
Rotary Slashers	6
Total	563

Acquisition of Land

During the year 1965-66 an amount of \$33,314.71 was expended on the acquisition of Land for Forestry purposes as follows:—

	\$
Purchase of Land	23,641.52
Survey and Real Property Fees	9,423.19
Compensation for Improvements	240.00
Miscellaneous	10.00
Total	\$33,314.71

The expenditure of \$23,641.52 represents the purchase of eight properties, comprising a total of 782 acres 3 roods 1.4 perches, from which 780 acres 1 rood 3 perches will be added to State Forests, National Parks and/or Scenic Areas whilst the balance of 2 acres 1 rood 38.4 perches will be used to provide office sites at Baralaba, Mapleton and Yarraman.

Forest Surveys

Thirty-seven camps operated during the first half of the year, and thirty-five during the second half. Details are as follows, as at 30th June, 1966.

General Surveys

Twenty camps were engaged on general survey work. This was associated with the traversing of reserve, logging area, and compartment boundaries, fire-breaks, roads, species separation, soil, timber and slope classification and road investigations. Two of these camps were engaged on theodolite control traversing, one in South and one in North Queensland.

Personnel

At the end of 1965-66 the following were engaged in survey work:—8 Foresters, one Forest Surveyor, nine Forest Rangers, 34 Overseers, 13 trainees and 112 men. Drafting Branch personnel totalled 19 officers.

Details of work in miles

Theodolite Controls	Compass and Chain Traverse	Re-opening of the old lines	Investigation Surveys	Stripping
131	1,055	346	220	5,230

REFORESTATION

General

Rainfall figures are shown below for six plantation centres. For all except Kalpowar the figures are an improvement on those for the previous year and for Imbil and Yarraman they are slightly above average. Conditions in late spring and through summer were quite good for the planting of Hoop Pine and *P. caribaea* and excellent survivals resulted throughout. The winter season of 1965 was good for the planting of Slash Pine in coastal South Queensland and very few refills were required. In the Granite Belt however the winter was dry and it was September before serviceable rains permitted planting of *P. radiata* to proceed. Survivals from this late planting have been satisfactory. The early spring provided good conditions for burning and as a result early burns were possible and clean planting areas obtained.

RAINFALL IN POINTS

	Hoop Pine Areas			Exotic Pine Areas		
	Yarraman	Imbil	Kalpowar	Beerwah	Tuan	Bowenia
1965-66	3,577	4,592	2,520	5,997	4,448	5,329
Average	3,146	4,600	3,603	6,065	5,175	6,482

The improvement in rainfall resulted in a return to normal growth in the main Hoop Pine and Exotic areas.

Field Operations

The following table gives figures for the extent of the chief field operations for the year; 1964-65 figures are shown for comparison:—

	1964-65	1965-66
	Acres	Acres
Area of natural forest treated	44,912	31,574
Area of plantations established	4,861	5,810
Area of plantations covered in pruning	18,926	17,210
Area of plantations tended	60,183	59,126
Area thinned merchantably	6,962	8,244
Area thinned unmerchantably	4,572	981

The area of new plantations established 5,810 acres is the largest since 1955-56 and the second largest annual planting ever. It represents an increase of 949 acres on the figure for the previous year. To achieve this it has been necessary further to curtail the expenditure on silvicultural treatment of natural forests and in consequence the area treated fell to 31,574 acres. Suspension of unmerchantable thinning in the South East corner of the State had its full impact during this year. This action taken in anticipation of a demand for pulp-wood from the plantations reduced the area thinned unmerchantably to 981 acres. The area covered by merchantable thinning operations again increased substantially and reflects the increasing demand for plantation thinnings. Cultural operations in established plantations namely tending and pruning were kept up to date though there was a slight reduction in the areas covered. In the case of tending this has been brought about to some extent by the control of lantana achieved in older Hoop Pine plantations by past tendings. A new departure in Hoop Pine areas was the adoption of pre-plant spraying with 2,4-D. This was responsible for a saving in areas where it was possible to apply it. In addition part of the pre-plant spraying of Exotic areas was done by contract. This effected a substantial saving in cost of application and, as a result, a power-mister to be operated from a tractor was purchased for use next year in the Maryborough, Gympie and Brisbane districts.

Plantations

Details of areas planted are shown by districts and by species in appendices F and G and from them are derived the following:—

	1965-6	To 30-3-66
	Acres	Acres
Native Conifers (chiefly Hoop Pine) ..	2,548.0	59,287.1
Exotic Conifers (chiefly <i>P. elliottii</i> , <i>P. caribaea</i> , <i>P. radiata</i> , <i>P. patula</i>) ..	3,216.1	56,735.2
Eucalypts	40.0	3,686.5
Other Broadleaved species	5.2	1,248.9
Miscellaneous Experimental	0.7	207.9

In addition to the area of new plantations established it was necessary to replant areas lost to fire in the Pechey, Gregory and Cathu plantations, amounting in all to 126 acres. Drought losses called for replanting of 136 acres at Passchendaele and 64 acres at Pechey whilst in the Gympie district 78 acres of Kauri Pine were clear felled because of the effects of Coccids and replanted with Hoop Pine. In the Yarraman district 93 acres of Exotics planted on frosted sites were heavily thinned to salvage drought losses and then underplanted with Hoop Pine.

Extensive reffiling was necessary only in the Passchendaele and Pechey areas where the drought was most severe and in the Murgon district as a result of the depredation of native rats. These rats are by far the most important pest in Hoop Pine plantations and the study of the problem of their control has been made the major duty of a trained officer.

The use of machines in clearing of forest for planting has been further extended and in the Hoop Pine areas this has generally resulted in a reduction in the cost per acre of preparing the area for burning. In the case of open forest areas being cleared for planting with Exotics keen quotes were received and the overall cost per acre would be about the same as for the previous year. Contracts for clearing were let as follows:—

	Areas Cleared	
	Hoop Pine (Rain forest)	Exotics (Open forest)
	Acres	Acres
Machine Clearing	1,555	2,573
Manual Clearing	583	130

In addition there has been increased use of the Department's machines particularly in clearing marginal wet sites which must be handled when conditions are favourable.

Areas covered in pruning operations are shown by stages in the following table:—

Year	State of Pruning				Total Area
	1st	2nd	3rd	4th	
	Acres	Acres	Acres	Acres	Acres
1964-65 ..	5,252	5,258	5,515	2,901	18,926
1965-66 ..	3,979	5,561	5,259	2,411	17,210

During the year 3,693 acres of plantation were covered for the removal of Epicormic shoots from high pruned stems.

The area covered in merchantable thinnings increased by 1,282 acres over last year's figure to give a record of 8,244 acres so thinned. The yield per acre thinned was 5,000 s.ft. (Hoppus) and the value \$35 per acre.

Diseases and Pests

(a) Insects, Birds, Animals—

Investigation work has been continued on Bagworms (*Nyalarcta hubneri*) a pest of *Pinus radiata*, on the Kauri Coccid a pest of Kauri Pines, and on white grubs (*Scarabaeoidia*) pests of nursery Hoop Pine and, occasionally, newly established Hoop Pine plantations. In addition investigations have been commenced on the native rat problem in young Hoop Pine plantations and a series of trials are in progress to evaluate the usefulness of bird repellent seed dressings for *Pinus* sowings.

Populations of bagworms in plantation areas at Passchendaele have remained at low levels for the past three years. Routine long term observations are being continued as this pest has demonstrated a capacity to increase to population levels which cause severe damage from time to time.

Damage to Kauri Pine stands in the Mary Valley has continued to be very severe resulting in further deterioration in the condition of all stands. Logging is proceeding according to the condition of stands and although in the worst areas all trees have been defoliated almost continuously for more than three years losses through tree deaths have been surprisingly low. Investigations on the biology and control of this pest are being continued. Trees in coastal areas have very low populations of the Coccid and these areas are being examined as part of the investigation. The insect has been recorded from Kauri Pine stands in North Queensland but damage has not been serious to date.

Control of white grubs in Hoop Pine nurseries has been under investigation for a number of years. Following the decision to change from lead arsenate to B.H.C., current investigation is directed at determining optimum dosage rates. In addition, trials are in progress to determine the value and practicability of several methods of B.H.C. soil treatment at planting for reducing losses from white grubs of newly planted Hoop Pine.

During the late winter months of 1965 a serious rat problem was encountered on the Gallangowan reserves and to a lesser extent at Jimna. Although this outbreak was not as extensive as those of the years 1954-56 when severe damage was caused in the Benarkin, Yarraman and Gallangowan areas, damage in the current outbreak has caused concern. This complex problem is undoubtedly associated with the marked ecological changes imposed by establishment of new plantation areas. In addition there is strong evidence to suggest that edaphic and climatic factors are involved. Baiting has been undertaken with results that are in general disappointing and additional tending involving ramming and straightening damaged trees has proved necessary. Although this latter treatment has saved a proportion of trees losses have been serious. An officer commenced a study of baiting techniques with the onset of rat activity in early June 1966. The species involved is mainly *Rattus culmorum*.

Enquiries from the general public, local authorities, other Government Departments and District Officers of this Department once again proved numerous. Apart from less serious forest and nursery problems of a Departmental nature most enquiries related to insect damage to ornamentals, windbreaks or shade trees.

(b) Fungi

(i) *Soil Fumigation*.—As in the past two years seed beds for the winter 1965 *Pinus* spp. sowings at Beerburum, Beerwah and Passchendaele were fumigated for control of *Phytophthora* root rot. Fumigation was carried out by Departmental Staff applying a 50:50::methyl bromide:chloropicrin mixture with special soil injection equipment. As previously, fumigation at Passchendaele was carried out in May for the 1966 sowings before the soil temperatures fell.

Fumigation was carried out at Gallangowan, Pechey and Yarraman early in 1966 prior to the *Pinus patula* sowings. This was done because of poor yields of this species in the past due to a high susceptibility to damping-off. Counts taken during germination indicate that at the first two centres improvements in stand density resulted.

In the last annual report it was mentioned that chlorosis of *Pinus caribaea* which is an important problem at Byfield nursery was controlled by soil fumigation and was possibly pathological. Since then *Phytophthora cinnamoni* has been isolated from the nursery. As a result of this work most of the beds sown with *P. caribaea* in 1966 were fumigated.

Experimental studies on fumigation for the control of root rot of *Pinus* spp. is continuing in a number of nurseries using a range of *Pinus* spp. Included in this work are several experimental soil fumigants.

In conjunction with studies on the control of damping-off of Hoop Pine using fungicides, some soil fumigation of Hoop Pine seed beds has been undertaken. Despite the fact that increases in germination and stand have resulted from fumigation, after about 9 months plants in plots fumigated with methyl bromide become stunted and bronze in colour. The cause of the problem has not been investigated but it is possibly due to the mycorrhizal fungi being killed. The effect of other soil fumigants is not yet known.

(ii) *Hoop Pine Damping-off*.—Following experimental studies on control of damping-off of Hoop Pine, a large portion of the 1965 Hoop sowings was treated with Captan 50 seed dressing. In 10 out of 13 Hoop Pine nurseries increases in germination resulted from the treatment, but the seed dressings had little effect on post-emergence damping-off.

A number of experiments were commenced in 1965 and results of these so far indicate that large increases in germination can result from several seed dressings, the best of which appear to Captan 50 and Panogen (liquid organic mercurial).

Part of the Hoop Pine sowing at Imbil was in a new section of the nursery. Beds in this area were prepared from ground, previously under grass, shortly before sowing. Counts made on seed batch J32 (L.G.C. 18.5 per cent.) gave the following results.

	% Germination	% Damping-off
Old Beds Captan 50 seed Dressing ..	22.5	0.7
Nil	19.5	0.8
New Beds Captan 50 seed Dressing ..	19.3	33.9
Nil	2.1	31.2

Rhizoctonia sp. was isolated from diseased seedlings and the results indicate the importance of early bed preparation where grass is being dug in. *Rhizoctonia* builds up on the decomposing organic matter and can cause serious problems in susceptible crops.

(iii) *Kauri Rust*.—Early in 1965-66 a leaf rust was collected by local staff on 2-year-old Kauri plantation (*Agathis palmerstonii*) at Gadgarra on the Atherton Tableland. This fungus has been identified by the Commonwealth Mycological Institute as *Aecidium balansae*. The importance of this fungus, the first rust on a native conifer in Queensland, is not known.

Regeneration of Natural Forests

Areas treated over the past two years are shown in the following table:—

Forest Type	1964-65	1965-66
	Acres	Acres
Eucalypt Forest	28,723	20,316
Cypress Pine	15,658	10,941
Tropical Rain Forest	527	270
Natural Hoop Pine	4	47

These figures again disclose a drop in the area of natural forests treated silviculturally during the year and this has been mainly due to the diversion of funds available for reforestation work to the most urgent need namely the rapid build up of the State's softwood estate. One of the most important operations bearing on the production of these valuable natural forests is the marking applied for logging and particular attention is being devoted to this aspect of the work. During the year new rules were issued for the tree-marking of the Blackbutt forests of Fraser Island and similar action is being considered for other areas.

Seed Collection

(i) *Hoop Pine*.—Expansion of the planting programme together with an unexpected early drop in viability of many batches of seed collected in 1962 has reduced the amount of seed in storage below the amount required for two years' sowing. The next general seed crop will be in 1967 but indications are that it will be possible to make a collection in 1966 from plantation trees in the Imbil district.

(ii) *Pinus elliotii* (Slash Pine).—The stage has been reached when collection of seed from orchards is adequate to the programme of more than 4,000 acres per year proposed with this species. This year 675 lb. of orchard seed were collected as against 239 lb. in the previous year. To meet other demands for Slash Pine seed a further 1,250 lb. were collected. The poorest grade of tree from which seed was collected was high-pruned stems selected at 120 to 160 per acre. Sales of Slash Pine seed during the year involved 1,489 lb. with a value of \$11,465.30.



Slash Pine on site previously considered to be unplantable.

(iii) *Pinus caribaea* (Caribbean Pine).—Collection of 105 lb. in central and northern Queensland this year means that the time has come when the State is self sufficient in regard to supplies of the Honduras variety of this species. However the use of the Bahamas variety at Bowenia and south of the tropics means that it will still be necessary to import seed of this species for some years to come and action has been taken to endeavour to secure this from the best sources.

(iv) *Pinus taeda*.—Largely to meet outside demands for seed of this species but also to raise a limited number of plants for special sites and purposes, a collection of 136 lb. of seed was made as far as possible from selected trees within plots in progeny trials involving controlled pollination of two outstanding parent trees. Performance of some of these crosses has caused a renewed interest in *P. taeda* and action is in hand to establish grafted stock to be the basis of plus stands for seed production. 119 lb. of seed of value \$916.30 were sold during the year.

(v) *Pinus radiata*.—In all 45 lb. of seed was collected. Of this 20 lb. was from specially selected trees.

Nurseries

Initial sowings were made in three new nurseries (Gregory, Woocoo, Kennedy) and this brings to 24 the number of nurseries operated by the Department. These supplied 4,240,000 plants for transfer to the field and prior to the commencement of the winter planting held 7,700,000 to meet planting programmes and public needs. The use of temporary saron-covered beds for standing out tubed stock has proved successful and has permitted production to be stepped up in Hoop Pine nurseries in South Queensland for a much lower expenditure that would have been involved in extension of high shades. Results from the first sowing in each of the three nurseries listed above were highly satisfactory; no problems of mycor-rhizal infection were encountered with Slash Pine at Gregory nor with Caribbean Pine at Kennedy. Increased production has been accompanied by a general reduction in cost per 1,000 of plants produced; this is particularly so in the case of the major nurseries producing open-root Slash Pine. In an effort to reduce the cost of watering in high shade nurseries the beds to be sown with Hoop Pine this year in the Yarraman nursery have been fitted with an automatic spray system using jets that throw a 10-ft. square pattern.

Sale of Trees

During the year the number of plants supplied to the public, schools, Government Departments and other instrumentalities was 284,000 which is an increase of 12,000 only on the figure for the preceding year. This does not reflect the increased demand that has been experienced especially in the case of Slash Pine for which orders for more than 300,000 plants will be supplied during this winter's planting season. Sowings of Slash Pine this year have been planned to meet a further increase next year. Planting of *P. caribaea* mainly by cane farmers in coastal North Queensland continues to increase and this year amounted to about 90 acres. With the opening of the new nursery at Kennedy provision has been made for an additional 50 acres in 1967 and it is anticipated that this will be needed to meet public requirements. Continued dry conditions in the Granite Belt over the normal planting season further depressed sales of *P. radiata*.

Distribution of plants supplied by species and by use is:

Species	Type of Planting	
<i>Pinus elliotii</i> (Slash Pine)	Forest Plots	140,000
<i>Pinus caribaea</i>	Schools	48,000
<i>Pinus patula</i>	Government Departments	1,300
<i>Pinus radiata</i>	Private	4,500
<i>Pinus taeda</i>	Departmental	5,000
Hoop Pine		20,000
Eucalypts		18,000
Miscellaneous		47,200
		284,000

Rocklea Amenity Nursery

Plants supplied by this nursery during the year reached a record total of 50,960 which is 9,500 above the previous highest figure. This increase in demand coupled with an adjustment of prices resulted in the value of plants supplied from the nursery rising to a total of \$7,655.

Dalby Holding Nursery

The number of plants handled in this nursery was 8,200 which included 3,450 Cypress Pine raised for trial plantings by the department. Sales amounted to 4,497 plants with a value of \$883.98. In addition some 250 plants were supplied to Schools and other Departments.

Christmas Trees

The number of Christmas trees sold rose by 322 to 6,148 with a return of \$2,978.41.

The total value of plants and Christmas trees sold was \$25,873.84 which is up by \$9,008.24 on the previous year.

Forest Hydrology

A Forest Hydrology research section based at Atherton was established late in 1965. The purpose of this section is to investigate the influence of forest vegetation on the water resource and to arrive at methods of forest management which will maintain soil and water values at a high level.

Several long term experiments have been planned in co-operation with the Irrigation and Water Supply Commission. These will include investigations into the effect of conversion from tropical rain forest to tropical pastures, and the effect of logging and roading activities in rain forest. Both studies will use the paired catchment technique and the first will be commenced late in 1966.

A plot scale study is being commenced in open eucalypt forest to study the effect of various prescribed burning practices on infiltration, surface run-off and soil erosion. Measurements of fire intensity, fuel build-up and soil physical characteristics will also be made.

A study has been completed into the effects of logging and roading in rain forest on the sedimentation of a domestic water supply. The results have shown that severe sedimentation can occur from poorly located and constructed roads, bridges and ramps after quite low intensity rainfalls. It is expected that recommendations made as a result of this study will substantially reduce sedimentation from future operations.

Several small trials to investigate the suitability of different grasses for erosion control plantings have been carried out. African Star Grass (*Cynodon plectostachyus*) fertilised at the rate of 10 lb. "Tropic"/100 square yards proved to be an outstanding coloniser on deep infertile granitic fill material and provided over 90 per cent. ground cover 10 weeks after planting.

SILVICULTURAL RESEARCH

A major part of the work of this branch has been the remeasurement and maintenance of current experiments. Reference is made below to the findings of the research staff during the year and the new work initiated.

Atherton Regional Research Station

The main work of this station is research into the silvicultural characteristics of the North Queensland rain forests with a view to determining treatment prescriptions suitable for application to these forests. Local problems, associated with the limited planting programme in North Queensland, form a much smaller part of the research work of this station.

(i) Rain Forests.—The study of the flowering and fruiting habits of the more important species, the effect of canopy cover and ground preparation on germination and survival of the seedlings, and the effect of liberation, on the subsequent growth and form of the regeneration, has continued. All plots were measured during 1965. The observations which have been made in this series of experiments are being currently assessed. A summary of the findings should be completed during the coming year.

A further series of spot-sowing trials was established. Seed was sown in a variety of rain forests, some of which had been recently accorded silvicultural treatment and some of which were silviculturally treated ten years ago. It is apparent that insects and other animals, possibly paddymelons (*Thylogale stigmatalis*), can destroy large quantities of seed before it has a chance to germinate. When the seed is not discovered by these predators germination percentage is often quite high. In a recently treated rain forest on a seed-bed which was raked and cultivated prior to sowing, germination of Queensland Maple (*Flindersia brayleyana*), Northern Silky Oak (*Cardwellia sublimis*) and Red Cedar (*Toona australis*) seed on occasions exceeded 50 per cent. Seedlings of

Northern Silky Oak and Northern Silver Ash (*Flindersia bourjotiana*) are repeatedly browsed by rain forest marsupials with consequent loss in height increment. Red Cedar and Queensland Maple seedlings are less palatable to these animals. The findings in the spot-sowing trials will help to elucidate the observations in the natural regeneration experiments referred to in the previous paragraph.

A number of yield plots was established over ten years ago to sample a wide variety of rain forest associations. Each yield plot included an untreated control, an area given standard silvicultural treatment and an area given a modified form of the standard treatment. The heavy task of remeasuring these plots and assessing the effect of the treatments is currently being undertaken.

An examination was made of two experiments which had been established to determine the desirability of liberating seedling and sapling regeneration, under 20 feet in height, some four to five years after the initial silvicultural treatment. This initial treatment reduced the basal area to levels of from 25 square feet to 105 square feet per acre in trees greater than 20 feet in height. The prescription for the follow up liberation involved the removal of vines from the useful stems, the brushing of all useless trees and species within five feet of stems of one of the highly favoured species (group A species) under 20 feet in height and the ringbarking of trees of low value commercial species (group D species) within five feet of group A regeneration under 20 feet in height. In the four years since the liberation treatment, height increment of the regeneration of the genus, *Flindersia* has been similar on the liberated and control plots. This height increment has remained the same over the basal area range studied viz. 25 square feet to 105 square feet per acre. Regeneration of Northern Silky Oak, under five feet in height, does respond to the liberation treatment. The regeneration has better form, smaller branches and better branch-shed in the non-liberated controls than in the liberated plots. The indications are that where Northern Silky Oak, under five feet in height, is not an important component of the regeneration, liberation tends should be delayed for at least eight years after the initial treatment.

A small experiment on the destruction of large unwanted trees in rain forest with picloram was established. Although some of the treated trees died rather quickly, no spectacular, overall results had been achieved three months after the treatment.

(ii) Plantations.—A large scale trial was established last year to compare the cost of ring-weeding with chemicals (2,2-DPA alone or in mixture with amitrole and simazine) and hand chipping in Hoop Pine (*Araucaria cunninghamii*) plantations established in degraded pasture. Although it was necessary to screen the Hoop Pine plants, chemical tending was still much cheaper than hand chipping and at least equally effective. The 2,2-DPA treatment cost less than half that of hand chipping, and the general adoption of this method for routine tending has been recommended.

The use of chemicals for grass control prior to planting, with or without additional mechanical site preparation, is also under investigation. Although this involves spraying the whole area, as compared with application to a 2-ft. circle around each plant in the ring-weeding treatments, present indications from an experiment in a molasses grass (*Molinis minutiflora*) infested area are that the cost need not be excessive. Most satisfactory grass control was obtained with two applications of 10 lb. 2,2-DPA in 20 gallons per acre, three weeks apart, followed by a spot treatment five months later. Further experiments covering other grass species and treatment schedules are being established.

Inkweed (*Phytolacca octandra*) about two feet in height in a first year Hoop Pine area was misted with 2,4-D amine at the rate of 0.8 lb. in 2 gallons of water per acre. The control of inkweed was satisfactory. Six per cent. of the Hoop Pine trees, which had been exposed to the mist, had their leading shoots damaged. The majority formed new leading shoots after a short period. There is no indication of impeded growth in the Hoop Pine.

Investigations continued on the underplanting of Honduras Caribbean Pine (*Pinus caribaea* var. *hondurensis*) plantations with Hoop Pine on grasslands on original rain forest sites. Interplanting of Hoop Pine and Honduras Caribbean Pine on these sites is also being studied.

(iii) Tree Breeding.—Grafts were made from about fifty of the finest Queensland Maple trees harvested during the year. In all cases the parent trees exceeded 150 inches g.b.h.o.b. and had a good bole length. The majority of the trees which have been preserved in this way had attractively figured wood.

It had been intended that grafting in the proposed Honduras Caribbean Pine seed orchard at Kuranda would be carried out in the late summer of 1966. Owing to the extension of plantation operations to the coastal region, it was decided to abandon the Kuranda project and establish the seed orchard in a forest site near Cardwell. It is expected that seeding in this species will be heavier at Cardwell which is at sea level than at Kuranda which is 1,500 feet above sea level. Planting of the stocks at Cardwell will take place during the coming summer.

Beerwah Regional Research Station

The work of this station is divided into four sections, three dealing mainly with exotic pine plantations and the fourth with coastal hardwood forests.

(i) Plantation Silviculture.—This section deals mainly with Slash Pine (*Pinus elliottii* var. *elliottii*) and Lobolly Pine (*Pinus taeda*) plantations but also controls experiments in Radiata Pine (*Pinus radiata*) plantations at Passchendaele and in Caribbean Pine plantations at Bowenia.

The germinative energy of newly collected and one-year-old Slash Pine seed, following different pre-germination treatments, was studied in laboratory germination tests and in bed germination tests. Germinative energy of new seed was similar for seed moist cold stored for six weeks or for three weeks, or for 15 days following a soak in water of 16 hours. With the older seed germinative energy improved with increasing length of moist cold storage. With either type of seed pregermination treatment, consisting of soaking in water for 48 hours or 60 hours prior to sowing, resulted in higher germinative energy than that of seed given no pregermination treatment and in lower germinative energy than that of seed given moist cold storage. It appears that with new seed the period of moist cold storage may be reduced, without ill effect, from the currently adopted six weeks to 15 days.

Trial plots of *Pinus merkusii*, of the Tapanuli provenance of Sumatra, have shown good growth and form, although they are inferior to slash pine controls. Further trials of this provenance in different environments appear to be warranted.

A comparison was made of the efficiency of the Swiss tree-climbing bicycle, a Swedish duralium ladder consisting of two 10-ft. sections and one seven-foot section and the Morris high pruning equipment in pruning Slash Pine from 21 feet to 26 feet and from 21 feet to 34 feet. Pruning from the Swiss bicycle is about half as fast as pruning from the ladders. Pruning from 21 feet to 26 feet from the Swedish ladder took 2 minutes 47 seconds per tree as against 3 minutes 37 seconds from the Morris equipment. Pruning from 21 feet to 34 feet took 7 minutes 32 seconds and 7 minutes 43 seconds respectively.

The pruning of 14-year-old Hoop Pine, underplanted beneath Slash Pine, was completed in 1965. The height of the Hoop now averages 45 feet with an increment of four feet per annum. The average maximum girth over stubs of the Hoop Pine is between 4.5 and 5.0 inches, the absolute maximum being 5.7 inches.

A detailed investigation was made into the relationships between Slash Pine performance and a number of site parameters within broad great soil groups in south-east Queensland. Significant correlations were found between Slash Pine site index and soil physical properties, original vegetation height, topography and average annual rainfall. The effectiveness of several methods of site preparation in promoting pine growth was assessed for a number of poorly drained soil types. Proposals, based on this investigation, have been made for the classification of future planting areas.

(ii) Tree Breeding.—This section deals with tree improvement work in exotic pines, used in plantation programmes, or which appear likely to find a place in these programmes. Most of the effort is being concentrated on Slash Pine, the several varieties of Caribbean Pine, Radiata Pine, Lobolly Pine and Patula Pine (*Pinus patula*) in roughly that order of importance. Some attention is being paid to tree-improvement work in Benguet Pine (*Pinus insularis*), *Pinus merkusii*, Maritime Pine (*Pinus pinaster*) and *Pinus pseudostrobus*.

(a) Slash Pine.—The 1966 orchard collection exceeded 600 lb., about double the quantity of seed required for the annual sowing programme. The di-allele crossing programme between the orchard parents continued with the establishment of 18 crosses covering an area of 9 acres. One tree, whose

progeny showed evidence of regular production of ramiforms (occasional acute angled branches usually persistent and heavy), was removed from the orchard. A few crosses, between trees of outstanding vigour and trees of outstanding straightness, were planted in a large scale trial to demonstrate the greatest improvements in these qualities that can presently be obtained.

(b) Caribbean Pine.—Of the 90 lb. of seed collected at Bowenia 50 lb. came from highly selected seed trees or from grafts of plus trees. This seed is confidently expected to give improved stock whose straightness in particular will be much better than that of previous plantings.

With the increased planting programme planned for this species, the performance of the three varieties is being studied throughout coastal Queensland south of Cairns and also in northern New South Wales. The earliest provenance trials at Bowenia, now five years old, indicate the Cuban variety to be the straightest and to have the best branch habit. Its early vigour is lower than in the other two varieties. Inter-varietal hybrids form part of this study. There is some evidence of heterosis in these at the nursery stage. An officer of this section, who has made the study of the genetics of this species the subject of his doctoral thesis at an American university, has forwarded seed of the Bahaman variety collected from a number of sources, for further provenance studies in Queensland.

Following the completion of the wood quality assessment the parent trees were selected for the seed orchard of the Honduras variety of the species. This seed orchard will be established near Cardwell. The crossing programme between these seed orchard parent trees continued and 20 crosses were made in 1965. The area planted with the 1963 crosses covered 6½ acres at Bowenia and three acres at Beerwah and incorporated 18 crosses. Grafting incompatibility and air-layering trials continued.

(c) Benguet Pine.—A provenance trial, testing good seed sources of this species, was established at both Beerwah and Bowenia.

(d) Hybrids.—A full schedule of crosses between the two varieties of Slash Pine and the three varieties of Caribbean Pine was completed. It is considered this hybrid has considerable potential in Queensland. Back crosses, F2 and F1 X F1 hybrids of Slash Pine and Loblolly Pine were established. Seed of *X Pinus rigitaeda* was received from the Institute of Forest Genetics, South Korea, and of

X Pinus attenuadiata from the Forest Research Institute, Canberra. Both of these will be tried in the high country on the southern border.

(iii) Nutrition.—Existing field trials have been maintained and new ones were established to test the response of Slash Pine, Caribbean Pine and their hybrid to different fertilisers when planted on plough-mounded swamp soils (low humic gleys and podsolic gleys).

Fertiliser trials initiated in 1959 in Slash Pine aged 24-25 years have shown conclusively that an economic response to phosphate fertilising can be obtained on podsolic soils which appeared to contain sufficient phosphate (230 ppm P₂O₅) for satisfactory growth. The following data are from Experiment 341 North Coast.

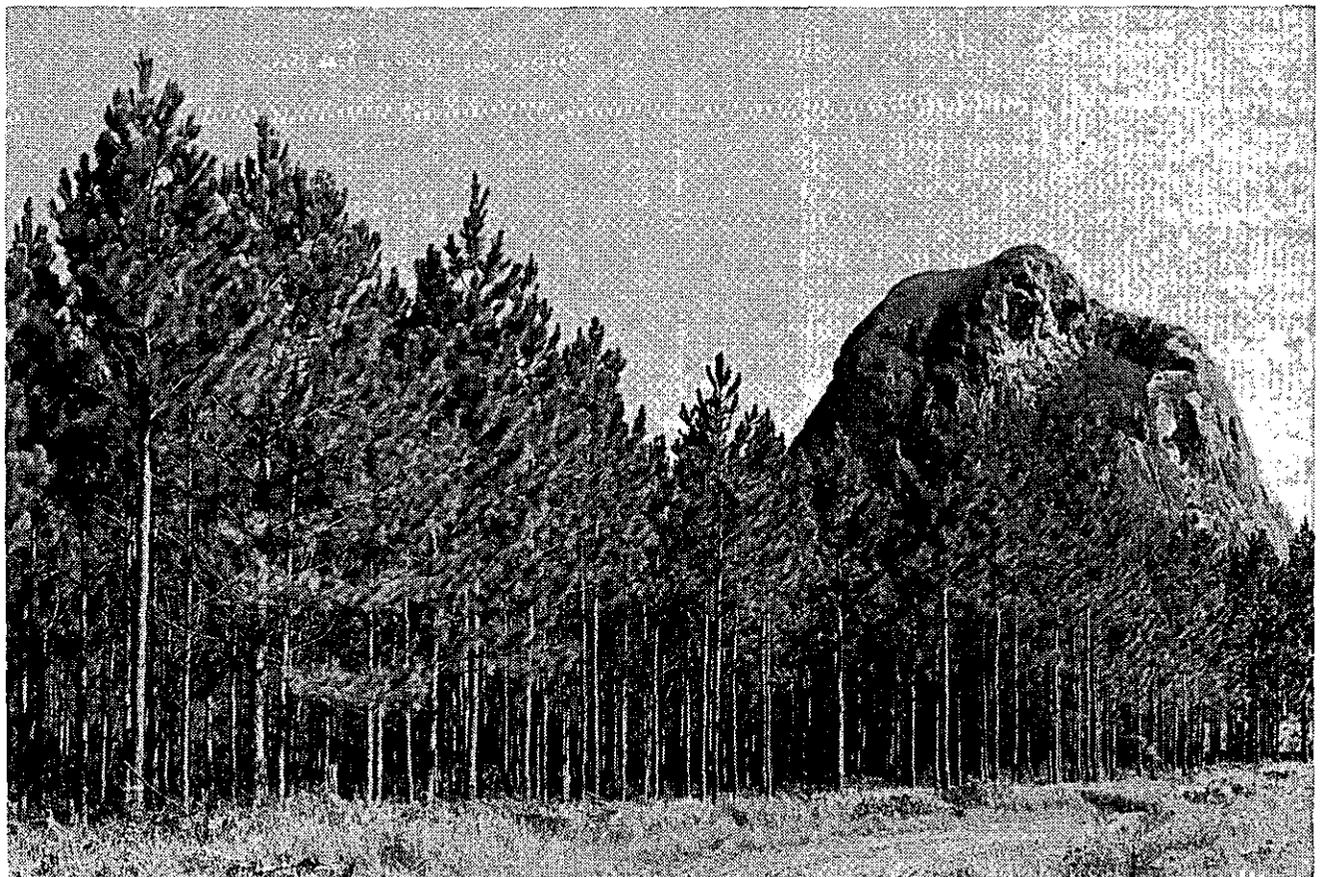
Slash Pine. Age 30-31 years. 215 Stems per Acre. Site Index 70
(Means of 2 replications)

Phosphate Broadcast in 1959 as P ₂ O ₅	Type of Phosphate	Stand 1965		Increment 1959-65		*Stand Value
		Basal Area	Merch. Vol.	Basal Area	Merch. Vol.	
Nil		sq. ft.	cu. ft.	sq. ft.	cu. ft.	\$
80 p.p.m.	Rock ..	117.0	3,092	23.4	970	355
80 p.p.m.	Super ..	120.8	3,350	28.0	1,168	384
80 p.p.m.	Super ..	118.8	3,354	30.0	1,287	388
160 p.p.m.	Rock ..	125.0	3,552	32.0	1,380	414

* Stand value in 1965 discounted to 1959.

The study of dry matter production in young stands has been extended to determination of nitrogen immobilisation. Loblolly Pine aged 5 years and planted at 5 ft. x 5 ft. immobilised 240 pounds of nitrogen per acre in the biomass. Eighty-six per cent. of this was in the trees. Comparison of the total nitrogen content of the plant-soil system with that of unplanted areas indicated that 57 pounds of nitrogen per acre per annum had been fixed in association with the pines. The site of this fixation has yet to be established.

Hoop Pine established on a lateritic podsolic soil with nitrogen fertilisers at 100 pounds of nitrogen per acre per annum continues to grow satisfactorily. Predominant height at age 9 years is 31.9 feet and current increment 5.4 feet. This compares favourably with Hoop Pine on rain forest sites in the Mary Valley.



Slash Pine 14 years from planting with external firebreak in foreground and Mt. Tibrogargan in the background.—Beerburrum.

Decline in vigour of 16-year-old Patula Pine growing on red loams (total P₂ O₅ 470 p.p.m.) has been investigated by field sampling of soils and foliage for major nutrients. These studies showed that site index may be correlated with phosphorus and nitrogen levels in the foliage and with soil total nitrogen, exchangeable phosphorus and exchangeable magnesium. A glasshouse omission trial has demonstrated that an N x P interaction is operative in this soil and that phosphorus and potassium deficiencies are present, the former being acute under glasshouse conditions.

(iv) Coastal Hardwoods.—Research has been directed chiefly towards the establishment over a range of forest types of studies aiming at increased forest productivity.

(a) Spotted Gum Forests.—Logging and treatment studies based on classification of type of stem retained are being established. The study initiated in 1952 to gauge the effects on growth of annual prescribed burning continued. Glasshouse pot trials further confirmed the deterioration in soil fertility with annual burning. Permanent field sampling points have been established to follow any subsequent changes in nutrient levels with continuance of annual burning. During the initial five years of this experiment the growth in the burnt area was significantly greater than that in the unburnt control, but there was a subsequent decline in burnt area increments. After thirteen years the mean annual girth increments for the burnt and control areas are similar within each species—Spotted Gum (*Eucalyptus maculata*) 0.27 inches and 0.25 inches, Grey Ironbark (*Eucalyptus drepanophylla*) 0.45 inches and 0.41 inches, White Mahogany (*Eucalyptus acmenoides*) 0.46 inches and 0.42 inches. Further studies of periodic prescribed burning, at greater intervals of time, are proposed.

(b) Wet Schlerophyll Forests.—Studies into the use of enrichment planting in conjunction with logging and treatment are being extended over a wide range of forest communities. The effectiveness of enrichment planting can be gauged from the early development figures (at 9½ years) for species established after logging in 1957 on a White Mahogany forest type at S.F. 393 Woondum.

Species	Mean g.b.h.		Mean Predominant Ht.
	In.	In.	Ft.
<i>Eucalyptus grandis</i> ..	20.4	35.9	78.7
<i>Eucalyptus pilularis</i> ..	18.9	38.8	74.7
<i>Eucalyptus cloeziana</i> ..	21.2	32.9	73.9

The chemical control of unwanted stems in the treatment of Blackbutt (*Eucalyptus pilularis*) forest has been further investigated following translocation of 10 per cent. 2,4,5-T ester formulation from treated to crop stems. Early results indicate that successful Blackbutt kill can be obtained with much lower hormone concentrations. Trials involving rates of application and strength of 2,4,5-T formulations and picloram over a wide range of species occurring in coastal hardwood forests are proposed.

Long term growth studies of regeneration and plantations of eucalypt species have been remeasured and treated, and maintained as necessary.

Dalby Regional Research Station

This research station now covers Cypress Pine (*Callitris columellaris*) and inland hardwoods in Warwick as well as Dalby districts, and rain forests of the MacPherson Range.

(i) Cypress Pine.—All thinning experiments were remeasured during the year. While these support the present routine prescription on good sites, they also point to the desirability of heavier thinning schedules for the lower site qualities. In particular, there are indications that on shallow soils in the Roma and Inglewood sub-districts the height at which a spacing of 20 feet x 20 feet is applied, should be decreased from 30 feet to 20 feet.

Thirty detailed yield plots at Milmerran were remeasured, and plot summaries brought up to date. These plots have been measured regularly for over 25 years, and could provide much valuable information for the sound management of Cypress Pine forests. Unfortunately, no comprehensive summary of the detailed yield plot results will be possible until more staff can be made available.

Chemical control of unwanted species continues to occupy an important place in the research programme. In initial trials picloram has given excellent kills of most species. Concentrations as low as 0.125 per cent. are effective in cut stump treatment of all but the most resistant species (e.g. *Eucalyptus dealbata*) provided that stump heights do not exceed 6 inches. However, the same concentration is effective

on complete frills at heights of up to 18 inches above ground level. Stem injections of 4 ccs. of 0.5 per cent. picloram 3 inches apart at the base of the tree have proved effective against all species except Spotted Gum, which is also surprisingly resistant to 2,4,5-T stem injections. Seasonal trials with 2,4,5-T stem injections over the past three years indicate May to October as the optimum period for good kills in this district. While picloram has given excellent kills of most species at low concentrations, there is still no clear evidence that its use at economically equivalent rates would provide a significant improvement in kill over that achieved by the present routine application of 1 per cent. 2,4,5-T amine to low stumps and frills. However, large scale trials are proposed to elucidate the relative economics of picloram and 2,4,5-T in silvicultural treatment of Cypress Pine areas.

Work has been initiated on the introduction of species suitable for plantation establishment on non-productive family pine (*Callitris preissii* ssp. *verrucosa* X *C. columellaris*) sites, and on fire-killed Cypress Pine areas. A 30-acre trial plantation was established at S.F. 150 Wilkie, on a good Cypress Pine site devastated by fire in December 1964. The most promising species after one year are Radiata Pine, Slash Pine, Loblolly Pine and Cypress Pine, all with excellent growth and survival. The success of Slash Pine and Radiata Pine on family pine sites is illustrated by the following data from a 10-year-old private plantation near Glenarban.

Species	Stems	G.B.H.	Pre. Ht.	Per Acre	
				B.A.	Merch. Vol.
	Acre	In.	Ft.	Sq. ft.	Cu. ft.
Slash Pine ..	590	15.83	31.7	81.8	202.8
Radiata Pine ..	609	15.35	43.9	79.7	236.3

(ii) Rain Forests.—All enrichment planting trials in the rain forests along the MacPherson Range were remeasured, and detailed analysis of the results is proceeding. Hoop Pine, Kauri Pine (*Agathis robusta*), Radiata Pine and Patula Pine show the most consistent survival and growth over a wide range of sites, while Queensland Maple is more variable. Other species tried have not been satisfactory. Experiments in the use of arboricides for overwood removal were initiated, involving 2,4,5-T, picloram and mixtures of both, applied in complete frills or as stem injections.

Trial plots of a number of conifers were established during late 1965, and experiments aimed at controlling post-fire weeds were also included. Initial results suggest that the most effective herbicides for this purpose are picloram, picloram/2,4-D mixtures and paraquat; unfortunately the toxicity of picloram to planted stock, particularly Hoop Pine may restrict its usefulness as an over-all post-planting foliage spray.

Imbil and Yarraman Research Stations

These two stations are concerned mainly with research connected with the establishment and maintenance of plantations of Hoop Pine and other species on rain forest sites in south-eastern Queensland. Imbil, with a rainfall of about 45 inches annually, is located in one of the wetter localities in which Hoop Pine planting is being undertaken. Yarraman with a rainfall of about 30 inches annually represents the drier sites on which Hoop Pine plantations are being established.

(j) Plantation Silviculture.—Most of the seed testing required by the Department is carried out at one of these stations and duplicated at the other. An experiment was conducted at both centres, using Hoop Pine seed to compare the seed sampling techniques, the germinator efficiency and the effectiveness of the application of fungicides to the seed. No significant differences were found between the two seed testing centres. Captan and organic mercurial fungicides were compared in Hoop Pine seed testing. The organic mercurials were shown to be superior to captan for this purpose. As the liquid form is more convenient to handle than the dust, it has been adopted as the standard fungicide in Hoop Pine seed tests.

Hoop Pine seedlings raised in pots were sprayed with 2,4-D amine at concentrations ranging from 0.05 per cent. to 0.2 per cent. active ingredient or with white spirit. The first application was one month after sowing and subsequent applications were at fortnightly intervals. The damage done shows that these weedicides have no place as a post-emergent spray in Hoop Pine nurseries.

Extensive trials were carried out testing the value in weed control of 2,4-D amine and 2,4,5-T amine applied with a mister as a preplant spray to newly germinated weeds. It was found that one lb. of 2,4-D in two gallons of water

per acre gave good control of inkweed (*Phytolacca octandra*), wild tobacco (*Solanum auriculatum*), peach (*Trema aspera*), lantana (*Lantana camara*), cotton bush (*Asclepias* spp.), night shade vine (*Solanum* sp.) fat hen (*Chenopodium carinatum*) and bell bush (*Codonocarpus australis*). Cape gooseberry (*Physalis peruviana*), wild gooseberry (*Physalis minima*), blackberry (*Rubus fruticosus*), wattle (*Acacia* spp.), devil's fig (*Solanum torvum*), thickhead (*Crassocephalum crepidoides*) and paddymelon (*Bryonia laciniata*) were largely resistant to 2,4-D. The effectiveness of 2,4-D declined with an application rate below three-quarters of a pint per acre. Preplant spraying with 2,4-D cut tending costs by one-third in the first six months of the life of the plantation. It was found that 2,4,5-T was generally less effective than 2,4-D as a pre-plant spray. However, applied at one and one-quarter lb. per acre active ingredient, it gave reasonably good control of cape gooseberry, wild gooseberry, blackberry and paddymelon which are resistant to 2,4-D. It is proposed to use mixtures of 2,4-D and 2,4,5-T in further trials during the coming year. Trials using 2,4-D and 2,4,5-T as post-planting mists were also carried out. The results were promising, particularly the indication that little harm will be done to the Hoop Pine plants by mists at the concentrations used.

The growth habits of lantana, a major pest in Hoop Pine plantations in the Mary Valley have been under investigation at Imbil since 1962. Germination of seedlings is prolific during the first two years after thinning a Hoop plantation, particularly during the wet season. Under the Hoop canopy the mean age of flowering is 27 months, with a very occasional plant flowering at age 14 months. Flowering occurs in autumn-winter and again in spring-summer, but in the former season the fruits are usually aborted. The study has shown that annual tending is desirable for the first two years after thinning. Tending under the Hoop canopy may be more widely spaced thereafter until the next thinning takes place.

Tests have shown that high pruning to 34 feet can be done more cheaply from a Swedish ladder, composed of two 10-ft. lengths and one 7-ft. length, than with the Morris high pruning equipment. High pruning to include the whorl at 34 feet results in a clear bole length 14 feet longer than obtained under current prescriptions. The mean maximum knotty core diameter will be 7 inches if pruning is lifted to 26 feet, two years after pruning to 21 feet on the current pruning schedule, and to 34 feet two years later. The mean maximum knotty core diameter will be 7.5 inches if the lift from 21 feet to 34 feet is carried out as one operation four years after the completion of pruning to 21 feet.

(ii) Tree Breeding.—The tree improvement programme in Hoop Pine was expanded considerably during the year. The staff was increased by the appointment of a tree-breeding overseer at Yarraman. The search for seed trees and plus trees in plantations over fifteen years old has been completed in the Imbil, Gympie and Kalpowar sub-districts and is well advanced in the Yarraman and Benarkin sub-districts.

The performance of 14 seed sources from South-eastern Queensland and one from New Guinea has been closely examined in six major trials at Imbil and Yarraman in which the stock ranges from 12 to 32 years old. The Jimna and Kalpowar seed sources have exhibited the greatest vigour and have produced about 25 per cent. more volume than the Gympie, Kilkivan and Mary Valley sources, which were the slowest growing of the indigenous seed sources. The straightest provenances were Jimna and Warwick. The New Guinea seed source was inferior to the Queensland seed sources in both straightness and height growth. Two major ecotypes, New Guinea and Southern Queensland, can be easily distinguished. The latter appears to consist of about six sub-ecotypes.

The period from December to February has commonly been held to be the normal flowering period for Hoop Pine. However, recent investigations have shown that a large number of trees flower in the period from April to June.

It is proposed to include 125 ramets of each of ten early flowering, and ten late flowering, clones in the Imbil seed orchard. The clones will be randomly located throughout, with two late flowering clones alternating with two early flowering clones within each row. The field grafting of 12 of the clones, eight early flowering and four late flowering, was commenced in November and will be completed in the spring of 1966. Of 920 grafts performed, only 40 per cent. were successful. The poor results are attributed to the high humidities prevailing and the unsatisfactory scion material.

The incidence of grafting failure, some three to four years after grafting as a result of incompatibility between stock and scion, has been carefully studied. It appears that, with the current techniques, losses can be anticipated in all clones but this loss is unlikely to exceed 45 per cent. Pruning of root stocks has speeded up the failure rate.

A strike of 67 per cent. was obtained using cuttings of six-year-old leading shoots.

A new technique for forecasting the probable viability of seed crops, up to 18 months prior to collection, is being investigated. The method involves the examination of pollen tube development in immature female stroboli.

General

There has been no response to the application of copper, zinc molybdenum, boron, manganese or magnesium to Caribbean Pine plantations at Tuan. There was some response to the application of potassium.

Volume tablets were prepared for a number of North Queensland rain forest species and grouped to provide two tables for forest inventory survey use. A detailed comparison of the various species has still to be done to decide on possible grouping for research use. No other completely new tables were prepared, but existing ones were extended as required.

The current Hoop Pine site index table, prepared graphically in 1954, was examined in relation to predominant height data from a number of Imbil experiments. There are indications that the table over estimates site index in younger stands, resulting in an apparent fall in site index with increasing age, and a complete revision is proposed.

The resignation of the Biometrician in January 1966, has resulted in only a limited biometrical service being provided at present. However, an officer of the Department is undertaking further studies in this field, and the position should improve greatly when his training is complete.

Data processing services were provided for Silviculture, Forest Products Research and Mechanical Equipment Branches as well as Forest Research Branch using the Treasury computer for the most part, but with some work still being processed at the University of Queensland. A programme for carrying out all the calculations normally required in plantation experiment remeasurement, which has been in limited use for special purposes for some time, has been expanded and made available for general use in those cases where the heights of all trees in an experiment are measured—approximately one-fifth of the overall annual remeasurement.

NATIONAL PARKS

The expanding interest in Australian wildlife and National Parks at both the popular and the scientific level, makes the study of Queensland's National Parks and the dissemination of information about them, a matter of some importance, while the accelerating development of Queensland's agricultural, pastoral and mineral potential with resultant loss of wildlife habitat and of natural areas suitable for National Park reservation makes urgent the necessity to evaluate the adequacy of the National Park system and to endeavour to fill in the more serious gaps in its coverage.

It is the aim of the Department of Forestry to preserve within the National Park system as complete a range as possible of the major natural environments which occur in Queensland, and new parks are being sought with this in mind. The broad vegetational pattern of Queensland is fairly well known, and selection of new areas for reservation is made within this framework and must of necessity be based on fairly general and easily discernible features such as topography, altitude, local climate, geographical location, and the types of vegetation present. The potential value for public recreation, depending largely on scenery, access, location, &c., is more easily assessed.

While it is hoped that by preserving the major vegetational types a reasonable cover of the native fauna will be obtained, this is by no means certain. The study of animals, and particularly our rather shy native mammals, involves peculiar difficulties, and entails extensive field work. So far, very little of this has been done in Queensland.

For this reason the Department has now appointed a Zoologist, a graduate of the University of Queensland, to study the fauna of the parks. The information gained will be used in producing literature concerning the flora and fauna of the National Parks which will not only be of interest to the park visitor but which will add to the body of scientific knowledge of our wildlife. It is proposed to obtain photographic records of as many animals as possible and also to record their calls on tape. The latter is of obvious interest and importance with animals such as the birds and frogs where identification can be made by their calls alone.

The fauna survey work has commenced on Lamington—one of our best known National Parks, and already it is showing some interesting results. Two species of mammals have been found for which the distribution shown in current

scientific literature does not extend to Lamington or even near it. These are a dormouse possum, a tiny animal only about four inches long (excluding its tail), and the potoroo, a small relative of the kangaroos and wallabies.

While initially the main results of these surveys will be to provide data on the species composition of the fauna of a particular park, eventually a body of knowledge will be built up on animal habitats and distribution patterns which will enable the selection of future reserves to be made on a more scientific basis.

The scientific value of having areas of undisturbed natural habitat is considerable, and the worth of our National Parks in this respect is well recognised. For example, during the last year visits to Lamington National Park were made by the Departments of Botany, Zoology and Geography in the University of Queensland. At the same time the University and other scientific organisations are always willing to advise and assist the National Park administration. Frequent calls are made on the services of the Government Botanist, the Queensland Museum and University scientists, while during the last year a very valued contribution made by the Rain Forest Ecology Section of C.S.I.R.O., is of particular note.

Many of the more attractive islands off the coast of Queensland, and particularly those within the waters of the Great Barrier Reef have been preserved as National Parks. The development and expansion of the island tourist industry is thus of direct concern to the National Parks administration, and the National Parks Biologist was nominated to represent this Department on the Inter-Departmental Committee set up to investigate various aspects of tourist island development.

During the year an inspection was made of an area in central Queensland which is inhabited by wombats. It was thought that it might be desirable to set aside an area as a National Park to preserve the wombat habitat. However the present owner of the property does not desire this action, and as he and his family are keenly aware of the scientific interest of these animals and are determined to protect them, no further action has been taken at this stage.

Whilst several National Park proposals are in varying stages of investigation, no new National Parks were proclaimed during the year. Actions in these cases must necessarily be slow, firstly because the permanent nature of these reservations makes it essential for the Department to very thoroughly investigate each proposal and secondly as laid down in the Act, other Departments concerned with land usage or who may have an interest in the land must be consulted.

There were some minor additions and some recomputations resulting in a nett gain of 2,918 acres.

As at 30th June, 1966, reservations were—

National Parks—
75 covering 1,010,899 acres.

Scenic Areas—
172 covering 38,002 acres.

Total—
247 Reserves covering 1,048,901 acres.

Expenditure on National Parks and Scenic Areas in the year 1965-66 totalled \$141,935.

Track System

During the year 310 chains of new tracks were constructed bringing the total length of the track system as at 30th June, 1966, to 265 miles 26 chains.

Some Features of the Year's Work

Apart from the major task of maintaining and expanding the walking track system within the Parks, some details of the year's activities are as follows:—

Lamington.—A new feature shelter shed was erected at O'Reilly's, fulfilling a long felt need.

Carnarvon.—Laundry and showering facilities were provided on the camping area and numerous direction signs erected.

Queen Mary's Falls—Killarney.—New composite toilets provided.

Noosa Heads.—A railed lookout at the "Boiling Pot" was provided.

Numinbah, Natural Bridge.—Commencement was made on the construction of a new foot bridge above the Arch.

Montville.—A notable achievement here was the construction of a new access road to the boundary of the Park and provision of a parking area for up to 80 cars.

Wyberba.—Portion 138, parish of Tenterfield was purchased for National Park purposes. The acquisition of this portion will permit of the provision of camping and picnic facilities for visitors who throng to this area during the wildflower season.

Eungella.—At Broken River picnic ground an electric circuit was connected to the automatic pressure pump and water is now available at several points on the picnic ground. A new toilet block is almost complete and water will be connected to the septic units here.

Finch Hatton Gorge.—About 4 miles of track constructed at this very picturesque area some years ago were reopened. Road access to the gorge however still remains poor.

Seaforth Island.—A short length track was put in and barbecue and picnic tables provided.

Long Island.—Three new lookouts were cleared on Sandy Bay track, providing excellent views across Long Island Sound and the Whitsunday Passage.

Conway.—A barbecue was erected at the picnic ground on Langford Creek, adjacent to the Shute Harbour road, which is proving very popular with visitors.

Bluff Heads.—Construction of 75 chains of track provides many fine views of the coast and nearby islands.

Mossman River Gorge.—Toilet block provided.

Wallaman Falls.—Commencement was made on the survey of an access road to serve this area. Locations of lookout areas, picnic areas and toilet facilities have also been selected.

Millstream Falls.—Attention was given to the widening and straightening of the access road. Further signs were also erected.

Palmerston.—Toilet block provided at Henrietta Creek.

Dunk Island.—Approximately 1 mile of track was constructed from Coconut Bay to Palm Valley. This is a most attractive walk which terminates in an extensive grove of Fan palms.

Hinchinbrook Island.—New conveniences completed at "The Haven". This has become a popular landing place for boating parties.

Magnetic Island.—A further 23 chains of track constructed on the Horseshoe Bay-Radical Bay track.

Jourama Falls.—The first section of access road from the Shire Road to the National Park boundary was constructed. Distance 35 chains.

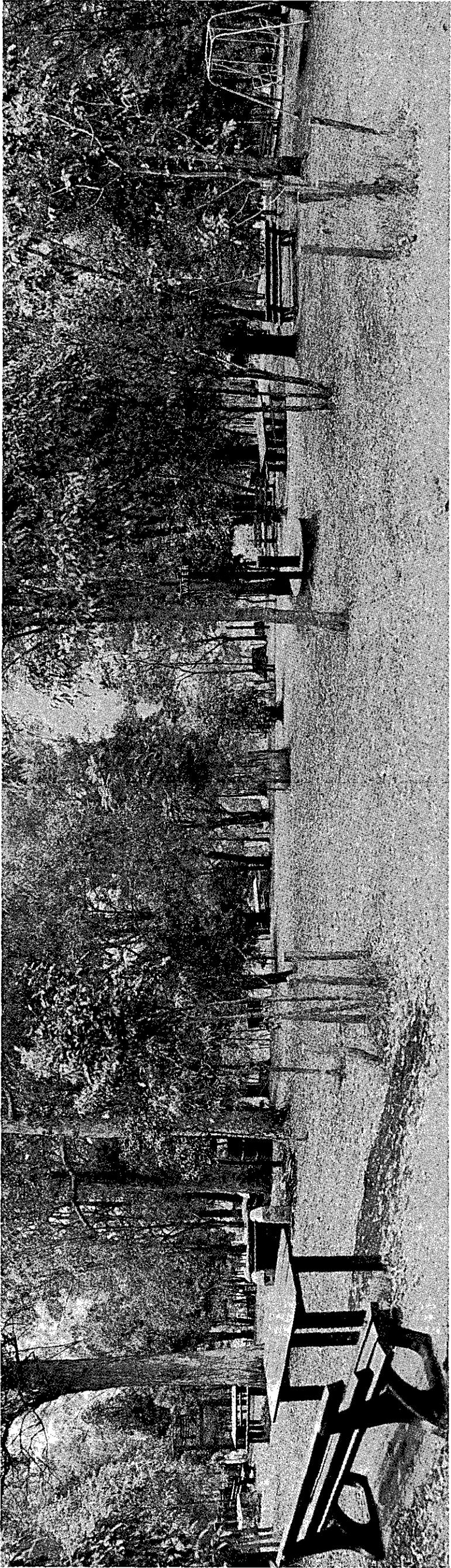
Mt. Spec.—New conveniences at "the loop" have been constructed. Water was connected to the newly established picnic area. A fireplace and three table/seat units were provided.

Lake Barrine.—A polished information sign, set in a stone frame, was constructed on the main parking area and a "Twin Kauri" information sign provided.

Lake Eacham.—Kiosk and other improvements painted. Extension to shelter shed carried out. A new diving board and protective fence also constructed.

Number of Visitors

Accurate figures are not available as to the number of visitors to all National Parks during the year, but it is known that the general public is showing an ever increasing interest in National Parks. A record number of over 650,000 visitors was recorded to the South Queensland Parks alone. The total recorded throughout Queensland is approximately the one million mark and this is a conservative estimate. The actual figure could be much higher.



PICNIC AREA, RAVENSBOURNE NATIONAL PARK
(Waterpoint established, fireplaces, table, and chairs)

Visitors' Appreciation

Throughout the year a number of complimentary remarks were made by visitors on the administration of Queensland National Parks and the following is one such letter addressed to this Department by a recent interstate visitor on his return home:—

7 Hugo Street,
Beaumaris, Victoria.
18 August, 1966.

Secretary,

Dear Sir,

It has been my good fortune to spend a couple of months in Queensland, a lot of the time being devoted to walking in your National Parks.

Generally the conditions of the tracks and notice boards is a credit to the State. This particularly applies to the Lamington National Park, where the extent of the carefully maintained track system is unique in my long experience of walking.

I am sure that the existence of these tracks would result in many people in the best possible way learning to appreciate and understand something of our unique flora and fauna.

Keep up the good work!

Yours sincerely,
Alan G. Shell.

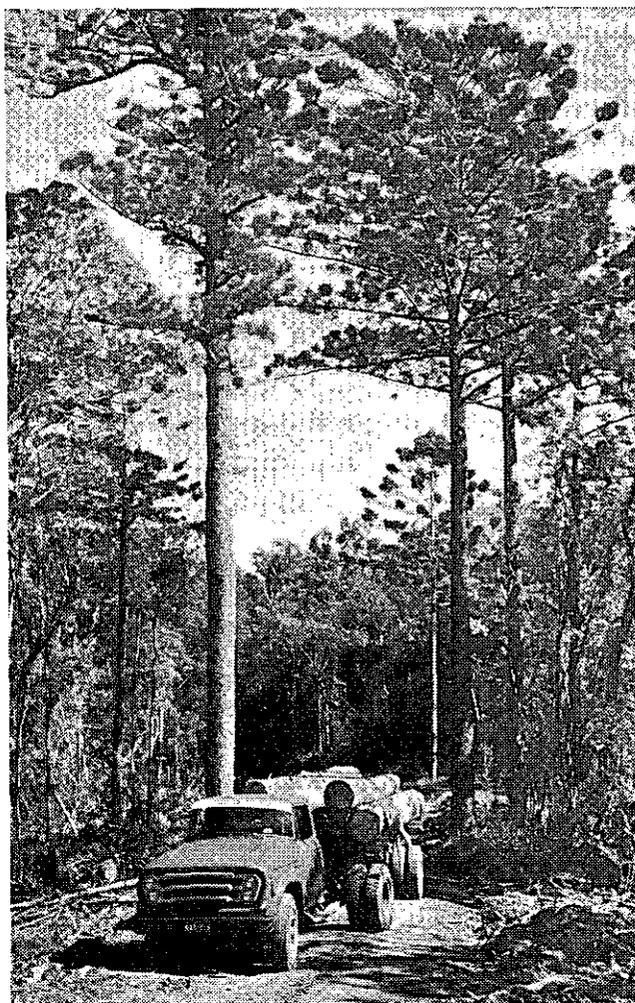
HARVESTING AND MARKETING

General

The volume of milling timber (including pulpwood) cut from Crown land during the year under review was 240,621,000 superficial feet. This cut has been exceeded once only, in the peak year of 1953-54. The increase in demand for log timber was general with the notable exception of Cypress Pine, the cut of which was appreciably less than for the previous year.

The increase in receipts for the year is not wholly related to increased operation of timber and forest products as a substantial "lump sum" payment by the Commonwealth Government is included, which covers the value of timber on land acquired from the State on behalf of the Department of the Army.

An increase in the cut of plantation timber for both milling and pulpwood is recorded, and tenders were invited, closing 30th June, 1966, for the purchase (for utilisation) of pulpwood from plantations in South-east Queensland at the rate of 44,600,000 superficial feet per annum. Tenders received are at present under consideration.



Logging of Natural Hoop Pine—Miriamvale Area. Only remnants of the native stands now exist.

Mill Logs Cut—Crown and Private Lands

This table shows logs cut by all mills in the State, annually, for the periods indicated.

Year	Queensland Grown									Imported	Total
	Hoop and Bunya Pine	Kauri Pine	Plantation Thinnings	Pulpwood	Hardwood	Cabinet Woods	Miscellaneous	Cypress Pine			
(1,000 superficial feet Hoppus)											
1960-61	35,027	2,223	25,959	..	252,482	27,389	48,558	50,473	17,091	459,202	
1961-62	25,822	2,124	26,632	..	215,450	20,914	39,791	45,275	12,612	388,620	
1962-63	28,277	2,114	31,443	..	212,014	21,404	38,937	50,044	12,833	397,066	
1963-64	29,597	1,685	32,860	416	230,424	20,306	42,772	53,328	12,478	423,866	
1964-65	27,059	2,058	37,761	3,637	219,397	22,646	43,862	55,447	12,088	*423,955	
1965-66 Estimated ..	28,000	2,000	40,000	4,000	222,000	23,000	46,000	48,000	12,000	*425,000	

* Includes Pulpwood.

Mill Logs—Crown Lands

The following are the annual quantities of Mill Logs obtained from Crown lands as from 1956-57:—

Super. feet (hoppus)				Super. feet (hoppus)			
1956-57	221,000,000	..	..	1961-62	187,000,000	..	..
1957-58	213,000,000	..	..	1962-63	194,000,000	..	..
1958-59	228,000,000	..	..	1963-64	212,000,000	..	..
1959-60	239,000,000	..	..	1964-65	229,000,000	..	..
1960-61	219,000,000	..	..	1965-66	241,000,000	..	..

A comparison of quantities of the various species of log timber cut from Crown Forests during the past five years is illustrated hereunder:—

Year	Hoop and Bunya Pine	Kauri Pine	Cypress Pine	Forest Hardwoods	Scrub Hardwoods	Cabinet Woods	Miscellaneous	Plantation Timbers	Pulpwood
(1,000 superficial feet Hoppus)									
1961-62	22,324	2,171	23,731	62,722	9,695	15,726	23,599	26,660	..
1962-63	24,393	2,253	26,037	60,479	9,029	17,302	23,108	31,116	..
1963-64	25,236	1,615	28,932	66,664	11,405	16,653	27,949	33,243	416
1964-65	21,195	1,913	31,944	66,381	14,050	19,697	33,106	37,757	3,637
1965-66	22,769	1,681	26,425	72,947	16,478	20,389	37,881	38,116	3,918

The Timber Business

(a) Mill Logs—	1964-65	1965-66
Hoop and Bunya Pine	21,195,000 super. feet	22,769,000 super. feet
Forest Hardwoods	66,381,000 super. feet	72,947,000 super. feet
Scrub Hardwoods	14,050,000 super. feet	16,478,000 super. feet
Cypress Pine	31,944,000 super. feet	26,425,000 super. feet
Kauri Pine	1,913,000 super. feet	1,681,000 super. feet
Cabinet Woods	19,675,000 super. feet	20,389,000 super. feet
Miscellaneous Species	33,106,000 super. feet	37,881,000 super. feet
Plantation Timbers	37,757,000 super. feet	38,116,000 super. feet
Pulpwood	3,637,000 super. feet	3,918,000 super. feet
Limb Logs, Head Logs, Stumps and Flitches ..	22,000 super. feet	18,000 super. feet
	229,680,000 super. feet	240,622,000 super. feet
(b) Construction Timbers—		
Headstocks, Transoms, Crossings, Braces, &c.	112,081 super. feet	155,104 super. feet
Sleepers	852,664 pieces	608,850 pieces
Girders, Corbels, Piles, Sills, and Girder Logs ..	{ 62,378 lineal feet 128,338 super. feet	{ 59,024 lineal feet 150,390 super. feet
Poles	317,871 lineal feet	293,228 lineal feet
House Blocks	38,878 lineal feet	11,389 lineal feet
Mining Timbers	519,742 lineal feet	570,408 lineal feet
	\$3,744,909.96	\$4,344,960.20
Gross receipts from Timber Sales, &c. .. .		
Nett Revenue	\$1,930,103.08	\$2,458,988.92

Rosewood

No Rosewood and/or Sandalwood was exported during the year.

Twenty-two tons 13 cwt. of Rosewood was purchased during the year and is awaiting shipment to Hong Kong.

Timber Felling and Timber Getting Award—State

During the twelve months under review the basic wage rate under the above Award varied as follows:—

On 20th September, 1965	£17 to £17 5s.
On 14th February, 1966	£17 5s. to \$34.50
On 2nd May, 1966 ..	\$34.50 to \$35.12 (Marginal increase)
On 23rd May, 1966 ..	\$35.12 to \$36.42

Logging

During 1965-66 the following quantities were hauled by, and payments made to contractors to the Department:—

Class	Quantity	Expenditure
South Queensland—		
Hoop and Bunya Pine	Super. feet 15,093,065	\$
Forest Hardwoods	19,204	
Scrubwoods	52,356	
Miscellaneous	51,956	
Cedar	6,251	
	15,222,832	339,372.96
North Queensland—		
Cabinet Woods	1,580,995	39,726.56
Forest Hardwoods	47,177	1,566.81
	1,628,172	41,293.37
Totals	16,851,004	\$380,666.33

Constructional Timbers—Departmental Contracts

A comparison of supply of constructional timbers from Crown Lands with the two previous years is given hereunder:—

Class of Timber	1963-64	1964-65	1965-66
Sleepers	526,159 pieces	338,831 pieces	311,538 pieces
Crossings	117,793 super. feet	14,268 super. feet	3,026 super. feet
Transoms	77,230 super. feet	12,159 super. feet	3,302 super. feet
Bridge Timber (Round)	11,714 lineal feet	13,724 lineal feet	21,298 lineal feet
Bridge Timber (Square)	1,512 super. feet	Nil super. feet	Nil super. feet

Hewn Timber Prices

No price change made during the year.

Logging Roads—1965-66

The Department's Road programme for the year constituted 55 miles of construction. Location and working surveys covering 63 miles were carried out.

Expenditure from Forestry Votes was as follows:—

	\$
New Construction	212,862
Maintenance	147,516
Subsidies to Shire Councils	45,428
Workers' Compensation	12,150
Pay Roll Tax	4,673
Surveys	5,383
Fares and Freights	2,005
Resumption for Access	3,379
	\$433,396

SAWMILLS LICENSING

Mills in active operation again decreased in numbers during the year, 554 operating during the first quarter, 539 during the second quarter and 511 during the third quarter. Figures for the final quarter are as yet incomplete but indications are that the figure here will approximate that shown for the third quarter.

The number of Licenses shown as relinquished in the undermentioned Schedule shows a marked increase on previous years but this results in the main from the withdrawal of licenses previously held by resaw and dressing plants which under "The Sawmills Licensing Amendment Act of 1965" are no longer required to be licensed. A decrease in the number of general licenses is also apparent and reflects the industry's problem of decreasing availability of log supplies.

The Sawmills Licensing Committee met regularly during the year and after consideration made submission to the Conservator of Forests on matters pertaining to Sawmills Licensing.

The following Schedule sets out the position with regard to Sawmills Licenses as at 30th June, 1966:—

Number of Licenses as at 30-6-65	Classification	New Licenses Issued	Changes in Classification		Licenses not Renewed			Current Licenses as at 30-6-66	Total Licenses as at 30-6-66
			Plus	Minus	Refused	Relinquished	Under Consideration		
578	General mills .. .. .	..	..	..	..	25	16	537	553
14	Case mills .. .. .	..	..	..	..	4	..	10	10
41	Sleeper mills	1	..	..	..	7	1	34	35
16	Other restrictions	3	..	..	..	8	..	11	11
67	Re-saw and dressing .. .. .	..	..	..	..	67	..	..	..
716		4	..	..	..	111	17	592	609

Offences

During the year ended 30th June, 1966, officers reported 82 breaches of the Acts and Regulations administered by the Department.

Proceedings were successfully instituted against 8 persons and fines totalling \$82.50 imposed.

In 20 cases of unauthorised timber operations, where it was considered the offence did not warrant proceedings, the value of the timber was collected and warnings issued. In some instances part of the costs of investigations was charged. Appropriate action was taken in other cases.

As a result of action taken in all cases an amount of \$6,198.42 was recovered by the Crown in timber revenue.

FOREST PRODUCTS RESEARCH

I. Engineering and Seasoning

Because of the non-replacement of the Sawmill Engineer, who has resigned, assistance given to Industry during the year has not been as extensive as in the past.

Some mills have expanded greatly their storage capacity for seasoning and more timber is being dried under cover for protection from the weather and to minimise degrade. Better care of timber delivered to building sites can also pay dividends.

Wood samples totalling 3,482 were checked for moisture content mostly for users, the majority of which were for the Housing Commission. Some 8 per cent. of these were outside the recommended range for use and this slight increase emphasises both the need for Industry to improve quality control and the advantages of protecting seasoned timber until placed in position.

II. Sawmill Economics and Data Processing

A series of mill studies on Cypress Pine, arranged through the Aus. T.I.S. State Committee, has been commenced, and three studies have already been completed. A further eight studies are proposed for the coming year, as well as two studies at Northern New South Wales mills, in co-operation with the New South Wales Forestry Commission.

Log prices for North Queensland species have been gazetted and log prices for Hoop Pine Plantation Thinnings are still under consideration.

Sawing studies were carried out at the Experimental Mill, Rocklea, with a view to ascertaining the sawing characteristics of plantation-grown *Pinus caribaea*. The material studied was—

- 91 stems from the Beerwah area, from both thinned and unthinned plots.
- 22 stems from North Queensland.

Analysis of experimental data is proceeding.

A total of 104,000 cards were punched during the year, of which 80 per cent. were for information computed for log pricing purposes. The balance comprised computer programmes and data required by other branches.

III. Utilisation

The Department's advisory services on the appropriate uses of timber were again in heavy demand and some 3,500 identifications of timber were made. This service is available to users of timber—engineers, architects, builders and the public in general.



FORESTRY RESIDENCE, BEERBURRUM, UNDER CONSTRUCTION.
Framing of unseasoned Slash Pine (*Pinus elliottii*) from Beerburrum plantations.
Ground plates and roof battens of Scribbly Gum (*E. Micrantha*).

The exhibit at the Royal National Show in 1965 showed the uses of plantation grown timbers particularly Slash Pine. Laminated components, columns and beams, were featured and it was demonstrated that this timber can be used for all sections of house construction. Attractive furniture can be made from this species which is particularly suited for turning and staining. The exhibit received very favourable comment from interstate visitors and all sections of industry.

In its own buildings the Department has used new techniques and one of the most interesting of these was the construction of a small bridge in the Numinbah National Park using pressure-treated exotic plantation timber.

As wood-using industry tends to move slowly from conventional design, it is considered that all Government Departments should co-operate with this Department to ensure that the varied uses of plantation timbers are widely demonstrated. These are the utility timbers of the future.

During the year industry has contributed much to show how timber can be economically used in the construction field. Among the most impressive demonstrations was the construction of a new plymill in Cairns in which laminated beams and trusses were used extensively also a roof of plywood.

An additional three plants have been installed for the manufacture of roof trusses and one firm has expanded into the field of laminated beams.

Cooling towers which, until quite recently were imported from America or southern States, are now being prefabricated by two firms using Queensland timbers.

These uses of timber assist the economic welfare of this State.

The two punch card index identification systems for North Queensland Rain Forest timbers and Queensland Eucalypts which have proved their use over a considerable number of years have been revised.

Co-operation has been maintained with the C.S.I.R.O., University, and other research workers and the supply of material included bark of Yellow Bean (*Podopetalum ormondii*) and gum of Kauri Pine for research work.

Although Standard Grading Rules for brushwoods and pines have not been completed, much progress has been made.

Increased interest has been shown in the work of The Standards Association of Australia. During the year the Queensland Timber Industry Committee was reformed and officers have attended meetings designed to produce a code for physical and chemical barriers against white ants.

Twenty-one complaints under "The Timber Users' Protection Acts" were received and investigated and eleven were settled between the parties concerned and the balance are still outstanding. In addition some 200 buildings have been inspected and where breaches of the Acts were in evidence, rectification work has been carried out.

IV. Wood Structure and Timber Physics

WOOD QUALITY ASSESSMENT AND INHERITANCE STUDIES

(a) Heritability of vigour and of 21 morphological characteristics is being determined using 11-year-old open-pollinated progenies of *Pinus elliottii* Engelm. var. *elliottii*. Selected data from the wood characteristics and the morphological characteristics of these stems will be used to determine what correlations exist between the various features.

(b) Assessment of wood quality of morphologically pre-selected Hoop Pine (*Araucaria cunninghamii*) trees was continued. To date 39 trees have been examined, 28 of which are considered to be acceptable, on the basis of wood quality, for inclusion in the seed orchard.

(c) Wood quality assessment has been carried out of 28 potential seed orchard candidates of *Pinus caribaea*. Only four of these were considered to be unacceptable. The trees examined showed a pith to bark trend of increasing basic density which is not always apparent in this species.

EFFECT OF SILVICULTURAL PRACTICES ON WOOD QUALITY

The purpose of this study was to determine the effect of thinning on the anatomical, physical and mechanical properties of the wood in Hoop Pine. Results to date indicate no apparent difference in basic density between stems from thinned and unthinned areas. However greater spiral gain was found to exist in stems from thinned areas than in those from unthinned areas. Work is proceeding on this experiment.

GENERAL

An invited paper on the Heritability of Fibre Characteristics and its Application to Wood Quality Improvement in Forest Trees was prepared and presented at a meeting of the Working Group on Wood Quality, International Union of Forest Research Organisations, in Melbourne in October 1965.

V. Wood Chemistry and Preservation

TIMBER PRESERVATION

The timber preservation industry has now become firmly established in Queensland and although additional plants are planned only two were completed during the year.

It is considered that the current capacity of vacuum pressure plants is adequate for the demand of treated timber. Two firms are proposing to use boron compounds in pressure plants.

This industry has over \$1,000,000 invested in plant using some 900 tons of chemical valued at \$300,000 per annum. Its treatments of 60 million superficial feet sawn per annum is assisting greatly to make better use of the State's timber resources.

During the year there have been problems in the use of P.C.P. treated wooden cases used for citrus fruits. After investigation in conjunction with other Departments it is considered that the main problem was associated with the fungicidal treatment of the fruit itself.

During the latter part of the year it became evident that quality control was not as good as it should be and this has caused the industry to take steps to improve the quality control of the preservative plants.

Pilot plant treatment, using creosote oil mixtures for engineering and railway purposes, has been initiated on a semi-commercial scale.

Research work has been carried out using a copper boron formulation as it would appear from pilot plant studies that this preservative could be more easily used in Queensland particularly for some species. Work is currently proceeding using aluminium and zinc formulations.

Studies have also been carried out with the object of developing a simple plant for vacuum impregnation which should be suited to small production units. From work to date it would appear that such a method is practicable.

During the year test pieces of timber for marine borer research for C.S.I.R.O. which have been immersed for ten years, in the Brisbane River, were examined and the copper chrome arsenate compounds have shown the best results for the preservation of timber against marine borers.

PLYWOOD, VENEER AND LAMINATION

The commercial application of sodium fluoride to veneers has presented problems and this preservative is being replaced by dieldrin.

No practical commercial answer has been found for gluing veneers treated with multiple salts and treatment of plywood has caused redrying problems.

There has been an increase in the production of large timber sizes by laminating small sections and this will greatly increase the adaptability of timber to building design.

CHEMICAL LABORATORY

During the year there were heavy demands on the laboratory and 2,881 spot tests and 2,733 chemical examinations were carried out. These checks were double those of the previous year.

VI. Education

Most spectacular advances this year have been made in the field of education.

For the correct use of timber it is essential that all sections of industry—manufacturers and users—understand the basic structure of wood and its qualities, and the types of differences that exist between species.

The Education Department commenced a Diploma Course in Wood Technology at the Eagle Farm Technical College and some 30 members of industry have enrolled.

The Department has supplied the majority of lecturers for this course and also lecturers for professional courses at the Queensland Institute of Technology.

Miscellaneous lectures and talks have been given to P.M.G. officers, Customs officers, Trade associations and service clubs and articles have been contributed to the Master Builders Journal.

Although quick results from the above work, cannot be expected there is no doubt that some advances are made in enlightening the general public of the adaptability and advantages of timber.

STAFF

As at 30th June, 1966, there were 434 salaried officers in the staff, comprising 181 in Head Office and 253 at District Centres. This represents an increase of 13 on the number as at 30th June, 1965. The number of wages staff employees was 1,693.

Thirty-eight salaried officers left the Department during the year and eight officers—Messrs. G. C. Gosschalk, G. E. Douglas, P. F. Bull, T. J. Watson, J. T. Watson, T. R. Cary, C. D. Moreland and A. D. Manthey—retired.

It is with deep regret that the deaths are recorded of Mr. J. J. J. McGhie, Records Clerk, Administration Branch, Brisbane, Mr. H. V. Allen, Forest Ranger, Division II, Maryborough, and Mr. J. H. Clarke, Forest Ranger, Division I, State Forest 20, Maryvale. The sympathy of all members of the Department is extended to the bereaved relatives.

ACKNOWLEDGEMENT

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

A. R. TRIST,
Conservator of Forests.

APPENDICES

APPENDIX A

Return of Timber, &c., removed from Crown Lands during the Year ended 30th June, 1966

SPECIES	QUANTITY	
	Super. feet	Super. feet
Milling Timber—		
(a) Native Forests—		
Hoop and Bunya Pine—		
Ply	3,536,534	
Logs	9,487,455	
Tops	9,745,450	
		22,769,439
Kauri Pine	1,681,364	
Cypress Pine	26,424,728	
Forest Hardwoods	72,947,249	
Scrub Hardwoods	16,478,439	
Cabinet Woods	20,389,340	
Miscellaneous Species	37,880,857	
Limb Logs, Head Logs, Stumps and Flitches	17,686	
		175,819,663
(b) Plantation—		
Hoop Pine	28,346,915	
Bunya Pine	47,574	
Kauri Pine	3,136,353	
Slash Pine (<i>Pinus elliotii</i>)	1,877,143	
Loblolly Pine (<i>Pinus taeda</i>)	1,963,048	
<i>Pinus patula</i>	2,025,118	
<i>Pinus radiata</i>	628,929	
Exotics (Miscellaneous)	17,568	
Rosegum	29,997	
Blackbutt	41,612	
Silky Oak	2,046	
		38,116,303
Pulp Wood—		
Slash	1,359,862	
Loblolly	2,420,172	
<i>Pinus palustris</i>	129,578	
Hoop Pine	8,318	
		3,917,930
		240,623,335
Other Classes—		
Sleepers Hewn	86,789 pieces	3,297,982
Sleepers Sawn—5 ft.	126,122 pieces	3,531,416
Sleepers Sawn—7 ft.	176,530 pieces	6,708,140
Sleeper Blocks (as sleepers contained)	219,409 pieces	7,898,724
Transoms, Crossings, Headstocks, Longitudinals	155,104 superficial feet	248,166
Girders, Corbels, Piles, Sills, Kerb Logs	59,024 lineal feet	1,062,432
Girder Logs	150,390 superficial feet	150,390
Poles	293,228 lineal feet	2,052,596
House Blocks	11,389 lineal feet	68,334
Fencing Material—Split	174,622 pieces	1,571,598
Fencing Material—Round	70,260 lineal feet	175,650
Mining Timber—Round	570,408 lineal feet	1,140,816
Mangrove Case Timber	9,649 superficial feet	9,649
		27,915,893

Other Classes—continued—

Fuel	24,453 tons
Trees and Plants (number)	288,429 plants
Sand, Gravel, Soil, Antbed, &c.	415,588 cubic yards
Freestone	2,542 cubic feet
Fibre, Bark, Dry Leaves, Reeds	29 bags
Duboisia	10,993 pounds
Flora	823 pieces
Peat	278 bags
Mulga Wood	50 tons
Poling Timber (Copper Refining)	3,578 tons
Charcoal	612 bags
Bee Hives	77 hives
Boat Knees	4 pieces
Lawyer Cane	1 ton

APPENDIX B

Total Receipts, Department of Forestry, for the Year ended 30th June, 1966

RECEIPTS FROM DISTRICTS	TOTALS
	\$
Group 1—South Queensland (Brisbane, Beerburum, Beerwah, Benarkin, Bundaberg, Fraser Island, Gallangowan, Gympie, Imbil, Jimna, Kalpowar, Maryborough, Monto, Murgon, Yarraman)	2,011,656.17
Group 2—North Queensland (Atherton, Cairns, Cooktown, Charters Towers, Herberton, Hughenden, Ingham, Innisfail, Port Douglas, Ravenswood, Townsville)	831,938.94
Group 3—Dalby, Roma, Taroom, Charleville, Mitchell, Quilpie	231,565.70
Group 4—Warwick, Goondiwindi, Inglewood, St. George, Stanthorpe, Cunnamulla	168,362.89
Group 5—Mackay, Rockhampton, Clermont, Bowen, Proserpine, Emerald, Springsure, Theodore	129,467.16
Group 6—Barcaldine, Blackall, Jundah, Longreach, Muttaborra, Stonehenge, Winton, Aramac, Isisford, Jericho	804.97
Group 7—Cloncurry, Boulia, Kynuna, Mackinlay, Richmond	259.48
Group 8—Burketown, Coen, Croydon, Georgetown, Normanton, Thursday Island	Nil
	\$3,374,055.31
OTHER RECEIPTS	
Forestry and Lumbering	348,852.41
Sale of Plants, Material, &c.	39,041.37
Licenses† (See note after Appendix C)	18,715.25
Rents	10,155.15
Grazing Dues	22,852.52
Miscellaneous, (Salisbury Area Timber Account, Forfeited Wages, Expenditure Recoveries, &c.)	494,212.07
Fancywoods	2,955.05
Sale of U.S. Tractors, Trucks &c.	34,121.07
	\$4,344,960.20
Plant Hire—	
Charged Loan Fund Projects	574,395.71
Trust Fund Projects	215,625.91
Revenue Fund Projects	2,165.85
	792,187.47
	\$5,137,147.67

APPENDIX C

Proceeds of Sales of Timber, &c., for the Period 1st July, 1962, to 30th June, 1966

Groups*	1962-63	1963-64	1964-65	1965-66
	\$	\$	\$	\$
Group 1	1,925,033.54	1,954,880.69	1,908,772.03	2,011,656.17
Group 2	835,593.26	772,136.51	817,934.78	831,938.94
Group 3	192,830.15	229,925.15	254,680.03	231,565.70
Group 4	122,406.89	151,421.80	132,461.89	168,362.89
Group 5	80,594.03	119,143.29	141,366.96	129,467.16
Group 6	1,921.58	1,518.33	2,131.89	804.97
Group 7	9,139.15	399.49	15.95	259.48
Group 8	475.00	..	..	..
	\$3,167,993.60	\$3,229,425.26	\$3,257,363.53	\$3,374,055.31
Receipts—Forestry and Lumbering	311,492.98	569,252.21	359,518.58	348,852.41
Sale of Plants, Material, &c.	22,674.30	17,884.71	24,777.14	39,041.37
Licenses†	6,633.10	6,986.45	7,587.45	18,715.25
Rents and Grazing Dues	22,350.85	23,995.64	26,809.12	33,007.67
Miscell. Salisbury Timber Account, forfeited wages, &c., Fancywoods	38,101.02	69,468.56	38,730.48	497,167.13
Sale of U.S. Tractors, Trucks, &c. .. .. .	..	..	30,123.66	34,121.07
	\$3,569,245.85	\$3,917,012.83	\$3,744,909.96	\$4,344,960.21

* For Districts within the groups, see Appendix B.

† Includes the following license fees:—Fuel, Quarry, Royalty, Brand, Sawmill, Apiary, Forest Products, Sales Permit.

APPENDIX E

Comparative Statement of Expenditure for Years 1964-65 and 1965-66

	1964-65	1965-66
	\$	\$
Revenue—		
Salaries	1,266,310	1,344,455
Travelling Expenses and Incidentals ..	75,998	100,980
Fares, Printing, Stores, &c.	9,994	9,744
Cash Equivalent of Long Service Leave	7,974	17,940
National Parks	65,682	61,999
Loan—		
Reforestation	3,752,000	3,980,947
Acquisition of Land for Forestry		
Purposes	31,452	33,315
Access Roads	302,490	235,594
Purchase of Plant	419,126	375,944
Purchase of Radio Equipment	13,908	29,974
National Parks	78,458	79,936
Trust—		
Hardwood Supplies to Railway		
Department and Others	332,428	324,454
Harvesting and Marketing Timber ..	1,151,158	1,211,759
Access Roads—Maintenance and		
Subsidies	171,284	197,802
Maintenance of Capital Improvements	108,852	115,978
Maintenance of Plant	504,508	559,945
Interest and Redemption on Loans ..	1,930,104	2,458,989
Total	\$ 10,221,726	11,139,755

APPENDIX D

Constructional Timbers Supplied During Financial Year 1965-66 under Forestry and Lumbering Operations

Class of Timber	Quantity	Sales Value
		\$
Hewn Crossings ..	2,651 super. feet ..	262.44
Sawn Crossings ..	375 super. feet ..	37.12
Sawn Transoms ..	1,980 super. feet ..	1,669.11
Sawn Transoms ..	1,322 super. feet ..	144.09
Piles	10,504 lineal feet ..	8,899.61
Girders—Dressed ..	10,794 lineal feet ..	23,144.80
Hewn Sleepers ..	86,789 pieces ..	117,422.41
Sawn Sleepers ..	5,340 pieces ..	7,151.72
Sleeper Blocks (as sleepers contained) ..	219,409 pieces ..	184,815.10
Split Posts and Rails, &c.	19,062 pieces ..	6,603.65
Total		\$350,150.05

APPENDIX F

Net Area of Plantation Established 1st April, 1965, to 31st March, 1966

Species	Brisbane	Gympie	Mackay	Maryborough	Monto	Murgon	North Queensland	Warwick	Yarraman	Totals
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
<i>Conifers</i>										
A. Native Conifers—										
Hoop Pine	63.6	441.4	31.1	40.0	245.2	581.7	109.3	3.7	1,031.2	2,547.2
Kauri Pine .. .. .	..	..	..	..	..	..	..	0.8	..	0.8
Total—Native Conifers	63.6	441.4	31.1	40.0	245.2	581.7	109.3	4.5	1,031.2	2,548.0
B. Exotic Conifers—										
<i>P. elliotii</i>	600.3	656.7	5.0	842.7	..	..	..	..	..	2,104.7
<i>P. taeda</i>	16.1	17.7	..	..	0.4	..	..	0.3	4.0	38.5
<i>P. patula</i>	0.8	..	..	..	..	..	..	1.0	125.4	127.2
<i>P. caribaea</i>	27.2	20.0	641.6	6.0	..	..	25.0	..	..	719.8
<i>P. radiata</i> .. .. .	..	..	..	..	..	..	..	100.1	43.0	143.1
<i>P. palustris</i>	0.4	..	..	..	..	..	..	..	..	0.4
Other Exotic Conifers	3.3	2.1	75.5	..	..	..	..	1.5	..	82.4
Total—Exotic Conifers	648.1	696.5	722.1	848.7	0.4	..	25.0	102.9	172.4	3,216.1
Total—Conifers	711.7	1,137.9	753.2	888.7	245.6	581.7	134.3	107.4	1,203.6	5,764.1
<i>Broadleaved Species</i>										
A. Native Forest Hardwoods—										
<i>Euc. grandis</i> (and <i>E. saligna</i>) ..	35.0	..	..	..	..	..	..	..	..	35.0
<i>Euc. microcorys</i>	5.0	..	..	..	..	..	..	..	..	5.0
Total—Native Forest Hardwoods	40.0	..	..	..	..	..	..	..	..	40.0
B. Other Broadleaved Species—										
Queensland Maple .. .. .	..	5.2	..	..	..	..	..	..	..	5.2
Total—Other Broadleaved Species .. .. .	..	5.2	..	..	..	..	..	..	..	5.2
Total—Broadleaved Species	40.0	5.2	..	..	..	..	..	..	..	45.2
Miscellaneous Experimental	0.7	..	..	..	..	..	..	..	..	0.7
Total—All Species	752.4	1,143.1	753.2	888.7	245.6	581.7	134.3	107.4	1,203.6	5,810.0

APPENDIX G

Net Area of Effective Plantation Classified into Forestry Districts to 31st March, 1966

Species	Brisbane	Gympie	Mackay	Maryborough	Monto	Murgon	North Queensland	Warwick	Yarraman	Totals
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
<i>Conifers</i>										
A. Native Conifers—										
Hoop Pine	848.7	18,116.8	33.1	250.4	3,916.0	11,067.7	1,361.1	3.7	21,370.6	56,968.1
Kauri Pine	5.3	1,369.1	2.5	69.7	3.6	4.9	277.3	0.8	7.4	1,740.6
Bunya Pine	0.9	448.8	..	0.8	1.2	64.8	0.2	..	49.8	566.5
Other Native Conifers	2.1	7.2	0.5	1.9	..	..	0.2	..	..	11.9
Total—Native Conifers	857.0	19,941.9	36.1	322.8	3,920.8	11,137.4	1,638.8	4.5	21,427.8	59,287.1
B. Exotic Conifers—										
<i>P. elliotii</i>	13,429.6	9,938.9	2,479.0	12,546.8	52.0	1.4	11.5	767.4	713.6	39,940.2
<i>P. taeda</i>	3,548.6	83.3	7.3	54.8	1.4	75.3	14.0	235.9	14.5	4,035.1
<i>P. patula</i>	19.8	37.7	8.1	8.2	22.7	173.4	35.0	459.9	3,497.1	4,261.9
<i>P. caribaea</i>	151.4	175.8	4,458.9	280.7	..	..	102.9	..	0.2	5,169.9
<i>P. radiata</i>	0.5	..	..	..	..	0.2	..	2,253.4	482.2	2,736.3
<i>P. palustris</i>	239.8	1.6	7.3	1.0	..	..	..	8.8	1.4	259.9
Other Exotic Conifers	42.8	25.2	161.8	17.3	8.7	0.6	7.7	29.1	38.7	331.9
Total—Exotic Conifers	17,432.5	10,262.5	7,122.4	12,908.8	84.8	250.9	171.1	3,754.5	4,747.7	56,735.2
Total—Conifers ..	18,289.5	30,204.4	7,158.5	13,231.6	4,005.6	11,388.3	1,809.9	3,759.0	26,175.5	116,022.3
<i>Broadleaved Species</i>										
A. Native Forest Hardwoods—										
<i>Euc. grandis</i> (and <i>E. saligna</i>)	259.3	1,273.6	0.1	0.2	..	26.8	1.1	..	168.2	1,729.3
<i>Euc. drepanophylla</i>	195.5	182.2	0.1	0.1	..	71.1	37.8	..	475.2	962.0
<i>Euc. microcorys</i>	100.4	18.9	..	0.7	..	..	28.2	..	10.5	158.7
<i>Euc. pilularis</i>	204.4	261.5	..	0.3	..	..	..	..	0.5	466.7
<i>Euc. cloeziana</i> .. ..	..	259.8	..	0.1	..	..	..	..	..	259.9
Others	12.0	84.8	..	0.9	..	..	9.2	..	3.0	109.9
Total—Native Forest Hardwoods ..	771.6	2,080.8	0.2	2.3	..	97.9	76.3	..	657.4	3,686.5
B. Other Broadleaved species—										
Silky Oak .. ..	..	93.4	..	0.4	..	25.0	31.1	..	645.9	795.8
Queensland Maple .. ..	..	66.8	..	..	0.6	..	238.6	..	..	306.0
Red Cedar .. ..	..	2.8	..	..	..	..	31.3	..	..	34.1
Others	0.1	76.8	0.3	0.4	0.2	..	34.1	..	1.1	113.0
Total—Other Broadleaved Species ..	0.1	239.8	0.3	0.8	0.8	25.0	335.1	..	647.0	1,248.9
Total — Broadleaved Species	771.7	2,320.6	0.5	3.1	0.8	122.9	411.4	..	1,304.4	4,935.4
Miscellaneous Experimental	56.1	51.3	21.4	..	..	0.1	10.4	12.6	56.0	207.9
Total—All Species ..	19,117.3	32,576.3	7,180.4	13,234.7	4,006.4	11,511.3	2,231.7	3,771.6	27,535.9	121,165.6

APPENDIX H
Areas of Natural Forest Treated
A.—EUCALYPTS

Sub-District	Treated 1965-66	First Treatment 1965-66	Total as at 30th June, 1966
	Acres	Acres	Acres
Brisbane	866	814	29,185
Beerburum	1,204	40	20,383
Gympie	324	324	20,089
Imbil .. ..	..	..	159
Mackay	3,138	3,138	8,642
Emerald .. ..	..	..	33,875
Maryborough.. ..	4,779	880	105,556
Bundaberg	1,794	1,062	36,303
Fraser Island	677	381	22,243
Monto	1,082	1,040	20,831
Murgon	4,578	4,256	38,087*
Atherton .. ..	..	..	3,689
Ingham .. ..	..	..	2,985
Warwick	322	..	10,462
Inglewood .. ..	..	..	15,697
Yarraman	8	..	6,414
Benarkin	16	16	2,067
Dalby	1,528	1,528	80,718
Total—Eucalypts	20,316	13,479	457,385

*Adjustment of +1,592.

APPENDIX H—continued

B.—CYPRESS PINE

Sub-District	Treated 1965-66	First Treatment 1965-66	Total as at 30th June, 1966
	Acres	Acres	Acres
Bundaberg .. ..	..	..	2,152
Fraser Island .. ..	..	..	4,424
Monto .. ..	..	..	2,496
Inglewood	3,296	1,598	93,226
Dalby	7,645	6,892	219,676
Total—Cypress Pine	10,941	8,490	321,974

APPENDIX H—continued

C.—RAIN FOREST

Sub-District	Subsequent Treatment 1965-66	First Treatment 1965-66				First Treatment Completed 1965-66	Total as at 30th June, 1966
		Brushed	Ringbarked and Thinned	Logged under Tree-marking Conditions	Trees Interplanted		
	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Natural Hoop Pine—							
Maryborough .. ..	..	..	..	..	..	..	65
Bundaberg .. ..	..	..	..	..	..	47	9,973
Total—Natural Hoop Pine	..	..	..	..	..	47	10,038
Natural Rain Forest—							
Atherton	55	212	203	8,755	28	143	5,929
Ingham	7	59	65	5,300	9	65	1,294
Warwick .. ..	..	..	..	..	..	..	21
Total—Natural Rain Forest	62	271	268	14,055	37	208	7,244
Total—Rain Forest.. ..	62	271	268	14,055	37	255	17,282

APPENDIX H—continued

Grand Total—		Acres
Eucalypts .. ..	.. .. .	457,385
Cypress Pine .. ..	.. .. .	321,974
Rain Forest .. ..	.. .. .	17,282
		<hr/>
		796,641

APPENDIX J

Reservations for the Year ended 30th June, 1966

1st July, 1965, to 30th June, 1966

STATE FORESTS			
	No.	A.	R. P.
At 1st July, 1965	368	6,202,597	2 0
Proclaimed 1-7-65 to 30-6-66 ..	9	276,331	1 0
Proclaimed Converted Timber Reserves	7	52,300	1 20
V.C.L. added to existing State Forests .. .. .	..	25,405	2 14
Timber Reserves amalgamated with State Forests .. .. .	..	2,750	0 0
Areas released	-1	-1,487	0 0
State Forests amalgamated with existing State Forests	-9	..	..
Recomputation of boundary .. .. .	..	-4,553	3 24
Total at 30th June, 1966 ..	374	6,553,343	3 10

TIMBER RESERVES

At 1st July, 1965	276	2,042,693	1 9.1
Proclaimed 1-7-65 to 30-6-66 ..	2	81	2 0
Areas released .. .. .	..	-1,100	1 6
Reserves cancelled	-1	-660	0 0
Reserves amalgamated with Timber Reserves	-2	..	..
Reserves converted to State Forests	-10	-54,985	1 20
V.C.L. added to existing Timber Reserves .. .. .	..	5,777	1 33
Recomputation of Boundary .. .. .	..	4,038	0 0
Total at 30th June, 1966 ..	265	1,995,844	2 16.1

APPENDIX J—continued

NATIONAL PARKS

	No.	A.	R. P.
At 1st July, 1965	75	1,008,021	2 8
V.C.L. added to existing National Parks .. .. .	..	431	2 4.5
Recomputation of boundary .. .. .	..	+2,484	1 31.4
Areas released .. .. .	..	-37	3 35.9
Total at 30th June, 1966 ..	75	1,010,899	2 8

SCENIC AREAS

At 1st July, 1965	172	37,961	1 25.6
V.C.L. added to existing Scenic Areas .. .. .	..	49	1 30
Recomputation of Boundary .. .. .	..	-8	3 34
Areas Released .. .. .	..	-0	0 16
Total at 30th June, 1966 ..	172	38,001	3 5.6

APPENDIX K

Distribution of Personnel, 30th June, 1966

Salaried officers	434
Other employees	1,693
Total	2,127