

1967

QUEENSLAND

**ANNUAL REPORT**

OF THE

**DEPARTMENT OF FORESTRY**

FOR THE

YEAR 1966-67

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**PRESENTED TO PARLIAMENT BY COMMAND**

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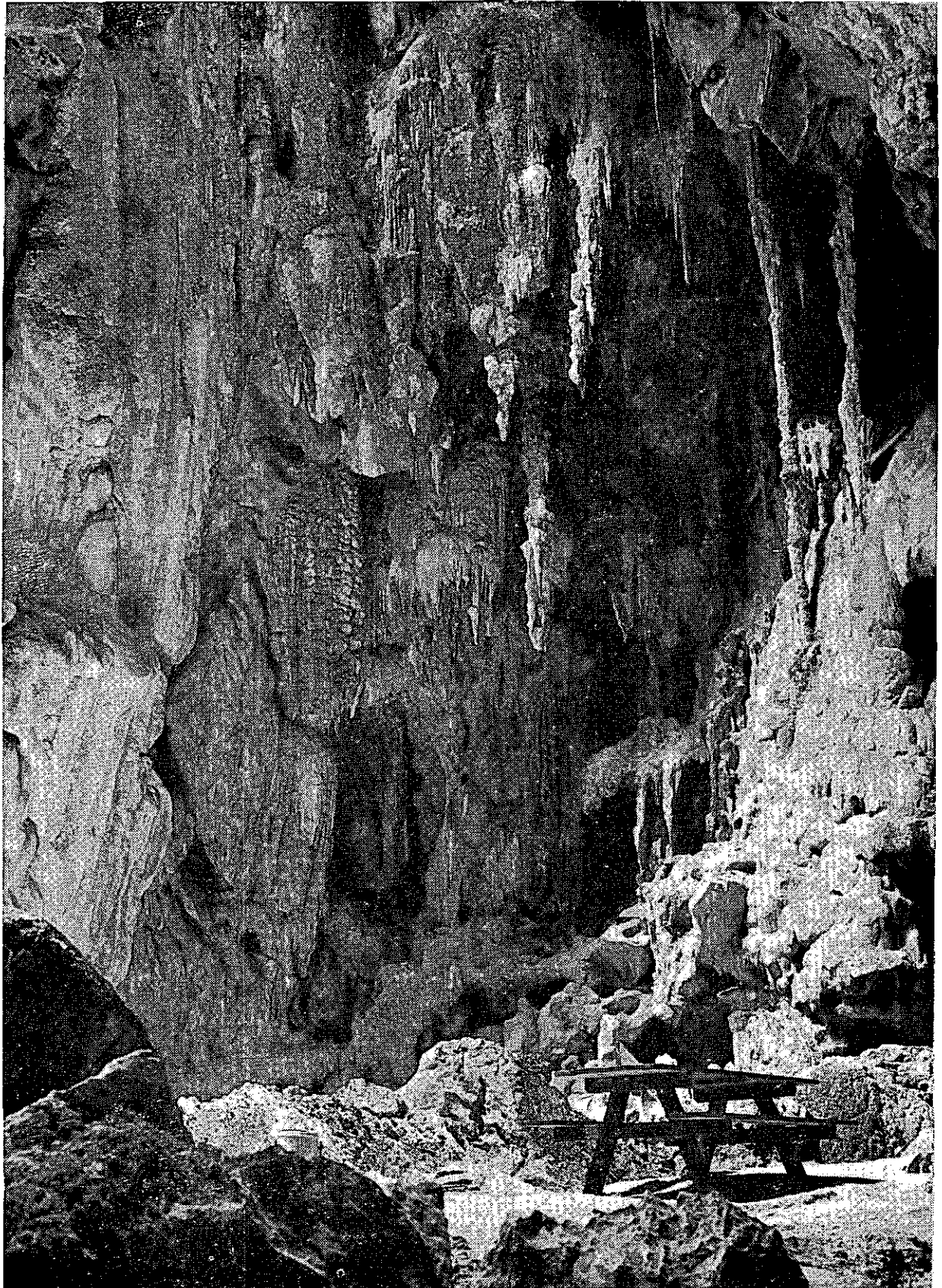
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A view of the main chamber at the entrance to the Royal Arch Caves, Chillagoe. These caves together with Donna, Markham, Ryan Imperial, Piano, Jubilee, Cathedral, Royal Archway, Geck and Spring comprise the Chillagoe Caves system.

The Department has provided improvements to facilitate viewing of these magnificent caves by tourists and guides are employed to conduct visitors through them.

# REPORT OF THE CONSERVATOR OF FORESTS

For the Year ended 30th June, 1967

## INTRODUCTION

The year 1966-67 will have historic significance in Queensland Forestry. It was during this year that the Commonwealth passed the enabling Act for subsidisation of increased softwood planting by the States. Furthermore the first actual advance (\$201,000) was made to Queensland as an offset against the cost of the expanded programme for softwood planting. For the first time in the history of forestry in Queensland, officers of the Department can feel optimistic about the prospects of achieving the objective of growing, within Queensland, the bulk of the States requirements in forest products. In view of the National importance of forestry, it is appropriate that this action has resulted from the deliberations of the Australian Forestry Council, following careful consideration by that Council of the National needs.

The likelihood that funds would be available for increased softwood planting has had the effect of increasing the rate of planting in Queensland during the last two years. In order to achieve these increases, work on the natural forest areas had to be curtailed to provide the necessary funds. This was regarded as a temporary measure justified by the gain to the State that will result from the production of increased areas of plantation becoming available at an earlier date, and thus permitting, as soon as possible, the industrial expansion that will be warranted by this increased production.

Whilst softwood plantations represent the best means of rapidly increasing the raw materials required by forest industries, they are only part of the answer to the problem of producing the forest products that are needed. The Rain forests of North Queensland, the Hardwood forests throughout the State and the Cypress Pine forests of the West, all have very considerable importance, and are currently supporting Industries that contribute substantially to the welfare of Queensland. The productivity of these forests can only be improved by silvicultural treatment. The funds available at present do not permit this work to be carried out at a level that even approaches adequacy.

The new softwood plantations established during the year constituted a record planting for any year to date. The area planted, 7,958 acres, was just over 1,800 acres greater than the previous best year. As has already been pointed out, this increased planting was stimulated by the special loans being made available on favourable terms by the Commonwealth. The target programme is 10,000 acres annually. Consequently it is unlikely that this year's planting will remain a record for long. Appreciation is expressed of the efforts of both the salaried and wages staff of the Department in achieving the increased planting with the greatest of efficiency and economy.

The volume of milling timber and pulpwood cut from Crown land fell to 211,630,188 superficial feet which is a decrease of 12 per cent. on the cut for 1965-66. Adverse weather conditions severely affected logging, and would account for the major part of this decrease. The limited availability of Crown timber in some areas is also a contributing factor. There are many parts of Queensland where the Crown timber supplies that can be offered for sale are quite inadequate to the needs of the Industry. With all classes of timber, excepting plantation thinnings, the cut was lower in 1966-67 than in 1965-66. With plantation thinnings there was a slight increase of 300,000 superficial feet.

After many years of co-operation with the industry in mill studies to assist in the determination of Crown mill log prices, it became necessary to abandon this system during the year. The position had been reached where discussions on the interpretation of the studies were of very little benefit in deter-

mining averages of industry performance. In future, Crown log prices will be determined empirically using the information already available as to relative values of logs of various grades, sizes and species. With the majority of Crown log timber presently sold at auction, market values will be confirmed by the results of such sales. This decision involved a departure from the basis formerly adopted of regarding periodic wholesale lists of sawn timber, green-off-saw, published by Associations of Sawmillers, as determining or limiting the upset values of Crown log timber. Wholesale green-off-saw prices are now seldom used as a basis for sales, and reasonably up to date wholesale price lists for some species were not available. Furthermore this previous system took no account of periodic increases in the costs of establishing and protecting forests, locating and assessing timber stands, and constructing and maintaining logging roads. Royalties had fallen to very low levels, in many cases being less than those applying a decade ago, despite the drop in the value of money over that period.

Early in 1966 a drywood termite forwarded to C.S.I.R.O., Canberra by a resident of Maryborough was identified as *Cryptotermes brevis*, a native of the West Indies. *C. primus*, a native of Queensland, has been known to be present in Maryborough for some years but as the introduced species is reported to cause considerable damage in other countries, a survey was carried out centering on the house in which the infestation occurred. The object of this survey was to determine the extent of the establishment of the introduced species, and whether eradication was economically feasible. Difficulties of the survey were greatly increased by the fact that *C. brevis* can only be distinguished from *C. primus* in the soldier form. It would appear at this stage that there are reasonable prospects of eradicating the introduced insect. The ready co-operation received from the owners and tenants of the houses and from the Works Department is gratefully acknowledged.

The establishment of seed orchards is essential in the practical and economic application of work on tree breeding. It is the objective with each of the major species used in the softwood planting programme to establish orchards in which are represented the most outstanding parent trees that are available. These orchards should be adequate to provide the Department's entire seed requirements for the subject species. As has been previously reported, this objective has already been achieved with Slash Pine. During the year good progress was made with the other two major species used in softwood plantations. Grafting of leading buds taken from superior parents has almost been completed in the 17 acres Hoop Pine seed orchard at Imbil. At Kennedy in North Queensland stock plants of Honduras Carribean Pine were established in a 7 acres seed orchard. With this latter species, the initial planting from imported seed produced a very high proportion of crooked trees, although in suitable localities the species was otherwise quite satisfactory. There is ample evidence that straightness can be greatly improved even in the initial stages of tree breeding work. This is illustrated photographically in this report, and is yet another indication of the profound effect that tree breeding can have on the economics of growing softwood plantations.

Improved Slash Pine seed has been obtained from a number of sources in South-East U.S.A. and from the South African Forests Department. The performance of the resultant stock will be observed with interest. These could enhance the local gene pool and permit further breeding advances with this species.

The yield of improved seed in Queensland is steadily increasing. During 1966-67 1,514 lb. of orchard seed were obtained from the 2 orchards of Slash Pine. This is well above the current Departmental requirement of Slash seed (1,100 lb. to be sown in 1967). 40 lb. of improved *P. caribaea* seed (35 lb. hondurensis, 5 lb. caribaea) and 17 lb. of improved *P. radiata* seed were also harvested. 3,287 lb. of Hoop seed were collected in Imbil sub-district from special seed trees and seed production areas.

In the introduction of exotic species into the forestry programme of any country, it is wise to confine the species, apart from experimental planting, to sites that on the best knowledge available are considered to be safe. This was done with Slash Pine in Queensland. At the beginning of the year the plantations had reached the stage where an analysis of the performance of Slash Pine plantations on varying sites was warranted, and this was carried out. The results indicated that the species could be planted on a much wider range of sites, particularly those that are periodically waterlogged, than was considered to be the position in the past. This has important implications in our planting programmes.

In an endeavour to perpetuate, for tree breeding purposes, some of the outstanding naturally occurring Queensland Maple trees, a four acre clonal reservoir of superior phenotypes of Queensland Maple was established at Kuranda. The clones are derived from trees over 144" g.b.h.o.b., of superior bole length and usually showing attractive figure, and are planted in the field as grafted stocks.

The Department faces a task of major magnitude in the evaluation of timber on areas that are being freeholded. Because of the great variation in the forests, and in the unit value of the timber, the work requires careful attention, and is much more time consuming than the valuation of the land. It is a natural corollary that prospective freeholders often become impatient of delays which they consider are due to awaiting the valuation of the timber. The officers of the Department have made, and are still making, every endeavour to expedite these valuations. To this end a sound method of aerial reconnaissance has been developed, and the maximum use is made of computers. Despite the addition, during the year, of almost 4,000,000 acres to the area to be dealt with by this Department, the area awaiting field work was reduced by approximately 1,000,000 acres on the comparative figure at the end of 1965-66. This can be regarded as very satisfactory progress.

In the course of examining application to freehold, parts of the subject areas are frequently found to carry excellent forest. In many such cases officers of both the Lands Department and the Forestry Department discuss the position with the lessee with the object of securing surrender of areas on which it considered that forestry is the best land use. The co-operation that has been accorded the Department has been excellent. Over the past 3½ years 329,282 acres has been added to the area of State Forests in this way. Sincere appreciation of the help of both the Lands Department and the lessees, is recorded.

The most significant feature of National Parks administration during the year was the proclamation of a reservation over about 1,248,000 acres of the Simpson's Desert situated in the far south-western corner of the State adjoining the borders of South Australia and the Northern Territory. This followed on an inspection by a Botanist from the Department of Primary Industries and the National Parks Zoologist. The inspection served to stress the uniqueness of this desert habitat. The area is of considerable scientific importance. It represents an environment totally different from anything else yet reserved, and it was largely for this scientific interest that reservation was sought. It is hoped that Queensland will be joined by South Australia and the Northern Territory in the formation of an extensive desert National Park in this Continent.

In recent years the general public has shown a greater appreciation of the purpose of and need for National Park reservations, and in the past ten years the area so reserved has increased from 836,472 acres to 2,306,388 acres.

On 28th May 1967 the Premier and Minister for State Development the Honourable G. F. R. Nicklin, M.L.A., M.M., L.L.D., in the presence of the Minister for Local Government and Conservation, the Honourable H. Richter, M.L.A., and Mrs. Richter and other distinguished visitors, unveiled a plaque erected by the Department to honour Romeo Lahey, M.B.E., a good friend of the National Parks.

Mr. Lahey has done so much for National Parks in this State, and in a very large measure was responsible for bringing to fruition the original reservation of Lamington National Park, that the Department considered it appropriate to honour in some tangible and lasting manner this distinguished service. Mr. and Mrs. Lahey have also made donations to the Crown of valuable freehold areas for addition to Lamington National Park. The plaque set in an attractive cairn, constructed of stone secured in the locality, is erected alongside the road to O'Reilly's Guest House.

A notable feature from the accommodation point of view was the provision of up to date and well equipped offices at Atherton and Inglewood. Both of these towns are important centres of Forestry activity and the buildings which have been provided not only give prestige to the Department but are

such as to add to the civic dignity of these rural centres. The Department is grateful to the Government, the Public Service Commissioner and the Works Department for this recognition and desires to record its appreciation of the action of the Minister the Honourable Harold Richter, M.L.A., in performing special week-end opening ceremonies. On both occasions large representative gatherings from all sections of the community attended.

## MANAGEMENT

### General

The area of State Forests at the end of the year was 6,719,333 acres, a net increase of 165,989 acres.

### Expenditure

Expenditure under the Reforestation Vote was \$3,999,865 compared with \$3,983,980 in 1965-66. Expenditure from Trust Funds on projects associated with the Reforestation Vote was \$124,215.

Expenditure is itemised as follows:—

Item	Expenditure	Percentage of Total
Direct Expenditure on projects—	\$	
Plantations .. .. .	946,120	22.9
Natural Regeneration .. .. .	164,341	4.0
Nursery Expenses .. .. .	152,183	3.7
Research .. .. .	151,122	3.7
Protection .. .. .	572,199	13.9
Surveys .. .. .	128,022	3.1
New Construction .. .. .	163,907	4.0
Maintenance of Capital Improvements .. .. .	120,501	2.9
Total direct expenditure .. .. .	\$2,398,395	58.2
Indirect Expenditure—		
Wet time, Holidays and Leave .. .. .	467,229	11.3
Supervision, Tools, Cartage, &c. .. .. .	756,687	18.3
Camping Allowance .. .. .	210,064	5.1
Pay Roll Tax .. .. .	68,598	1.7
Workers' Compensation .. .. .	51,416	1.2
Administration .. .. .	109,117	2.7
Miscellaneous (Less Stores Suspense of \$8,162 Credit) .. .. .	62,574	1.5
Total indirect expenditure .. .. .	\$1,725,685	41.8
Total expenditure .. .. .	\$4,124,080	100.0

### Employment

The number of men engaged on Reforestation work was 1,332 at 1st July, 1966, compared with 1,404 at the end of June, 1967.

The average level of employment on this work was 1,318 compared with 1,316 in 1965-66.

Average expenditure per man per year was \$3,129 compared with \$3,113 in 1965-66.

### Timber Assessment

The work of inventory assessment of State Forests has been maintained at a level similar to that of recent years. Much of this work has been carried out on areas being covered for the first time and this involves the establishment of permanent yield plots with supplementary stripping to increase the precision of volume calculations. In addition remeasurement of established plots was continued by camps in the Cypress Pine and plantation areas. In all 690 new plots were established during the year to bring to 20,230 the number of plots sampling 2,620,000 acres of forest. Most of these plots were put into the Rain forests of North Queensland and in the coastal hardwood forests.

On grazing selections some 140,000 acres of forested country considered to merit acquisition as State Forest was covered by strip survey to provide estimates of stocking and value.

### Valuation of Timber on Lands for Conversion of Tenure

There has been a steady increase in the number of applications referred to the Department for valuation of timber but, despite this, the number of blocks and the area still to be dealt with were lower at the end of the year than at the start. In this regard aerial reconnaissance has proved most useful and is being used to an increasing extent.

The following table summarises the present position regarding these applications and shows for comparison, figures for the two previous years.

FREEHOLDING POSITION IN RELATION TO PREVIOUS YEARS

	As at 30th June, 1965		As at 30th June, 1966		As at 30th June, 1967	
	No.	Area	No.	Area	No.	Area
Total applications made .. .. .	1,226	Acres 7,152,000	1,730	Acres 11,742,000	2,115	Acres 15,664,000
Withdrawn before valuation .. .. .	32	103,000	27	120,000	34	216,000
Total requiring valuation .. .. .	1,194	7,049,000	1,703	11,622,000	2,081	15,448,000
Valuation complete and determined by Land Court .. .. .	239	799,000	380	1,418,000	810	3,565,000
Valuation complete and awaiting determination .. .. .	458	1,848,000	722	4,186,000	681	6,052,000
Field assessment complete but not yet valued .. .. .	182	1,036,000	134	910,000	199	1,916,000
To be assessed in field .. .. .	315	3,366,000	467	5,108,000	391	3,915,000
Totals .. .. .	1,194	7,049,000	1,703	11,622,000	2,081	15,448,000

Protection

The fire season was relatively mild, though the number of fires at 124 was 10 greater than last year. Good rains fell in all but North Queensland in the first quarter. With little old growth remaining from the drought, western areas were fairly safe. Hot northerly winds were uncommon, though some dust storms occurred. Thunderstorm activity was greater than normal, with several severe hailstorms. The late summer rains were higher than for the last few years, and were followed by an extremely wet early winter. Coastal

areas had their highest ever June rains and these will result in good spring growth which may create a severe hazard in early summer.

The table below gives statistics on all fires in the State on which Forestry employees were engaged, and on which the Department was involved in fire-fighting costs.

Over 60 per cent. of these fires were of less than 100 acres each. Improvement in communication and detection services has helped to bring this about, since it has ensured earlier arrival on fires by crews.

Month	Number of Fires	Size of Fires in acres*				
		0-10	11-100	101-1,000	1,001-10,000	10,001+
July .. .. .	5	2	2	..	1	..
August .. .. .	4	1	3	..	..	..
September .. .. .	14	3	6	4	1	..
October .. .. .	19	6	6	5	2	..
November .. .. .	35	6	7	16	6	..
December .. .. .	22	6	10	4	1	1
January .. .. .	12	4	6	1	1	..
February .. .. .	8	3	3	2	..	..
March .. .. .	2	..	1	1	..	..
April .. .. .	..	..	..	..	..	..
May .. .. .	3	1	1	1	..	..
June .. .. .	..	..	..	..	..	..
Total .. .. .	124†	32	45	34	12	1

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

† Includes 5 restarts of fires.

Three small fires occurred in plantations and losses were very light; one at Benarkin was controlled with only a few trees involved, another burnt over 1 acre of a trial plot in the Yarraman district whilst the third covered 4.7 acres of young blackbutt planted on an old school site. Estimated losses from these fires were \$252. A fire on the border of Barakula State Forest in Dalby district cost \$872 to suppress. Another, on hardwood forest in Gallangowan sub-district cost \$597 to suppress, and these were the most expensive single fires. The largest fire by area, burnt over 20,000 acres of artillery range country near Toolara State Forest but only \$59 was spent on a watching patrol.

The table below gives statistics on all fires in the State which burnt on State Forests, Timber Reserves, National Parks, or on adjoining private lands within a Special Fire Zone as defined under "The Rural Fires Acts, 1946 to 1964," and which fires involved the Forestry Department in fire suppression costs.

This table shows that nearly one-quarter of the total fires occurred in the Gympie district, but most of these were small and caused little damage. The Cypress Pine areas had a mild fire season.

District	No. of Fires	Area Burnt Over (acres)			
		Crown Timber Areas		Private	Total
		Inside Protection Systems	Partly Protected or Unprotected		
Atherton .. .. .	10	440	4,714	122	5,276
Brisbane .. .. .	18	278.5	500	1,201	1,980
Dalby .. .. .	15	119.3	..	4,340	4,459
Gympie .. .. .	30	646	15,280	21,696	37,622
Mackay .. .. .	4	..	70	957	1,027
Maryborough .. .. .	14	10,490	5,970	1,700	18,160
Monto .. .. .	0	..	..	..	..
Murgon .. .. .	13	961	1,096	3,000	5,057
Warwick .. .. .	3	0.3	2,500	70	2,570
Yarraman .. .. .	10	1	201	128	330
National Parks—All Districts .. .. .	7	..	475	12	487
Total (including restarts) .. .. .	124	12,936	30,806	33,226	76,968

## Communications

Forty-four more V.H.F. sets were purchased, and the network is expanding steadily in efficiency and scope. Monto, the last district in south-east Queensland to be converted to V.H.F., has had preliminary assessment, while other districts had their networks expanded. Standards of construction and maintenance of phone lines have been improved. An apprentice radio mechanic has been appointed, and the Communications Centre at Bunyaville has had an office room and storeroom added to cope with its expanding activities.

## Detection

The State's tallest tower was opened at Yuleba State Forest by the Honourable the Minister for Local Government and Conservation on 29th October, 1966, as a Fire Prevention week function. It was well attended by local people and was a fitting climax to the job of erecting a 116-foot wooden pole tower on a difficult site. A new cabin was built on an existing tower at Nanango, and its height was increased by 25 feet to 80 feet. This has extended considerably the area under its surveillance. In Benarkin sub-district a 3-pole tower is under construction, and prior to the year's close the legs (104-foot tall) had been erected. It is anticipated that considerable material and construction savings will be effected by building 3-legged towers.

## Equipment

Fifty portable pumpers of a very satisfactory design were sent to districts, and twenty larger pumpers suitable for use on slip-on tanks, have been delivered. Important development work on hand tools was carried out, and Liquid Petroleum (L.P.) Gas flamethrowers are replacing the bulkier and less safe knapsack types.

## Fire Research

Projects have been commenced by the assistant to the Fire Protection Officer involving experimental burning and a system of fire damage appraisal. All work is of a long term nature.

Major known causes of outbreaks by percentages were:

	%
Unauthorised burning off	31.4
Government and Semi-Government authorities	4.8
Smokers	2.4
Recreationists' camp fires, &c.	9.7
Lightning	3.2
Restarts of fires	4.0
All other known causes	11.4
Unknown causes	33.1
<b>Total</b>	<b>100.0</b>

Total expenditure on firefighting patrol and detention was \$78,530 (\$111,168 in 1965-66). Direct costs were \$8,850 (\$12,645). Prescribed burning for protection purposes covered 42,710 acres (33,181 acres) at a cost of \$4,678 (\$4,443). Burning of logging debris cost \$4,094 (\$2,426). Co-operative protection burning with neighbours cost \$8,751 (\$5,999).

Expenditure on new fire roads was \$227,405 (\$223,268) and maintenance of fire roads cost \$216,464 (\$207,148).

## Industrial Safety

The accident frequency rate for the year was 101.6, which was not as satisfactory as the figure of 93.3 for 1965-6. This condition resulted from an unusually bad second quarter (153.2) the worst experienced since the third quarter of 1963. No reason could be found, and the quarterly results since (84.8 and 82.4) give cause to hope that the improvement shown in the table below will continue.

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
1966-67	101.6

Safety courses were given in 2 districts to 40 supervisors in 4 different sessions. A further 44 supervisors were given a one day refresher course and 130 employees were given a lecture and film session.

The formation of Safety Committees at district level is being fostered since it suits the spread-out nature of our employment centres. There is no doubt that there is an increasing safety consciousness at all levels in the Department and this should maintain a steady improvement in results.

## MECHANICAL EQUIPMENT

### General

Expenditure on the purchase of new equipment and vehicles was reduced below the projected amount by difficulties encountered in the purchase of vehicles and tractor/dozers.

Over the 1966-67 financial year, the older dozer units have further deteriorated and a heavy expenditure on new units can be anticipated in 1967-68.

The increase in the Reforestation programme is placing a heavy load on staff and facilities for handling mechanical equipment.

Workshops at Atherton and Inglewood were completed during the year by the Department of Works. The Yuleba workshop was completed by day labour. The Dalby workshop was purchased for the Department by the Department of Works.

At the beginning of the year, one (1) additional Driver Instructor, was engaged for the Warwick and Dalby districts and stationed at Dalby.

Two training schools for Plant Inspectors and mechanics were held during the year and although of short duration, covered a wide field and were extremely well conducted. The Plant Inspectors and mechanics who attended the schools should derive considerable benefit from the lectures and practical demonstrations given. The servicing and repairing of modern machines and vehicles calls for a high standard of mechanical skill and it is unfortunate that mechanics with the necessary training and experience are difficult to recruit and retain.

At the end of the year, the number of mechanics employed amounted to twenty-eight (28).

## Plant Hire Rates

The Plant Hire Rates were brought up to date during the year and were fixed at a level that would ensure that the purchase price of each item of plant together with interest charges would be recovered during the life of the machine. These new rates became effective from 1st April, 1967 and because of changing costs will be reviewed at six-monthly intervals.

It is estimated that the increase in plant hire rates will raise by \$55.00 the annual cost per man employed on Reforestation work and this lays stress on the necessity to maintain plant at a high level of efficiency and to operate it economically.

## Receipts and Expenditure

Details of Expenditure are—

	1965-66	1966-67
	\$	\$
Loan, Purchase of Plant	375,944	356,845
Trust, Maintenance of Plant	559,944	638,394

It will be noticed that expenditure under Maintenance of Plant has increased by \$78,450 over the expenditure for 1965-66. The major increases are as follows:—

	1965-66	1966-67	Increase
	\$	\$	\$
Fuel	103,428	128,440	25,012
Oils	13,313	14,575	1,262
Tyres and Tubes	20,300	23,121	2,821
Repairs	330,911	353,724	22,813
Travelling Expenses	8,953	16,912	7,959
General Expenses Districts	25,320	38,475	13,155
			<b>\$73,022</b>

	1965-66	1966-67
	\$	\$
Plant Hire Credits	792,187	809,307
Sales of Plant	34,121	32,248
Balance, difference between Plant Hire Credits and Maintenance of Plant (Debits)	\$232,243	\$170,913

## Purchases

Major items of plant purchased during year—

- 5—127 BHP Graders
- 6—90.5 BHP Graders
- 49 Replacement Motor Vehicles
- 9 Additional Motor Vehicles

## Acquisition of Land

During the year 1966-67 an amount of \$15,886.80 was expended on the acquisition of land for Forestry purposes as follows:—

	\$	c
Purchase of Land	2,198.10	
Survey Fees	10,863.45	
Real Property Fees and Lands Department Charges	267.25	
Compensation for Improvements	2,558.00	
	<b>\$15,886.80</b>	

The expenditure of \$2,198.10 represents the purchase of two properties with a total area of 105 acres for addition to State Forests.

## Forest Surveys

Activity in this section of the Department's work has been maintained at about the same level of the previous year with 36 survey parties in the field during the first half of the year and 34 in the second half. Twenty-three of these including 3 establishing theodolite control lines were engaged on general survey work and soil surveys associated with the Reforestation programme. Of the remaining camps 4 were employed mainly on Forest Inventory Surveys to provide basic management data and 8 were employed full time on timber assessments in connection with applications for freeholding. A number of the camps employed on general survey work were also employed on a part time basis on assessments for freeholding.

DETAILS OF WORK IN MILES

Theodolite Controls	Compass and Chain Traverses	Re-opening of the old lines	Investigation Surveys	Stripping
128	1,834	100	215	6,614

## Personnel

At the end of the year 185 persons were engaged in survey work in the field compared with 174 at the same time last year. These comprised Foresters (11), Forest Surveyor (1), Forest Survey Rangers (10), Forest Survey Overseers (33), Survey Trainees (9) and other Survey personnel (121).

In the Drafting Branch the number of officers employed increased by 3 to a total of 22 to cope with the added demand for maps in connection with the expanded planting programme.

During the year a change was made in the training scheme for the provision of Survey Overseers with the object of giving trainees a broader understanding of other phases of forestry activities before they concentrate on those aspects peculiar to forest survey. This affords the young trainee a better opportunity to judge whether he is suited to survey work and life and should lead to greater stability in this section. At the same time all trainees will be given more intensive instruction in survey work.

## REFORESTATION

### General

During the year climatic conditions were favourable for plantation establishment and tree growth, particularly in the second half of the year. Good spring rains ensured the success of the open root plantings of winter 1966 and little refilling was needed. Early and consistent summer rains provided excellent conditions for the establishment of plantings of tubed stock of Hoop Pine and Caribbean Pine throughout the State. These conditions were maintained by regular falls of rain well into the winter months and permitted an early commencement of the open root planting of exotics in Southern Queensland with the result that a large proportion of the record planting was completed before the end of June.

The early months of 1967 were marked by intense cyclonic activity. In late January cyclone Dinah brought heavy rain and wind blasts of up to 80 m.p.h. to coastal areas south of Bundaberg. These caused considerable damage to young plantations of Slash and Caribbean Pines up to 3 years of age and necessitated considerable expenditure in straightening and ramming stems blown over by the wind. Results of this work have been good and the damage has been largely restored by the action taken.

The cyclonic conditions that were accompanied by serious flooding in the Ingham district during March caused little damage to plantations and the initial planting of Caribbean Pine at Kennedy was not adversely affected. Forest roads and bridges, however, suffered severely and a landslide occurred in the Gadgarra plantation area on the Atherton Tablelands.

Rainfall is shown below for 6 centres representative of the main Hoop Pine and Exotic Pine planting areas.

RAINFALL IN POINTS

—	Hoop Pine Areas			Exotic Pine Areas		
	Yarraman	Imbil	Kalpowar	Berwah	Tuan	Bowenia
1966-67	4,615	6,198	3,404	9,763	6,741	6,490
Average	3,154	4,640	3,578	6,112	5,275	6,482

The four centres in Southern Queensland have figures substantially above average whilst the two centres in Central Queensland are very close to average. Growth rates with both Hoop and Exotic Pines were about 50 per cent. up on those for the previous year which was itself close to average.

Labour difficulties were encountered in some isolated Hoop Pine areas at the time of planting and first tending. The position was eased by the increased use of hormones in pre-plant sprays to control weeds and by the temporary transfer of staff from jobs which did not have the same seasonal urgency. Whilst full employment obtains in the State it is to be expected that similar action will be required to ensure correct timing of operations with attendant benefits in establishment, growth and costs.

Increased use of mechanisation has been essential to maintenance of the plantation programme at the record level achieved. During the year greater use was made of power misters in the application of hormones prior to planting to control weed growth. Practically all forest clearing for planting of Exotic Pines was performed by machines and most of the Hoop Pine areas were also prepared by pushing with dozers. For the first time the application of rock phosphate was handled by machine at Tuan in the Maryborough district. In all of these instances the use of machines has resulted in reduced costs.

## Field Operations

The following table gives a summary of the figures for the chief operations for the year compared with 1965-66 figures:

Operation	1965-66	1966-67
	Acres	Acres
Area of plantation established .. ..	5,810	7,960
Area of plantation covered in pruning ..	17,210	16,757
Area of plantation tended .. ..	59,126	58,301
Area thinned merchantably .. ..	8,244	7,301
Area thinned unmerchantably .. ..	981	1,219
Area of natural forest treated .. ..	31,574	28,200

## Plantations

The area planted this year was the greatest planted in any financial year to date. At 7960 acres it exceeds the previous best by 1808 acres and is 2150 acres up on the 1965-66 figure. This expansion of planting programme stems from the urgent need to provide the State's requirements of forest products and to reduce the drain on overseas credits caused by their import. It has been achieved in anticipation of funds being made available by the Commonwealth Government to permit the annual planting to be lifted to 10,000 acres by the year 1968-69. The initial payment of \$201,000 has been received from the Commonwealth in respect to the 1966-67 planting but was not available during that period. Therefore funds had to be provided by a further curtailment of work in the treatment of natural forests. With continued provision of Commonwealth monies it is hoped to be able to restore to its former level the work carried out in the Cypress, Hardwood and Rain forests of the State.

Plantation areas are shown by district and species in appendices "F" and "G" and from them the following figures are taken:—

Species	1966-7	Total Area Planted to 31-3-67
	Acres	Acres
Native Conifers (chiefly Hoop Pine) ..	2,731.5	61,963.2
Exotic Conifers (chiefly <i>P. elliotii</i> , <i>P. caribaea</i> , <i>P. radiata</i> , <i>P. patula</i> ) ..	5,226.4	61,916.6
Eucalypts .. ..	Nil	3,713.1
Other Broadleaved species .. ..	Nil	1,234.1
Miscellaneous Experimental .. ..	2.5	205.2

The planting of native pines is about 200 acres above the previous years' whilst that of exotic pines has increased by just over 2000 acres. Practically all of the increase has been in south-east Queensland in the Brisbane, Gympie and Maryborough districts where the bulk of the additional increase to 10,000 acres per year is planned because of availability of suitable planting land and the need to concentrate plantations to permit the development of integrated pulp and timber using Industries.

During the year plantation establishment commenced at Kennedy in North Queensland with the planting of 160 acres of *Pinus caribaea* var. *hondurensis* on State Forest 461 Glenbora. Action is in hand to secure the State Forest Reservation of sufficient planting land in the Ingham-Cardwell region



to permit an annual programme of 1000 acres to be sustained. *Pinus caribaea* var. *hondurensis* in school plots and in trial plantings has shown itself to be well adapted to conditions on the coastal plain within the tropics where it has made exceptional growth and proved resistant to fire and to drought. Other centres where planting programmes were commenced are State Forest 531 Esk where 120 acres of Slash Pine were planted and State Forest 200 Palen where 80 acres of Hoop Pine were established.

There was a further reduction in the area of plantations tended during the year. Figures for the past three years have been:—

Year	1964-65	1965-66	1966-67
Area covered in tending	Acres 60,183	Acres 59,126	Acres 58,300

These figures reflect the effect of increased use of 2,4,5-T butyl ester as a foliar spray both pre-plant and in older plantations of Exotic Pines. The control of coppice growth achieved has increased the time between tendings.

With Hoop Pine the use of hormones as a pre-plant spray brought about a reduction in first-year tending costs in a year favourable to the growth of weeds. Research work indicates that better results would be obtained by use of a stronger formulation than that applied as routine and the mixture favoured for future use is 2 pints 2,4-D and 1½ pints 2,4,5-T amine with a wetting agent in 2½ gal. of water per acre. Application is by power mister and it is important that it be made before the weeds exceed 6 in. in height.

Lantana remains the most serious weed in older Hoop Pine plantations but the use of hormones pre-planting has made it possible to undertake the planting of areas of fire-gutted Rain forest that had become lantana thickets. On State Forest 283 Colinton an area of 193 acres of such lantana was cleared and planted during the year at costs comparable with those for normal areas.

The year's pruning operations are shown by stages in the following table together with those for 1965-66.

Year	State of Pruning				Total Area
	1st	2nd	3rd	4th	
1965-66	Acres 3,979	Acres 5,561	Acres 5,259	Acres 2,411	Acres 17,210
1966-67	Acres 3,229	Acres 4,943	Acres 5,928	Acres 2,657	Acres 16,757

#### Co-operation with Prisons Department

Hoop Pine plants for the initial planting on State Forest 200 Palen were raised for the Department in a high shade nursery on the Palen Creek Prison Farm which adjoins the Reserve. This nursery was established some 30 years ago to provide plants for plantations on the Prison Farm Reservation and has been extended to meet the Department's requirements. In addition to the nursery the Prison Farm maintains 226 acres of Hoop plantations the oldest of which were planted in 1939-40 and has a small annual planting programme.

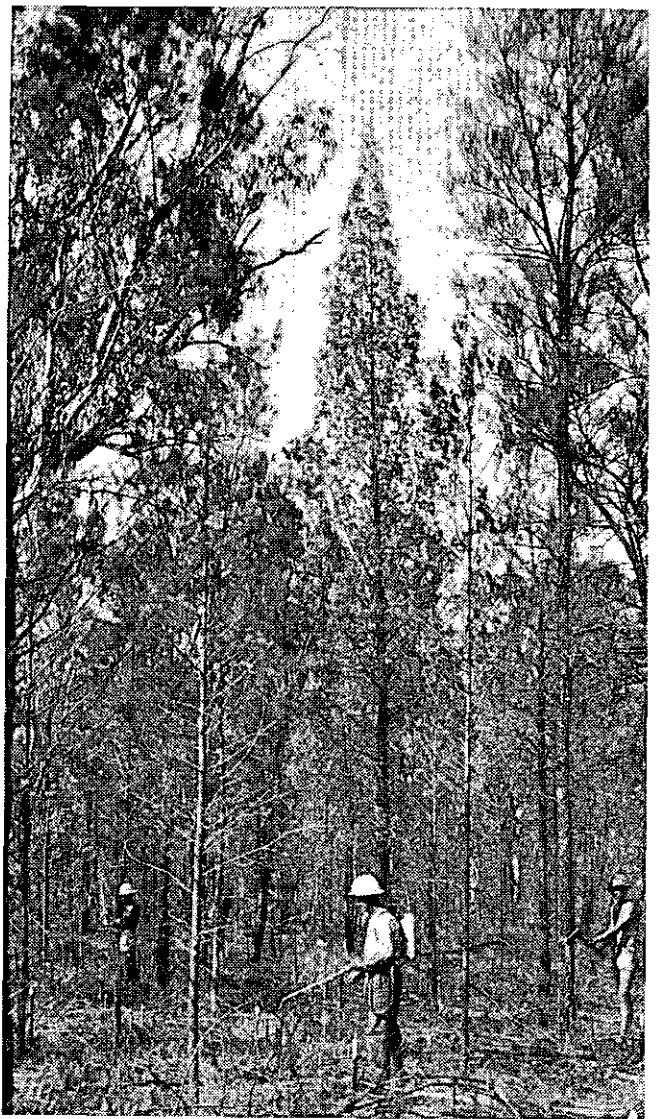
The work entailed in nursery and plantations on State Forest 359 Palen is carried out by prisoners under the direct control of Prison Farm officers with some supervision by officers of the Forestry Department. An annual payment based on the value of this work is made by the Department to the Prisons Department.

#### Diseases and Pests

##### (a) Insects, birds and animals—

The Kauri Pine coccid (*Conifericoccus agathidis* Brimbl) continues to be the most destructive plantation tree pest in Southern Queensland. Harvesting of affected stands of Kauri Pine in the Mary Valley is continuing and losses have been minimised in this way. Although this pest has been recorded from Kauri Pine in all parts of the State where the tree is grown it is only in the Mary Valley that serious tree damage has occurred.

Young Hoop Pine stands in the Gallangowan and Mount Stanley areas showed evidence of rat activity again during this year. However, the area in which significant losses occurred was small in comparison with that occasioned in years of major rat activity. The rat species responsible in this area was *Rattus culmorum* (Thomas and Dollman). Investigation work is in progress, aimed to find more efficient baiting procedures. Preliminary studies to determine whether it might be possible to alleviate the problem by changes in cultural procedures are also under way.



Treatment Gang in Cypress Pine Forest, Dunmore.

Other investigational work under way concerns the white grub problem in Hoop Pine nurseries and newly planted stands; the leaf bagworm, *Hyalarcta hubneri* (Westn) in *Pinus radiata* at Passchendaele; lerp insects, *Cardiaspis* spp. on eucalypts; the Hoop Pine seed moth, an unnamed species the larvae of which cause significant losses in viability of seed in maturing cones; and the Red Cedar shoot borer *Hypsipyla robusta* (Moore) on which promising results from insecticidal control trials have become apparent.

Other pest occurrences of note during the year included an unusual potentially serious outbreak of the golden mealy bug *Nipaecoccus aurilanatus* (Mask) in plantation Hoop Pine at Kalpowar, eventually controlled by natural predators including the ladybird *Cryptolaemus montrozieri* (Muls), and the high incidence of attack by the leaf blister sawfly *Phylacteophaga eucalypti* (Frogg) on ornamental eucalypts.

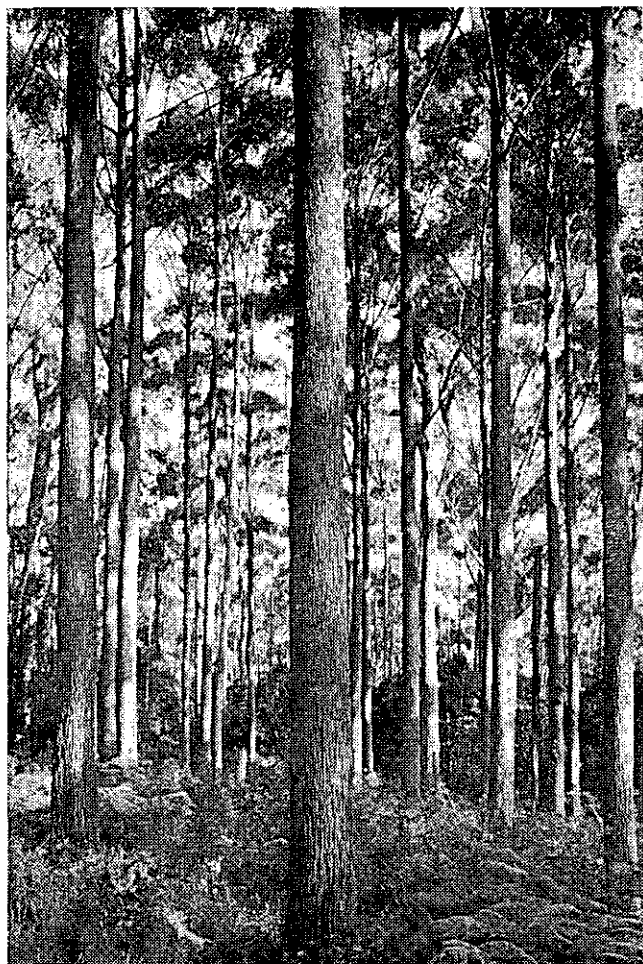
##### (b) Fungi—

As in previous years, soil fumigation was carried out at four departmental nurseries for the control of *Phytophthora cinnamomi* root rot of *Pinus* spp. Experimental studies and several year's experience in routine sowings in fumigated seed beds have shown that root rot can be effectively controlled with methyl bromide, chloropicrin and mixtures of these fumigants. One aspect that was further investigated this year, was how many sowings can be made following fumigation before *P. cinnamomi* again becomes a problem. Following experimental studies in previous years, two large beds one each at Passchendaele and Beerburum previously fumigated and sown in 1964 and 1965 respectively were sown again in 1966 without fumigation. Observations and soil and root isolations failed to find any evidence that *P. cinnamomi* had reinfested either of the beds. As a result of this work most of the coming year's sowings will be made without further fumigation.

Studies have continued on the use of seed dressings to improve Hoop Pine germination results. Experiments at a number of centres showed that improvements in germination, frequently of more than 20 per cent., can result from the use of a number of fungicidal seed dressings including Captan,

Thiram and several organic mercurial seed dressings. The use of Captan 50 has continued in routine sowings: in some nurseries germination increases of the order of 35-45 per cent. resulted from this treatment.

In October, 1966, an outbreak of *Colletotrichum acutatum* "terminal crook" disease of Slash Pine was recorded at the Gregory nursery. This was the first outbreak of this disease since 1964, when it occurred in the Beerburum and Beerwah nurseries. At Gregory this year the outbreak was centred in one of the three beds sown: in this bed an estimated 18.2 per cent. of the 270,000 plants was affected, but in the centre of infection the figure was up to 90 per cent. Of the 460,000 plants in the other beds only approximately



Stand of natural regeneration Blackbutt thinned to 25 ft. x 25 ft. spacing. Age 44 years. Average G.B.H. 66 in. Ht. 140 ft. Piccabeen Logging Area State Forest 445, parish of Kenilworth.

2.5 per cent. were attacked. The disease causes death of the apical shoot and severe distortion immediately below this but does not kill the seedling. Observations indicate that the affected plants fail to produce alternative leading shoots and hence are not suitable for planting out. There is some evidence that the fungicides Maneb and Thiram may be effective in controlling the disease. A minor outbreak of this disease was reported from the A.P.M. nursery at Kallangur.

Other diseases of interest but not of widespread occurrence that were recorded during the year included possible *Armillaria mellea* deaths of Slash Pine at Beerburum: this is a disease associated with stumps of the original forest stand that can cause deaths in plantations during the establishment years. An area of root rot of mature Hoop Pine possibly due to *Ganoderma applanatum* was investigated at Mount Crosby. Root rot of Hoop Pine causes losses in North Queensland but to date very few cases have been recorded in the major southern plantations. This appears to be the first record of root rot in South Queensland where a possible pathogen has been collected. Deaths of adult needles of nursery stock of both *Pinus elliottii* and *P. taeda* due to the needle cast fungus, *Lophodermium* sp. were recorded in the winter 1967 at Beerburum and Beerwah. This disease is reported from Europe to be a nursery disease in wet years and the very wet conditions experienced in the first half of 1967 no doubt explains this occurrence of *Lophodermium* in these nurseries.

## Seed Collection

The main seed collections made during the year were:—

	lb.
Hoop Pine	26,462
Slash Pine	2,950
Caribbean Pine	170
<i>Pinus taeda</i>	200
<i>Pinus radiata</i>	23

Years of general seed crops in natural stands of Hoop Pine occur normally at about 4-yearly intervals and on these occasions it is necessary to collect seed sufficient to support the planting programme until the next general seed year, and to hold the seed in cold storage to maintain its viability. The last general seed year was in 1962 and it appears that the next will be in 1968.

The collection of 26,462 lb. of seed made last December was made mainly from the Hoop Pine plantations of the Mary Valley. Two years before a similar collection was possible chiefly in the plantations of the Yarraman district. Usually seed produced in other than general seed years is usually of low viability but in both of these collections tests have shown germination capacity close to normal for plantation-produced seed. As a result it should be possible to provide sufficient stock for the increased planting programme of Hoop Pine until the next general crop.

Collection of Slash Pine included 1,514 lb. from Seed Orchards. This is 858 lb. more than the orchards yielded in the previous year and made it possible for the first time for seed of this quality to be offered for sale to Government and private concerns in Australia interested in the growth of this species. For some years there has been a strong demand for seed of Slash Pine from overseas as well as from within Australia and this year sales amounted to 1,181 lb. with a value \$10,088.

Supplies of Caribbean Pine seed are difficult to obtain from abroad and Queensland is fortunate to be in a position to collect her requirements from relatively young plantations at Bowenia and in North Queensland. The 170 lb. of seed collected is 65 lb. more than in the previous year. Numerous requests have been received from tropical countries eager to procure seed of this species but only minor quantities have been provided. Next year's crop is expected to be very poor but the May flowering this year was normal and with increasing areas reaching producing age it should be possible to make a substantial collection in January, 1969. Seed sufficient for the 1968 sowings of this species is in hand.

## Nurseries

No new nurseries were established during the year though a number of Hoop Pine nurseries were extended. The number of nurseries maintained by the Department remains at 24 of which 12 handle Hoop Pine and 10 Exotic whilst 2 are amenity nurseries producing species to meet the public demand for trees for shade shelter and ornamental purposes. In addition Hoop Pine is raised for Departmental use at the nursery at the Palen Creek Prison Farm. Department nurseries provided 4,840,000 plants for transfer to the field and there were 9,900,000 plants in the nurseries prior to commencement of the 1967 winter planting. The use of sarlon in Hoop Pine nurseries as a cover for stand-down beds was further extended to cope with increased production of planting stock and it has been entirely satisfactory. It has also been used as shade in trial sowings in both low and high shade nurseries and indications are that it will prove successful. The installation in the Yarraman nursery of an automatic sprinkler system was mentioned in last year's report. This system has worked quite well and was responsible for a substantial reduction in watering costs for the nursery during the year. There was a bigger area under plants within the nursery in 1966-67 than in the previous year yet the cost of watering was reduced by \$600. At the Benarkin nursery a Skinner spray line operated by a mile oscillator was erected over a section of high shade nursery with sarlon cover and a section with slat cover and sown in spring 1966. This too gives favourable promise and by reason of its cheapness and greater ease of installation is likely to be the method adopted for watering in Hoop Pine nurseries.

## Treatment of Natural Forests

Areas afforded silvicultural treatment in 1966-67 are shown in the following table together with those for 1965-66:—

Forest Type	1965-66	1966-67
	Acres	Acres
Eucalypt Forest	20,316	15,873
Cypress Pine Forest	10,941	11,643
Tropical Rain Forest	270	684
Natural Hoop Pine	47	Nil
Total	31,574	28,200

The decline in area treated has been brought about chiefly by the need to provide funds for the plantation programme and, to a lesser extent, by the difficulty of obtaining suitable staff for work in the relatively isolated natural forests of the State. It is hoped that the provision of Commonwealth Funds to assist in softwood plantings that additional money will become available for work on these important forests and that the establishment of central camps with better amenities will assist in the retention of staff. Improved road access and transport makes this practicable.

A major problem in the silvicultural treatment of native forests has been the regrowth of unwanted stems which greatly reduced the beneficial effects of the work and made retreatment necessary. The use of arboricides extends the period over which the treatment is effective and thus enhances the value of the work. In the Cypress Pine forests of the west a 1% mixture of 2,4,5-T amine is used as a cut-stump treatment for Bull Oak. A low frill treatment of most other species has been effective.

During the year the rules for treemarking of merchantable trees were modified in respect to a number of forest types and the studies are proceeding in respect to other important hardwood and rain forest types.

#### Sale of Trees

At 535,000 the number of plants supplied to the public, schools, Government Departments and other instrumentalities was a record being 235,000 more than the previous best (1962-63) and 250,000 up on the figure for 1965-66. Increased interest is being shown by private individuals and by other concerns in the establishment of softwood plantations particularly in coastal North Queensland.

The Department assists these operations by making officers available without charge to inspect areas and to advise on species, planting procedures, protection from fire and on general cultural practices. For those planting approved timber species in forest plots, plants are supplied at concession rates from the Department's nurseries.

Numbers of plants supplied by species and distribution was:—

Species	Type of Planting
<i>Pinus elliottii</i> (Slash Pine) 364,000	Forest Plots .. 449,000
<i>Pinus caribaea</i> .. 36,000	Schools .. 3,500
<i>Pinus patula</i> .. 2,000	Government Departments .. 2,000
<i>Pinus radiata</i> .. 8,000	Departmental .. 18,000
<i>Pinus taeda</i> .. 42,000	Private .. 62,500
Hoop Pine .. 8,000	
Eucalypts .. 19,000	
Miscellaneous .. 56,000	
535,000	535,000

#### Amenity Nurseries

Plants supplied from the amenity nurseries at Rocklea and at Dalby and their value was:—

Nursery	Plants Sold	Value
Rocklea .. .. .	64,194	\$ 9,459.15
Dalby .. .. .	8,165	1,581.00

The above figures show increased use of these facilities by the general public at both centres. In the case of the Rocklea nursery they surpass the previous highest (1965-66) by 13,234 plants and by \$1,804.

#### Christmas Trees.

Nine thousand eight hundred and eighty-five Christmas trees were sold for a total value of \$5,504. This was an increase of 3737 over 1965-66 sales.

The total value of all plants and Christmas trees sold was \$36,228.69 which is \$10,354.85 up on the previous year and by far the highest return to date.

### SILVICULTURAL RESEARCH

A major part of the work of this branch has been the remeasurement and maintenance of long term current experiments. The new work initiated at each of the research centres and some of the results of research are referred to below.

#### Atherton Regional Research Station

The main work of this station is research into the silvicultural characteristics of the North Queensland Rain forests with the object of determining treatment prescriptions

suitable for application to these forests. Some work is also done on local problems associated with the establishment of plantations in North Queensland.

(i) Rain Forests:—Work was continued on the preparation of a field key for the identification of tree species in the North Queensland Rain forests. The bark, blaze and leaf features of 840 trees belonging to 370 species have been recorded and punched onto cards. It is estimated a further 130 species remain to be recorded.

The study of a number of experiments designed to establish the flowering and fruiting habits of the more valuable Rain forest species, the time of seedfall, the amount of regeneration obtained under different canopy conditions, and with different treatments of the forest floor, and the rate of growth of this regeneration was continued. Two papers were prepared one covering flowering and fruiting and the other the growth rate of the seed trees. Further papers will be prepared to cover other aspects of this study. A paper was also prepared dealing with the results of the spot sowing trials outlined in the 1965-66 Annual Report.

Observations on the enrichment plantings which have been made regularly since 1953 were continued. Queensland Maple (*Flindersia brayleyana*) is clearly the most suitable species for this purpose on most sites. An experiment was established to test the effect of different forms of canopy control on the form and growth rate of underplanted Maple. The canopy treatments comprised complete opening rapidly, complete opening slowly, retention of high shade and retention of low shade. The responses of naturally occurring high value species are also being recorded.

The task of remeasuring sixteen yield plots, which were established between 1951 and 1953 to determine the effect of each of two different silvicultural treatments following logging, in a range of Rain-forest associations was completed. The appraisal of the large mass of data obtained is continuing.

Past experimental work has indicated that the limited gain in growth, of saplings up to 20 feet in height resultant from follow-up treatment within eight years of the initial treatment does not justify the cost of this treatment. Two experiments were established during the year to investigate the effect on the sapling and small tree component of the stand of a follow-up treatment 12 years after the initial treatment. At this stage stingers (*Laportea* spp.), which frequently occur prominently in the regrowth following logging and treatment, have been largely eliminated from the stand by competition. Thus a treatment is possible at this stage without the necessity of incurring the cost of a preliminary destruction of these species with hormone sprays.

Most Rain forest species have poor apical dominance and the saplings are likely to respond to increased growing space by branching at a low height. Experiments were established to observe the mechanics of branch shed and the effect of growing space on bole length in Queensland Maple, Silkwood (*Flindersia pimenteliana*) and Northern Silky Oak (*Cardwellia sublimis*).

Experiments were established to determine the effects of mistletoe on the increment of several of the more susceptible of the prime cabinet species. These include Queensland Silver Ash (*Flindersia pubescens*) and Silver Silkwood (*Flindersia acuminata*) both of which commonly carry mistletoe, and the less susceptible Queensland Maple and Silkwood.

A clonal reservoir for the preservation of outstanding Queensland Maple clones was established at Kuranda on a freshly burned scrub site. The scions have been collected during normal logging operations over the past few years from felled trees 144 inches or more g.b.h.o.b. and with superior bole length and straightness. A considerable percentage have well developed figure in the wood. It is anticipated this reservoir will be a source of improved seed for enrichment plantings in the near future.

Work on establishing appropriate methods of linear sampling, which will indicate the need for treatment and the effectiveness of past treatment, proceeded during the year. A method based on a strip of contiguous quadrats, each a quarter chain square, was evolved for assessing the stocking and species/size distribution of compartment sized areas of Rain forest. Field work has been kept to a minimum though line cutting is still necessary. A FORTRAN programme has been written allowing computer analysis to proceed directly from the field sheets.

Four areas, three treated (453 acres) and one not treated (152 acres) were assessed. Treatment was carried out about six years ago and it was found that these compartments have regenerated satisfactorily. Stocking of valuable species was always in excess of 100 well spaced trees per acre i.e. over 100 of the 160 quadrats per acre were satisfactorily stocked. Seventy of these trees were in a dominant condition and 50 were over 20 feet high. The data from the non-treated area have not been completely worked up but it is apparent that the development of the valuable species has been very poor, their place having been taken very largely by less valuable species and weeds.

Work will continue on the use of linear sampling, not only to define what areas are suitable for treatment, but also to indicate what intensity of treatment is most economic.

(ii) Plantations:—Hoop Pine (*Araucaria cunninghamii*) has been adopted as the standard species for planting on freshly burned Rain-forest sites and Honduras Caribbean Pine for old Rain-forest sites, which have become grassed, and for sclerophyll forest sites. Trial plantings of Benguet Pine (*Pinus khasya—insularis* complex) at age 15 are almost as vigorous as the Caribbean Pine, particularly on the more fertile sites. Two plantings of Hoop Pine from New Guinea seed sources appear to be more suited to the conditions at Danbulla and Kuranda than Hoop Pine derived from south Queensland seed sources. Outplantings of White Pine (*Pinus strobus* var. *chiapensis*) made in the summer of 1965-66 are showing good progress. This is contrary to the general performance elsewhere in Queensland where this species fails to survive the dry season. Trials were initiated with *Pinus brutia*, *Pinus roxburghii* and Bahaman Caribbean Pine (*Pinus caribaea* var. *bahamensis*).

In co-operation with the Commonwealth Aluminium Corporation Ltd., species trials were initiated at Weipa with a view to utilising reclaimed open-cut mining land. The emphasis is on high value broad-leaved species which can bear the heavy cost of transport to a distant market. Seven species were outplanted and a number of other species will be planted this year.

It was reported in the last Annual Report that two applications, each of 10 lb. 2,2-DPA in 20 gallons of water per acre, to molasses grass (*Molinis minutiflora*) regrowth following previous rotary hoeing had given good control of the grass for the following six months. It is still practically free of grass 18 months after the treatments. The same weedicide treatment was applied this year to rotary hoed and non-rotary hoed areas carrying mixed grasses and weeds. Grass and weed control has been good and there is no obvious difference between treatments.

A small phytotoxicity trial with the residual herbicides terbacil and diuron was established. None of the trees planted two days after the soil treatment died during the remaining three months of the report year. Diuron at 5 lbs. per acre and terbacil at 2 lbs. per acre gave the best weed control.

The investigation of the performance of Hoop Pine underplanted to Honduras Caribbean Pine on grassed Rain forest sites continued with the observation of earlier estab-

lished plots and the establishment of new plots. The Hoop Pine underplants appear to be more healthy than those on equivalent open planted sites but height growth has been slow to date. Hoop Pine in mixed plantings of the two species has grown better than in open plantings on comparable sites.

A site for the clonal seed orchard of Honduras Caribbean Pine was selected in open forest country near Cardwell. Seven acres were cleared and stocks were planted at 24 feet by 24 feet spacing, two stocks four feet apart being located at each planting point. It is proposed to graft the fifteen chosen clones on to the stock plants in the coming summer. It is anticipated this orchard will commence to produce seed in 1970 and in due course will supply seed for a planting programme of 1,500 acres per annum in Central and North Queensland.

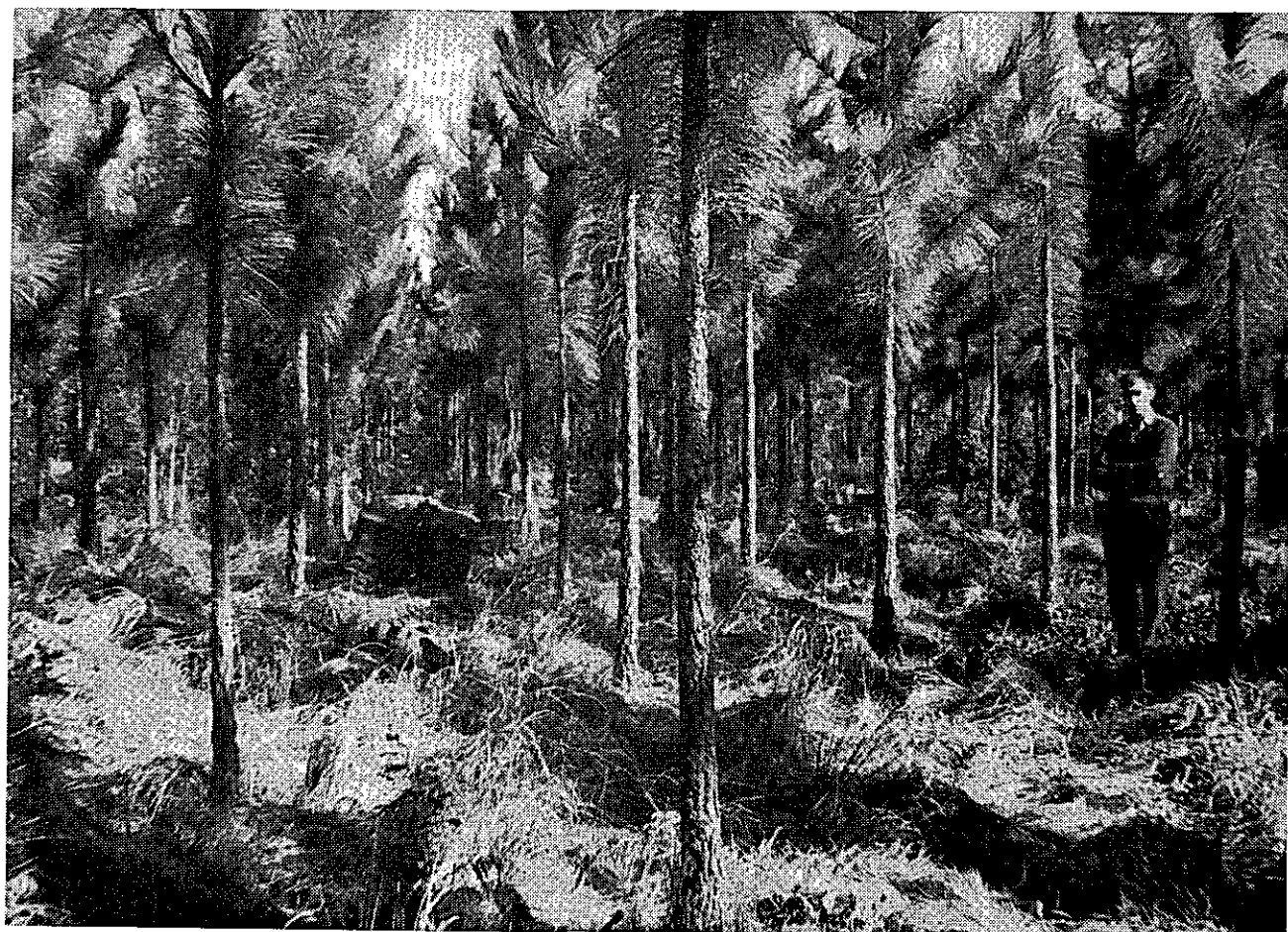
#### Beerwah Regional Research Station

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

(i) Plantation Silviculture:—This section deals mainly with the silviculture of Slash Pine (*Pinus elliotii* var. *elliottii*) and Loblolly Pine (*Pinus taeda*) plantations in coastal south-east Queensland, but also controls experiments in Radiata Pine (*Pinus radiata*) plantations at Passchendaele near Stanthorpe and in Caribbean Pine plantations at Bowenia, near Yeppoon.

Long term experiments investigating species introduction, plant espacement, pruning, thinning, and weed control were measured and maintained. One further experiment on plant espacement of Radiata Pine, covering four spacings ranging from 7 feet x 7 feet to 10 feet x 10 feet, was established at Passchendaele.

The series of pregermination trials with Slash Pine seed commenced in 1965 were repeated during the year. Under nursery bed conditions this later trial has confirmed that with freshly collected seed the germinative energy is similar for seed moist cold stored for three weeks or for six weeks; germination is reduced slightly by further reduction of the moist cold storage period to 15 days, but, with this shorter period, pre-soaking in water for periods of 16-24 hours prior to storage will improve germination to comparable levels. With one year-old seed the germinative energy again increased with increasing periods of moist cold storage up to six weeks; however, the combination of water soak and



**IMPROVED STEM STRAIGHTNESS—HONDURAS CARIBBEAN PINE—AGE 4½ YEARS**

The use of improved seed, resultant from crossing superior parents, has lifted the percentage of reasonably straight stems from twenty to seventy.

moist cold storage treatments appears to be less reliable with this older seed. Water soak treatments alone are generally not effective with either old or fresh seed, and the addition of a detergent to the water has depressed germination.

Research work over the past 15 years has shown that Hoop Pine can be successfully introduced as an underplanting under healthy Exotic Pine stands, at least five years old, established on coastal lateritic podsollic soils. The mechanisms involved in the underplanting effect are currently under investigation by the nutrition section, the critical factor being essentially one of nitrogen supply and demand. The promise of underplanting in improving the productivity of Slash Pine plantations is indicated by recent measure data from the oldest Hoop Pine underplanting.

GROWTH OF HOOP PINE UNDERWOOD AND SLASH PINE OVERWOOD—SITE INDEX 81\*

Species	Age	Stems	Mean g.b.h.o.b.	Basal Area		*Predom- inant Height
				Stand- ing	CAI	
Slash ..	Years 30	Acre 122	In. 41.5	Sq. ft. 119.2	Ft. 4.9	86.5
Hoop ..	15	210	15.6	29.2	3.2	50.6
Total ..		332		148.4	8.1	

\* Predominant height is the mean of the heights of the tallest tree on each twentieth acre. Site index is actual or anticipated predominant height at age 25.

A further trial was conducted to determine the relative accuracy of various height measuring instruments in Slash Pine stands from 70–80 feet high. This study showed that aluminium height sticks give the most consistent and accurate measure of height, as well as being the most economical instrument to use. Both the Suunto Clinometer and Abney Level, between which there was little difference, were slightly less accurate in terms of error distribution. As the Suunto is almost as fast to operate as height sticks, and the Abney is much slower, the Suunto is preferred where an alternative height measuring instrument is required.

A "Research Note" entitled "Relation of Slash Pine Site Index to Soil, Vegetation and Climate in South-East Queensland" was published. It relates site index of Slash Pine plantations to soil type, soil depth, site preparation, height of natural tree vegetation, topographic position and rainfall. It indicates that financially successful plantations may be established on a much wider range of sites than have been generally used in the past. A paper "Thinning of Slash Pine in Queensland with Special Reference to Basal Area Control" was submitted to the World Symposium on Man Made Forests.

(ii) Tree Breeding:—This work is concentrated mainly on Slash Pine and Caribbean Pine, but some attention is given to several other pine species.

(a) Slash Pine:—Seeds from a large number of var. *elliottii* individuals selected in breeding programmes in southern U.S.A. and South Africa were imported this year for local testing. Such introductions will enhance the local gene pool and could be of substantial value. A supply of var. *densa* seed from several provenances is now being accumulated for establishment of a comprehensive trial at several localities in the near future.

Seed production in the var. *elliottii* seed orchards continues to rise. In 1967 the 18 acre, grafted orchard, planted between 1958 and 1963 at 24 feet by 24 feet spacing, yielded more than 52 lb. of clean seed per acre. By age nine years from planting, fertilized grafts in the orchard averaged more than 200 cones per tree, while the unfertilized gave only 160. Current regular applications of the most effective fertilizer treatment throughout the orchard, coupled with the natural increase in production with age, is expected to further increase the seed yield.

(b) Caribbean Pine:—During the year well-replicated four and five year-old variety and provenance trials of Caribbean Pine were measured for growth and assessed subjectively for trunk straightness. In addition, similar data were taken on a replicated four year-old experiment comparing the height and straightness of five full-sib families resultant from crosses among six parents selected at ages six to seven years for excellence of trunk straightness, crown form and vigour. Two coastal plantations were involved, one near Beerwah (27°S) and the other at Bowenia (23°S). These and other experiments are described fully in a paper prepared for presentation to the British Commonwealth Forestry Conference, India 1968. A summary of the more pertinent results for trunk straightness is given in the table below.

EFFECT OF VARIETAL AND PARENTAL SELECTION ON TRUNK STRAIGHTNESS IN CARIBBEAN PINE

Variety	Parentage of Stock	Age at Assessment (Years)	Straightness (2)	
			Beerwah	Bowenia
<i>caribaea</i> ..	Unselected	5.5	49	70
<i>bahamensis</i> ..	Unselected	5.5	46	60
<i>hondurensis</i> ..	Unselected	5.5	15	20
<i>hondurensis</i> ..	Selected (1)	4.5	50	70

(1) Six selected parents were control-crossed producing stock of 5 separate families.

(2) Percentage of progeny in which stem straightness defects will not markedly affect potential sawn recovery.

Trees of unselected var. *hondurensis* were relatively very crooked, confirming previous observations, but a marked improvement in trunk straightness was achieved by selective breeding. The standard of the improved stock is illustrated in a photograph in this report. In the same experiments, trees of varieties *hondurensis* and *bahamensis* grew equally fast, surpassing those of var. *caribaea*. This is also true of older trials in Queensland. Results of the varietal comparisons for both growth and trunk straightness agree with the findings of Luckhoff in South Africa.

Comprehensive provenance trials of var. *bahamensis* were again established, using seed collected by Dr. Nikles from many locations in the Bahama and Caicos Islands. In addition, open pollinated progeny tests of 20 superior trees chosen in natural stands were planted near Beerwah and at Bowenia. Thirty-five pounds of var. *hondurensis* and six lbs. of var. *caribaea* seed were collected from small plots of superior clones.

(c) Loblolly Pine:—It appears the best seed sources of Loblolly Pine and Slash Pine for use near Beerwah will be the extreme southern margins of the distributions in Florida. But for drier, colder, inland areas of higher elevation in South Queensland, improved seed of more northerly and westerly provenance is being tested, especially drought-resistant Loblolly Pine supplied by courtesy of the Texas Forest Service. The generous co-operation of a number of organisations in south-eastern U.S.A. and of the South African Forests Department is gratefully acknowledged in providing many seed samples of improved Loblolly Pine in the past year.

Plans have been produced for the establishment of a small clonal seed orchard of Loblolly Pine at Beerburum. So far 12 superior trees have been chosen by progeny test selection or by phenotypic selection within outstanding families. This work is being carried out jointly with the Forestry Commission of New South Wales.

(d) Radiata Pine.—The work with this species consists mainly of progeny testing local selections at the two major centres of planting, Pechey and Passchendaele. Clonal seed production areas have been established chiefly with parents whose offspring performed well in open pollinated progeny tests, but do include some imported clones. This year 17 lb. of clean seed was obtained from such areas.

(e) Miscellaneous species.—With assistance from Messrs. Lamb and Cooling of the Commonwealth Forestry Institute, seed of a number of tropical pine species was obtained for the establishment of provenance and species trials at many localities. These include Benguet Pine, *P. merkusii*, *P. oocarpa* and *P. tropicalis*.

A Research Note "The Vegetative Propagation of Slash Pine in Queensland" was published. An invited paper "The Production of Improved Seed in Queensland" was submitted to the World Symposium on Man Made Forests.

(iii) Nutrition.—The work of this section is directed mainly towards establishing the fertilizer requirements of plantations established on wallum soils in south-eastern Queensland. More limited work is carried out at Bowenia, Passchendaele and Pechey. Pilot trials in the glasshouse and chemical and physical analyses of soils are carried out, as required for Departmental staff in other centres.

Fertilizer experiments continue to indicate that the application of phosphatic fertilizer to Slash Pine and Loblolly Pine plantations on most of the soil types in the wallum is a commercially sound proposition. The study of the phosphorus cycle in Slash Pine plantations was continued. The relationship between foliar level of nutrients and growth rate in both Exotic and Native Conifers was further studied. Measure data for a series of 80 plots, covering application rates of 0, 2, 4 and 6 cwt. per acre of a 3 : 1 mixture of Nauru rock phosphate and superphosphate to the complete site range in eight to ten-year-old Caribbean Pine plantations at Bowenia, were analysed. In the second year after treatment there was no response to fertilizer applied at two cwt. per acre in any of the site classes, nor to higher rates of

application in plantations with a site index in excess of 105. In plantations with site index between 65 and 105 there were equal responses to fertilizing at four cwt. and six cwt. per acre. The increased production was 300 super. feet (H) per acre. A higher increase in annual yield will be required to offset the cost of fertilizing.

Investigation of appropriate site preparation techniques, prior to the establishment of plantations on periodically water-logged soils, has continued. Several "omission" experiments were laid down to determine limiting nutrients for plantations on these sites. The response to cultivation and to application of superphosphate on a gleyed podsolic soil is illustrated in the following table. All plots except the control plots were cultivated and given a basal dressing of nitrogen, potash and copper at the time of planting. The superphosphate was applied as a split dressing, half at time of planting and half at age two years. No superphosphate was added to the control plots.

RESPONSE OF SLASH PINE TO CULTIVATION AND FERTILIZING—  
AGE 3 YEARS  
(Means of four replications)

Superphosphate Cwt. per acre	Mean Height Feet	C.A.I. Height Feet	Foliar P Per cent.
Control .. ..	6.03	2.56	.071
Nil .. ..	9.52	4.44	.082
2 .. ..	12.26	5.45	.084
4 .. ..	12.73	5.66	.090
8 .. ..	13.16	5.76	.094

It is considered the height difference between the control and nil superphosphate is a response to cultivation, as it is known there would be a nil response to the basal dressing in the absence of added phosphate. The difference between the nil treatment and the plus superphosphate treatments is a response to added phosphate, in the presence of cultivation and basal nitrogen. Foliar phosphorus is above the critical level of 0.077 per cent. in all plots except the control.

In an experiment designed to ascertain optimum levels of nitrogen and phosphorus for the development of Hoop Pine on lateritic podsolic soils, the best response at age 3½ years has been to an annual dressing containing 600 lb. per acre of nitrogen and to a split dressing of 12 cwt. per acre of superphosphate. Mean height was 9.8 feet.

Glasshouse studies indicated a marked response by Patula Pine (*Pinus patula*), grown on lateritic krasnozems soils collected at Pechey, to the addition of phosphatic and potassium fertilizers. Experiments were established to determine the response of Patula Pine plantations at Pechey to phosphorus, potassium and nitrogen added at the time of planting and, in the case of the first two elements, added at age 18 years. There was a very marked response to fertilizing in the new plantation.

(iv) Coastal Hardwoods.—The work of this section is directed chiefly to the study of the Spotted Gum (*Eucalyptus maculata*) forests of the Maryborough district and the wet sclerophyll forests of the Gympie and Brisbane districts with a view to increasing their productivity. Existing field trials have been maintained and new ones have been established to test further the interaction between hormone type, strength and season of application on kill of unwanted stems treated in silvicultural operations.

A hormone treatment trial was initiated in 1956 in a 33-year-old Blackbutt (*Eucalyptus pilularis*) stand to test the effect of removal of Blackbutt coppice regrowth on the increment of stems spaced at 25 feet by 25 feet. There has been an annual volume increment advantage of 28 cubic feet per acre resultant from the removal of coppice regrowth; this is equivalent to an additional 0.2 in. in g.b.h. growth per year. No additional growth advantage has been gained by complete removal of the rainforest understorey. Of the hormone dosages tested 5 per cent. 2,4,5-T amine in water appeared to be the most economic for application in spaced tomahawk cuts to most species occurring in wet sclerophyll forests in south-east Queensland. Cuts spaced at two-inch intervals appeared satisfactory for the killing of Blackbutt, but reduction to one inch between cuts is required for more resistant species such as Tallowwood (*Eucalyptus microcorys*), Brush Box (*Tristania conferta*) and Turpentine (*Syncarpia glomulifera*).

Logging and treatment studies in Spotted Gum—Grey Ironbark (*Eucalyptus drepanophylla*) forests in the Maryborough district have indicated some advantage in raising the existing standards for stem retention. The existing logging prescription for this type of forest specifies a cutting girth limit of 78 in. for Spotted Gum and slightly lower limits for associated species with some thinning permitted in the 48 in. + girth classes—the silvicultural system is one of advanced growth salvage. An alternate logging and treatment

prescription has been under trial in an attempt to raise the productivity of Spotted Gum forests by retaining only that advanced growth which meets certain high standards, viz. retained stems in the 48-78 in. girth class must have 20 ft. of compulsory log, be not badly fire scarred and have a well formed vigorous crown. In the lower girth classes the standards for retention become increasingly higher. The trial prescription makes use of the rapid response of lignotubers and coppice regrowth to removal of the overwood competition, and results in higher yields per acre in the present cutting cycle through the removal of sub-standard stems. Details of logging yields and subsequent increments under the standard logging and treatment prescription and under the trial prescription, as revealed in one of a number of experiments, are given in the following table on a per acre basis.

Prescription	Logged		Retained		Increment 1965-67	
	Volume	Value	Stems	Basal Area	Basal Area	Volume
Standard ..	su.ft. 396	\$ 3.72	25 ft. + 86.7	sq.ft. 41.4	sq.ft. 3.4	su.ft. 298
Trial ..	1,846	10.58	40.2	25.2	2.2	362

Annual girth increment following the application of the standard and trial prescriptions was 0.49 in. and 0.84 in. respectively for Spotted Gum and 0.44 in. and 0.79 in. respectively for Grey Ironbark. Measure data from yield plots have indicated that the average merchantable volume increment of treated coastal Spotted Gum forests has been 130 super. ft. per acre per annum in stems 24 in. + g.b.h.o.b. over a period of 13 years. This is very similar to the growth rate shown for the standard prescription in the table above.

#### Dalby Regional Research Station

This station carries out experimental work in the Cypress Pine (*Callitris columellaris* syn. *glauca*) and Hardwood forests in the area west of Dalby and Warwick with an annual rainfall of 20 in. to 30 in. Work is also carried out in the Rain forests and sclerophyll forests on the Dividing Range, east of Warwick, where the rainfall generally exceeds 50 in. per annum. The new work initiated by this station during the year was limited because of extensive staff changes.

(i) Cypress Pine.—Investigation of methods of chemical control of unwanted species in Cypress Pine forests again occupied a major place in the programme. Observations were continued on trials to determine seasonal effects in the use of 2,4,5-T amine, 2,4,5-T butyl ester and picloram as basal stem injections. There was an early negative correlation between mortality and temperature at time of application. This correlation has subsequently faded indicating that death is more rapid, but not more probable, when injections are carried out in the winter rather than in other seasons. Treatments using picloram have continued to give excellent results with all species other than Spotted Gum. Screening trials were commenced during the year to determine the effectiveness of hormone injections at waist height using a tomahawk and modified sheep vaccinator. This method, if successful, would enable a measured dose of hormone to be applied to a stem. This would ensure economical use of chemicals and would standardise treatment. All experiments concerning the chemical control of unwanted species in Cypress Pine are at present being reviewed with the object of producing a Research Note on this subject in the coming year.

An experiment was commenced during the year with the aim of achieving a realistic working plan for the eradication of *Harrisia* cactus (*Harrisia tortuosa*) from S.F. 154 Western Creek. This noxious weed is again becoming prevalent in the area with heavy infestations of small seedlings which cannot be controlled economically using the standard technique of arsenic pentoxide implantation. Early trials on the spray application of 2,4,5-TP which has shown limited success on the related species at Collinsville, indicate that this hormone should be very effective in controlling the dense masses of seedling regrowth. A study of the effect of arsenic pentoxide and hormone on the viability of seeds inside fruit at various stages of ripeness is also being carried out. These fruits commonly contain between 1,000 and 2,000 seeds and are thus a major source of re-infestation if not rendered sterile, when the plant is destroyed.

Trial plantings on non-productive Family Pine (*Callitris preisii* ssp. *verrucosa* x *C. columellaris*) sites and on fire-devastated Cypress Pine areas continued this year at Inglewood and Dunmore. Experiments to determine the correct season and method of planting in these low rainfall areas

indicate that tubed stock should be planted after good autumn or winter rains. The early growth rate of the 35-acre plantation on the fire-damaged area of Dunmore is very promising with the average height of the two-year-old Loblolly Pine being 4.5 feet and the maximum height 12.0 feet. The possibility of large scale losses in these plantations on low rainfall areas must always be present. It is intended to establish drought-resistant strains of Longleaf Pine (*Pinus palustris*) and Loblolly Pine from Texas U.S.A. in trial plots during the coming year.

(ii) Mountain Forests.—Radiata Pine is showing the best growth to date of the species planted on the cleared Rain-forest area at Gladfield. All species are showing good health and survival, with Loblolly Pine, Patula Pine and Hoop Pine ranking next after Radiata Pine in growth rates. It is planned to extend species trials in this area in the future.

In the enrichment planting trials Radiata Pine once more has demonstrated its versatility and shares the fastest growth rate with Patula Pine. These are followed by Kauri Pine (*Agathis robusta*) and Hoop Pine while the performance of Queensland Maple is quite variable. This latter species, while never attaining North Queensland growth rates, still shows sufficient promise to warrant further consideration.

An experiment to test the effectiveness of 2,4-D amine in water for the control of rainforest weed species was concluded during the year. This hormone was most effective when applied in spring and early summer and re-applications were found to be necessary at six-to-nine month intervals to keep the weeds in check. Weed species exhibit variable tolerance to this herbicide and increases in concentration tended to produce greater terminal damage to the Hoop Pine plants.

An investigation into the suitability of polythene bags for the tubing of Red Ironbark (*E. sideroxylon*) and Cypress Pine was carried out during the year. While growth and survival were inferior to that obtained from standard galvanised iron tubes it was considered that the possibility of large savings in material costs warranted further trials with additional species.

#### Imbil and Yarraman Research Station

These two stations are concerned mainly with research into the establishment and maintenance of plantations of Hoop Pine and other species on Rain forest sites in south-east Queensland. Imbil with an annual rainfall of about 45 in. represents the wetter Hoop Pine plantation areas, while Yarraman with an annual rainfall of about 30 in. represents the drier, more inland, sites.

(i) Plantation Silviculture.—The measurement and maintenance of long-term experiments, involving species trials, plant spacing, effect of removal of weed species, pruning and thinning, were carried out as required. New experiments dealt with culling standards at time of tubing, the use of chemicals to control weed growth in plantations and species trials on wet and dry sclerophyll forest areas which are currently considered to be incapable of supporting profitable Hoop Pine plantations.

The experiments, designed to determine the relative efficiency of 2,4-D amine, 2,4,5-T amine, mixtures of the two amines and mixtures of the two esters, as herbicides when applied as a mist at rates varying between 0.75 lb. and 2.5 lb. active ingredient in two gal. of water per acre, have not yet been assessed. It is standard practice to cover the young Hoop Pine trees while misting the weed crop with these hormone herbicides. It was found on a day, when the temperature in the sun was 102°F., that plants covered with unperforated plastic bags suffered severe damage to the tips if left covered for one hour. Plants covered with plastic bags which had six 1 in. diameter holes 8 in. above ground level suffered slight to moderate tip scorching while plants covered with paper bags suffered only very slight tip damage. Damage was negligible with the paper bag cover and slight with the plastic bag covers when period of cover was half an hour. Damage in all cases, occurred mainly where the cover touched the foliage. Newly planted Hoop Pine trees which were misted with 2,4-D amine or 2,4,5-T amine, applied at rates up to one and one quarter lb. per acre early in 1966, showed no difference in form or vigour when assessed in June, 1967, from plants which were covered during misting.

Application of 2 lb. of diuron per acre in 100 gallons of water with a knapsack spray resulted in complete pre-emergent kills of inkweed (*Phytolacca octandra*), peach (*Trema aspera*), Cape gooseberry (*Physalis peruviana*), wild gooseberry (*Physalis minima*), wild tobacco (*Solanum auriculatum*), lantana (*Lantana camara*), and devil's fig (*Solanum torvum*) and an 80 per cent. pre-emergent kill of wattle (*Acacia* spp.). Applications of two lbs. of diuron per acre in four gallons of water with a surfactant gave similar results. In both treatments subsequent tending was reduced to a manual tend removing coppice and the occasional weed which escaped the effects of the initial spraying. The presence of diuron in the soil did not adversely affect the health or growth of Hoop Pine.

Study of the flowering and fruiting habits of lantana under a plantation canopy at Imbil, was continued. The mean age at which plants flower is 28 months but viable seed will not be produced until plants are about 45 months of age.

A detailed study was made of two pruning experiments at Imbil designed to test the relative merits of three and four stage pruning to 21 feet in Hoop Pine and the relative merits of completing a pruning lift on all select stems in one year as against partial pruning i.e. splitting the lift so that the more vigorous stems are given a pruning lift in one year and the less vigorous stems are given the same pruning lift in the following year. It was found that the extra cost of partial pruning and four lift pruning over three lift pruning were not likely to be recouped by the higher yield of clean wood.

Four trial plots were established at Yarraman to test the suitability of about 12 species for plantation establishment on forest, as distinct from Rain-forest, sites in the Yarraman district. This is the commencement of a plan to similarly test all the major forest types in the district. The application of four ozs. of urea per tree to Hoop Pine freshly planted on a forest type at Imbil resulted in 1.4 feet increased height growth in 18 months. This result may have practical significance as it could expedite crown closure. The growth rate on such sites after crown closure is frequently satisfactory.

(ii) Tree Breeding.—The main objectives of the Hoop Pine breeding programme in south eastern Queensland are to establish and to progeny-test clonal seed orchards at Imbil, and Taromeo near Yarraman.

Field grafting, the standard practice for Hoop Pine, commenced in the Imbil orchard in 1965. Further grafting, mainly by the patch technique was carried out very successfully again this year in the spring and autumn. Top-cleft grafting in the field, without the protective coverings used for similar grafting of the Exotic Pines was also quite successful. An advantage of this method is that the rapid growth of the scion suppresses stock coppice, thus eliminating the need for subsequent tendings. A problem, however, is the provision of scions in sufficient quantity.

Detailed plans have been drawn up for the orchard soon to be established at Taromeo. Grafting incompatibility, a serious problem at Imbil, is not evident among numerous grafts made at Yarraman over a period of several years. Provision has been made in the design of the Taromeo orchard for the incorporation of plagiotropic, pollinator grafts as well as the establishment of the usual orthotropic clones. Use of both types of graft should result in the coincident production of male and female flowers in the orchard and earlier yields of improved seed than would be so otherwise.

Further research was started this year on the problem of delayed, graft incompatibility at Imbil. Trials include hetero-plastic inter-stock grafting of orthotropic scions from "widely-compatible" clones, autoplasmic inter-stock grafting of plagiotropic scions, and expanded work on the induction of basal sprouts to be used as cuttings in rooting trials.

Procedures for progeny testing the Hoop Pine seed orchards have been decided on. A pollen mixture is to be used on all clones. Replicated outplantings are to be made in two or more localities. The primary test plots will be single lines of 10 trees. In addition, replicated 49-tree square plots will be established at one locality.

Estimates were made indicating that 2,000 seed trees and 50 acres of seed production stands should be aimed at in Hoop Pine plantations as a minimum requirement to ensure maximum upgrading of the quality of Hoop Pine seed supplies pending commercial production from the orchards. The selection of these seed trees and seed production areas was accelerated during the year. The increasing reliance upon plantations for seed supplies of Hoop Pine and the growing contribution of improved seed sources to this supply are illustrated in the following table.

WEIGHT IN LBS. PLANTATION SEED COLLECTIONS AT IMBIL—  
HOOP PINE

Year	High Pruned Trees (Routine)	Special Seed Trees and Stands	Total
1957-58	5,221	996	6,217
1962-63	9,641	4,572	14,213
1966-67	13,057	3,281	16,338

Further studies of Hoop Pine provenance tests, already established at Imbil and Yarraman, confirmed that provenance differences in form, vigour and wood quality are of economic significance. As a result a new comprehensive study of variation in Hoop Pine throughout its natural range has been commenced. Some seed samples were obtained in the 1966-67 season and it is hoped to complete the collecting-phase of

the project in the coming year. A feature of the study is that both provenance and individual tree identity will be maintained throughout. The co-operation of the Papua and New Guinea Department of Forestry and the New South Wales Forestry Commission in the project is greatly appreciated.

#### General

No new volume tables were issued during the year, but checks were carried out on Hoop Pine and Radiata Pine tables currently used in thinning sales. A critical examination of the Slash Pine sample tree data presently available revealed several anomalies which appear to be associated with initial spacing. Further data is being obtained to clarify the position before the revised volume tables for this species are finalised. Some preliminary work was carried out on the Hoop Pine data with a view to the preparation of volume tables to three inches and six inches d.u.b. small end suitable for use in thinning sales.

Sample tree data from spacing experiments have now been transferred to punch cards and a study of the effect of initial spacing on volume has commenced. These data are not included in standard tables as used in sales, but will be used in a general volume table for research use.

Information on bark thickness of Hoop Pine and Slash Pine was taken out to permit estimation of the six inches d.u.b. point from overbark measurements, and a prototype gauge was designed for this purpose.

Work on the revision of the site index table for Hoop Pine at Imbil is well advanced, and suitable mathematical models appear to have been arrived at. However, this has been temporarily suspended to permit development of several general purpose computer programmes for use in this and other projects. A graphical revision of the Caribbean Pine table was undertaken to provide urgently needed information for management purposes. The original table for this species was prepared with extremely limited data, and was seriously overestimating site index in younger stands. The new table is based on more extensive, but still inadequate data, and will no doubt require further modification in future.

The appointment of a biometrician in February, 1967, enabled good progress to be made with analysis of experiments which had been deferred up to 12 months.

Data processing services were expanded during the year with the appointment of two trainee programmers who are currently attached to this Branch. In order to give all officers engaged on research an appreciation of computer use, a FORTRAN II course was arranged at Treasury for these officers in September, 1966. A further FORTRAN II course was given within the Department in February, 1967, and a conversion course to FORTRAN IV in May, 1967. In addition, three officers attended COBOL courses at the Treasury Department and at the Main Roads Department.

#### NATIONAL PARKS

Reports from officers indicate that the general public is showing a greater appreciation of the purpose of and need for National Park reservations. Public consciousness of the underlying principles of such reservations is essential for the preservation in their natural state of sufficient areas of our natural heritage. It is very heartening to see this increased interest in National Parks and the dedicated organisations which are so interested in the conservation of our natural flora and fauna, are to be commended for their efforts.

#### New Reservations

A significant feature of National Park administration during the year was the increase by 1,257,487 acres in the area reserved: the total at 30th June, 1967, being 2,306,388 acres.

The main new reservation was Simpson's Desert proclaimed on 20th May, 1967, over about 1,248,000 acres. Following representations by the National Parks Association of Queensland, an inspection was made of part of the Simpson Desert in the south-west corner of Queensland to determine its suitability for National Park reservation.

Access to this area is very difficult and it was necessary to use two 4-wheel drive vehicles. The party consisted of a Botanist from the Department of Primary Industries, the National Parks Zoologist, a Forestry Mechanic, and a guide from Birdsville. The party travelled into South Australia then north-west into the Northern Territory in order to traverse the desert from west to east. The high parallel sand dunes have a steep eastern face almost impossible to climb, even with a four-wheel drive vehicle, which virtually rules out east to west travel.

The inspection served to stress the uniqueness of this desert habitat: the many adaptations to the severe climate displayed by the plants and animals of the area are rarely encountered in other environments. The area is of considerable scientific importance and shows potential for research in a number of scientific disciplines. It was largely for this scientific interest that reservation was sought.

An area of about 5,200 acres on Moreton Island was proclaimed a National Park on 13th August, 1966. This reservation covers a representative sample of the original Moreton Island terrain and includes Mount Tempest which is reputed to be the highest sandhill in the world.

In 1966 the Department acquired freehold portion 138 in the parish of Tenterfield covering 131 acres and on 3rd November 1966, this was amalgamated with existing National Park Reserves 281 and 282 to form the one unit of about 12,605 acres now known as Girraween National Park. Purchase of this area has enabled the Department to establish a picnic and camping area to serve this Park noted for its wild flowers.



A section of the people attending the unveiling of the Plaque honouring Mr. R. W. Lahey, M.B.E., M.E., unveiled by the Premier and Minister for State Development, the Honourable G. F. R. Nicklin, M.M., LL.D., M.L.A., on 28th May, 1967.



An area of about 475 acres was secured from Saddle Mountain holding for adding to Mount Elliott National Park. It contains several examples of Aboriginal art in the form of rock drawings.

National Park status has been given to an area of about 584 acres surrounding the Crow's Nest Falls and the immediate gorge situated about 4 miles from the township of Crow's Nest. Acknowledgement is made of the generosity of local landholders Messrs. T. A. and N. A. Smoothy and A. D. Gleeson who donated parts of their properties to ensure that land on both sides of the creek is preserved for public enjoyment.

On 27th May, 1967, about 3,360 acres of extremely rugged country containing numerous cliffs and precipitous razorback outcrops of the Mistake Mountains were reserved as National Parks and on the same date 56 acres of the South peak of Mount French was so reserved. Negotiations in respect of the North Peak of Mount French are still proceeding.

Finally an area of about 180 acres, donated to the Crown for National Park purposes by Mr. and Mrs. R. W. Lahey from their freehold land, was added to Lamington. It includes a beautiful rain forest area, some small sections along the Main Road to O'Reilly's and a small elevated area which affords unrestricted views in all directions.

#### Lamington Fauna Survey

The fauna survey of Lamington National Park which commenced in 1966 has been continued, and it is anticipated that the field work will be completed during 1967-68. The Zoologist should be able to complete a report on the Survey which it is hoped will form the basis of a publication on this well-known park.

#### Lady Musgrave Island

The Report of the Interdepartmental Committee on Leasing and Development of Queensland Islands listed Lady Musgrave Island as being potentially suitable for Tourist Resort development. Because of its small area of approximately 40 acres and its probable importance as a breeding area for sea-birds the Department felt that a Tourist Resort might constitute a serious disturbance to the wild life.

A complete survey of the fauna and vegetation of Lady Musgrave Island was therefore undertaken in November, 1966. A detailed map of the vegetation was prepared.

The survey revealed that literally every part of the island was occupied by nesting birds. There were mutton birds nesting in burrows under the ground; silver gulls, several species of terns and banded rails nesting on the ground; white capped noddies and reef herons nesting in the trees. Three species of terns and the silver gulls were nesting in defined rookeries of limited area, while bridled terns nested over the whole island wherever there was some open ground.

The white capped noddies were probably the most numerous species. Over 200 nests could be counted in a single tree, and the adult population of the island may have exceeded 100,000.

It was therefore decided that it would be undesirable to allow any habitation on this island and upon the position being represented to it, the Land Administration Commission agreed not to offer any Lease.

#### Scientific Study in National Parks

National Park Management in Queensland follows a policy of complete protection of all things naturally occurring within a park. There is provision however for an exception to be made in the case of Scientific Study.

An example is the work being carried out in Lamington National Park by Dr. Connell of the University of California, which is aimed at determining seed dispersal, growth rates, etc., of Rain forest tree species.

The past year has seen a definite increase in the number of requests for permission to carry out scientific work in National Parks. All such requests require careful consideration. In many cases the desired permit is issued; sometimes a modification of the planned work is required in the interests of protecting the park; if the necessity for using a National Park is not apparent or if the competency of the applicant is in doubt, permission is refused.

#### Expenditure and Work Carried Out

Apart from salaries of officers and other administrative expenses which are not a direct charge on the National Park Vote the amount expended during the year on wages of men engaged on the Parks and on materials for improvements was \$152,190.

Maintenance of existing tracks and improvements is a major task. Other work carried out included 67 chains of new track construction, provision of septic toilets at Purlingbrook, Wyberba and Broken River, Eungella, attention to



Plaque and cairn honouring Mr. Romeo Watkins Lahey, M.B.E., M.E., which was unveiled by the Honourable the Premier of Queensland, Mr. G. F. R. Nicklin, M.M., LL.D., M.L.A., on 28th May, 1967.

Left to Right: Mr. R. W. Lahey, M.B.E., the Premier and Minister for State Development, the Honourable G. F. R. Nicklin, M.M., LL.D., M.L.A., the Minister for Local Government and Conservation, the Honourable H. Richter, M.L.A., the Conservator of Forests, Mr. A. R. Trist, and Secretary, Department of Forestry, Mr. W. Wilkes.

access road and turn round at Bunya Mountains, construction of firebreak at Noosa Heads, completion of footbridge at the Natural Bridge, Numinhah, improvement of access within the Chillagoe Caves, erection of lookouts and safety fences at Wallaman Falls and other areas, nameplating of trees, erection of further signs and provision of extra facilities at picnic areas.

Pamphlets were produced on "Picnic Grounds and Camping Areas Southern Queensland" and "Tamborine Mountain National Parks".

#### Staff

A third National Park Ranger was added to the staff on 1st January, 1967, and approval has been given for another Graduate Forester to be employed full time on National Parks. Full time wages staff number 47.

#### The late "Gus" Kouskos

It is with the deepest regret that the death is recorded of C. Kouskos affectionately known as "Gus" to so many. He commenced with the Department on 22nd April, 1937, and passed away on the job on 19th September, 1966, whilst carrying out a survey in the Numinhah Valley.

His death shocked and saddened not only Departmental officers and his fellow workmates but also a wide circle of friends and visitors to the Parks who held in the highest esteem "the gentle Gus". It has been said that even the creatures of the forest would mourn the passing of this gentle man of nature.

To his widow Mrs. Kouskos and his son Mark Antony, the Department tenders its deepest sympathy and records its thanks and appreciation for all he did for present and future generations in a cause he loved.

#### Plaque to Honour Romeo Watkins Lahey, M.B.E., M.E.

On 28th May, 1967, at 11.30 a.m. the Honourable G. F. R. Nicklin, M.M., LL.D., M.L.A., Premier and Minister for State Development, in the presence of the Minister for Local Government and Conservation, the Honourable H. Richter, M.L.A., and Mrs. Richter and other distinguished visitors, unveiled a plaque erected by the Department of Forestry to honour Romeo Lahey.

The plaque reads as follows:—

This plaque honours ROMEO WATKINS LAHEY, M.B.E., M.E., for his distinguished service to the community in furthering the national park ideal of preserving areas unimpaired for the enjoyment of present and future generations and for his persistent efforts resulting in the proclamation of Lamington National Park on 31st July, 1915.

Mr. Lahey subsequently donated to the Crown valuable areas for addition to this magnificent national park.

Mr. Lahey, as a young man, possessed the same enthusiasm as the explorers of Yellowstone National Park in the United States of America who, in the year 1870, were responsible for the ideal of preserving areas "unimpaired for the enjoyment of future generations".

He took up the cause advocated previously by the late Mr. R. M. Collins for the preservation in all its natural grandeur of an area embracing the headwaters of the Nerang, Coomera and Albert Rivers.

In 1915 he canvassed the people of the Albert Electorate and secured over 500 signatures to a petition to the Honourable J. G. Appel, M.L.A. "praying you to approach the Secretary for Lands to secure the immediate reservation as a National Park of all the contiguous unalienated land along the Macpherson Range in the parishes of Numinhah, Telemo and Roberts".

Mr. Lahey, and others interested in the proposal, were to see their efforts crowned with success when, on the recommendation of the Honourable J. M. Hunter, M.L.A., Minister for Lands, Lamington National Park was proclaimed over an area of about 47,000 acres on 31st July, 1915.

That was but the beginning of a lifetime of devotion by Mr. Lahey to the cause of National Parks. Whilst at all times helpful and constructive Mr. Lahey has not hesitated to make his views known if he considered that any action by the Government, any organization or individual was detrimental to the National Park ideal.

In the year 1930 Mr. Lahey was instrumental in forming the National Parks Association of Queensland, amongst its aims being "To preserve intact in their natural condition the existing National Parks of Queensland and to secure the reservation of all suitable areas; to educate public opinion to a fuller appreciation of the necessity and value of National Parks and to form a link between the public and the administration dealing with the National Parks."

For 31 years Mr. Lahey, as president, guided this Association in its activities.

In the New Year's Honours Lists for 1960 Mr. Lahey was honoured by Her Majesty Queen Elizabeth II with the M.B.E. in recognition of the service he had rendered to the community in Queensland in furthering the National Park ideal in this State.

In more recent times Mr. Lahey has donated to the Crown for addition to Lamington National Park several areas of his privately owned property totalling in all 236 acres. The site on which the plaque stands was donated by him.

Few people in recent times have given so generously of their time, their enthusiasm, their energy and their property in the furtherance of an ideal as has Mr. Lahey.

The Honour Plaque suitably mounted in a cairn has been erected at this chosen spot by the Department of Forestry so that it will serve as a reminder to future generations of what Romeo Lahey, M.B.E., M.E., a true gentleman of nature, has done for a cause that he loves.



Loading Cypress logs in Yuleba State Forest.



Snigging Kauri log to Loading Ramp State Forest 607 Cairns. Freshwater Logging Area, North Queensland.

### HARVESTING AND MARKETING

#### General

The volume of milling timber (including pulpwood) cut from Crown Land during the year fell by about 12 per cent. compared with 1965-66, the total being only 211,630,188 superficial feet hoppus measure. There was a major reduction in the North Queensland cut following a very high rate of operation in the previous year, and throughout the State logging was seriously affected in the latter part of the period under review by unusually adverse weather conditions and related damage to logging roads.

As mentioned in the 1965-66 report 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 for a minor proportion of this volume have been accepted, but those received covering the major part of the timber included conditions not provided for in the tender invitation. For this reason propositions were then invited from any interested party, and discussions relating to such are proceeding.

The revised basis for Crown log pricing being now adopted is mentioned in the introduction of this report.

During the year the stumpage basis for timber sold for use in the round was also re-examined. New stumpage rates for poles and piles reflect the change in the pattern of marketing this type of product, in that prices are now generally related to distance from the nearest registered pressure treatment plant, instead of distance from rail as formerly.

#### 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)											
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 .. .. .	26,247	1,529	36,271	3,918	229,805	23,167	45,579	50,402	8,024	*424,942	
1966-67 Estimated ..	24,500	1,500	38,000	5,000	205,000	17,000	32,000	47,000	10,000	*380,000	

\* Includes Pulpwood.

#### Mill Logs—Crown Lands

The following are the annual quantities of Mill Logs obtained from Crown lands as from 1957-58:—

Super. feet (hoppus)				Super. feet (hoppus)			
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
1961-62 .. .. .	..	..	187,000,000	1966-67 .. .. .	..	..	212,000,000

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)									
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
1966-67 .. .. .	21,144	1,598	25,197	68,648	11,191	14,538	26,970	37,450	4,889

## The Timber Business

(a) Mill Logs—	1965-66	1966-67
Hoop and Bunya Pine .. .. .	22,769,000 super. feet	21,144,000 super. feet
Forest Hardwoods .. .. .	72,947,000 super. feet	68,648,000 super. feet
Scrub Hardwoods .. .. .	16,478,000 super. feet	11,191,000 super. feet
Cypress Pine .. .. .	26,425,000 super. feet	25,197,000 super. feet
Kauri Pine .. .. .	1,681,000 super. feet	1,598,000 super. feet
Cabinet Woods .. .. .	20,389,000 super. feet	14,538,000 super. feet
Miscellaneous Species .. .. .	37,881,000 super. feet	26,970,000 super. feet
Plantation Timbers .. .. .	38,116,000 super. feet	37,450,000 super. feet
Pulpwood .. .. .	3,918,000 super. feet	4,889,000 super. feet
Limb Logs, Head Logs, Stumps and Flitches ..	18,000 super. feet	5,000 super. feet
	<b>240,622,000 super. feet</b>	<b>211,630,000 super. feet</b>
 (b) Construction Timbers—		
Headstocks, Transoms, Crossings, Braces, &c.	155,104 super. feet	204,548 super. feet
Sleepers .. .. .	608,850 pieces	678,537 pieces
Girders, Corbels, Piles, Sills, and Girder Logs ..	59,024 lineal feet	68,671 lineal feet
Poles .. .. .	150,390 super. feet	429,729 super. feet
House Blocks .. .. .	293,228 lineal feet	212,051 lineal feet
Mining Timbers .. .. .	11,389 lineal feet	15,865 lineal feet
Mining Timbers .. .. .	Nil	33 pieces
Mining Timbers .. .. .	570,408 lineal feet	457,849 lineal feet
Gross receipts from Timber Sales, &c. .. ..	<b>\$4,344,960.20</b>	<b>\$3,980,444.95</b>
Nett Revenue .. .. .	<b>\$2,458,988.92</b>	<b>\$2,114,718.33</b>

### Rosewood

The following figures show the position regarding supply and sale of Rosewood during the year:—

In stock at 1st July, 1966 ..	22 tons	13 cwt.
Purchased during year .. .. .	27 tons	6 cwt.

Exported to Hong Kong .. .. .	49 tons	19 cwt.
	49 tons	19 cwt.

Stock on hand .. .. . Nil

No sandalwood was purchased or exported during the year.

### 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 10th April, 1967 ..	\$36.42 to \$36.92
On 29th May, 1967 ..	\$36.92 to \$37.32 (marginal increase)

### Logging

During 1966-67 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 14,481,021	\$ 345,556.41
Forest Hardwoods .. .. .	30,629	
Scrub Hardwoods .. .. .	93,745	
Miscellaneous .. .. .	60,982	
Cedar .. .. .	3,441	
	14,669,818	345,556.41
North Queensland—		
Cabinet Woods .. .. .	752,292	19,703.98
Forest Hardwoods .. .. .	206,417	7,156.08
	958,709	26,860.06
Totals .. .. .	15,628,527	372,416.47

### Constructional Timbers—Departmental Contracts

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

Class of Timber	1964-65	1965-66	1966-67
Sleepers .. .. .	338,831 pieces	311,538 pieces	345,499 pieces
Crossings .. .. .	14,268 super. feet	3,026 super. feet	17,348 super. feet
Transoms .. .. .	12,159 super. feet	3,302 super. feet	51,059 super. feet
Bridge Timber (Round) .. .. .	13,724 lineal feet	21,298 lineal feet	19,280 lineal feet

### Hewn Timber Prices—

No price change made during the year.

### Logging Roads—1966-67

The Department's Road programme for the year constituted 68 miles of construction. Location and working surveys covering 63 miles were carried out.

Expenditure from Forestry Votes was as follows:—

New Construction .. .. .	\$ 175,249
*Maintenance .. .. .	156,369
Subsidies to Shire Councils .. .. .	35,926
Workers' Compensation .. .. .	1,369
Pay Roll Tax .. .. .	4,506
Surveys .. .. .	2,673
Freights and Fares .. .. .	2,602
Resumption for Access .. .. .	2,870
	<b>\$381,564</b>

### SAWMILLS LICENSING

The number of mills in active operation during the year was 516 during the first quarter, 524 during the second quarter and 500 during the third quarter.

Returns to hand for the final quarter are, to date, insufficient to reveal a definite trend but it is anticipated that the effect of adverse weather conditions which is to some extent displayed in the reduced figure for the third quarter will have an even greater effect on figures for the final quarter.

The position in regard to Sawmill Licenses as at the 30th June, 1967 is set out in tabular form below. A further reduction in the number of licensed mills is again demonstrated. It should, however, be borne in mind that as the majority of licenses not renewed applied to mills of minor capacity, the reduction in the number of licenses is not accompanied by a proportionate decrease in overall licensed capacity, the decrease here being less than 1 per cent. Lack of log supplies has again been the main reason for the closure of mills.

The Sawmills Licensing Committee met at regular intervals during the year for the purpose of considering matters pertaining to Sawmills Licensing and submitted their recommendations to the Conservator of Forests.

\* A refund of \$9,684 has been received from the Commonwealth Government as subsidy on flood damage restoration in North Queensland.

The position in regard to Sawmill Licenses as at 30th June, 1967, is shown in the following table:—

Number of Licenses as at 30-6-66	Classification	New Licenses Issued	Changes in Classification		Licenses not Renewed			Current Licenses as at 30-6-67	Total Licenses as at 30-6-67
			Plus	Minus	Refused	Relinquished	Under Consideration		
553	General mills .. .. .	..	..	..	9	30	1	513	514
10	Case mills .. .. .	..	..	..	..	3	..	7	7
35	Sleeper mills .. .. .	..	..	..	1	2	..	32	32
11	Other restrictions .. .. .	1	..	..	..	2	..	10	10
609		1	..	..	10	37	1	562	563

### Offences

During the year ended 30th June, 1967 officers reported 95 breaches of the Acts and Regulations administered by the Department.

Proceedings were successfully instituted against 5 persons and fines totalling \$145.20 imposed.

In 40 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 cost of investigation was charged. Appropriate action was taken in other cases.

As a result of action taken in all cases an amount of \$5,484.54 was recovered by the Crown in timber revenue.

## FOREST PRODUCTS RESEARCH

### I. Engineering and Seasoning

The position of Sawmill Engineer has not yet been filled and assistance to industry has been of a general nature rather than on particular problems requiring research.

There is still need for the education of timber users to handle correctly timber which has been seasoned and dressed. It is still a common sight to see dressed and seasoned timber exposed to sunlight and rain in timber yards and on building sites. Such harmful practices degrade the timber, cause dissatisfaction with the user and handicap it in competition with other materials.

Because of difficulties in dressing dry Cypress Pine it has been the practice to use dressed unseasoned timber. Flooring so laid suffers from subsequent shrinkage. During the coming year research is to be carried out in co-operation with Industry to establish the most efficient techniques to use in machining seasoned Cypress.

### II. Sawmill Economics and Data Processing

The series of Cypress Pine studies commenced last year is almost complete, one mill only remaining to be studied. The New South Wales Forestry Commission co-operated in two studies at mills in that State. Valuable data has been collected which will enable a detailed analysis of log classification and log pricing of this species to be carried out.

During the year a new log price list was issued for plantation thinnings. The list it replaced was for stems that had not been high-pruned and was based on girth breast high and stage of thinning. The new list includes prices for select high-pruned stems and is based on log volume as well as girth breast high. Other log price lists were also reviewed taking into account increases that have occurred in freight, and in other costs of harvesting.

A number of sawing studies were carried out at the Department's Rocklea mill and these were mainly concerned with determining the sawing characteristics of plantation grown timbers.

Continued use is being made of the computer to provide data representative of the species, sizes and types of logs being harvested. A 10% sample is taken of all stumpage accounts issued in respect to logs sold by the Department and the information required was recorded by the punching of 82,000 cards during the year. In this manner data is made available which is of value to the various sections of the Department.

### III. Utilization

Increasing use is being made of the advisory service the Department provides to architects, builders and to the general public on the correct use of timber and on the best species for particular usages. In this regard some 800 personal enquiries were received and dealt with. From these enquiries it is apparent that there is still a lack of knowledge of the

qualities of Queensland grown species on the part of architects and builders who, through established customs and standards, specify imported species for uses that can be met by native species frequently superior for the purpose to the imported species which is regarded as satisfactory.

In its own programme the Department is trying in some measure to overcome this disability by the use of lesser known or unfashionable native species in its buildings. In this regard with the co-operation of the Department of Works, local species were extensively used in the new Forestry Offices at Atherton and Inglewood.

Some 4,900 timber specimens were identified, for enquirers, and work has continued on the development of a method that will permit the identification of timbers by the use of punch cards.

The Department has co-operated with the Universities, C.S.I.R.O., and other Research institutions by the supply of timber, bark and other botanical material for their study. Of particular interest is the search for drugs which may prove effective against cancer.

There has been increased interest overseas in species yielding essential oils.

Tests conducted by the C.S.I.R.O. (Canberra) have shown that the wood of *Ganophyllum falcatum* (Scaly Ash), a North Queensland species, is highly resistant to the attack of subterranean termites.

There is a long felt need for standard grading rules to be formulated and adopted by all connected with the Timber Industry. These will provide a basis on which uniform building codes can be promulgated which will assist in achieving economic and efficient use of the limited timber supplies available. The Department is represented on several committees of the Standards Association of Australia which are dealing with this subject. At present all sections of the Timber Industry are examining critically a draft code of practices recommended for light timber framing. When finally adopted this code will be of great value. Considerable progress has also been made towards the formulation of grading rules for softwoods including plantation grown timbers and of a code dealing with the protection of buildings from subterranean termite attack.

During the year standard grading rules for brushwoods were published and these will be of great value to timber users provided industry grades and sells to these rules and architects and building authorities adopt them in their specifications.

Departmental publications on timber utilization have been in heavy demand and there are indications that users are becoming increasingly aware of the importance of selecting the species best adapted to the use they have in mind.

Under "The Timber Users' Protection Act" 34 complaints were received and investigated. In 5 cases it was found that no breach of the Act had been committed, 13 cases were settled by agreement between the parties concerned whilst action on the balance is still in hand. In addition some 250 buildings were inspected in various districts throughout the State and in a number of instances it was clear that some architects and builders are still unaware of requirements under the Act.

### IV. Wood Structure and Timber Physics

Due to the absence in the U.S.A. of Mr. W. J. Smith who is pursuing further studies, work in this section was somewhat curtailed.

As part of the Tree Breeding Programme with Hoop Pine an assessment was made of wood characteristics of 18 outstanding phenotypes selected by an intensive survey of plantations as candidates for inclusion in seed orchards in the Gympie and Yarraman districts. As a result of these studies 3 trees were eliminated from the programme because of unsatisfactory wood properties.

The increasing use of Caribbean Pine in tropical countries has directed attention to the need for reliable information on its wood qualities and its suitability for pulping and for general softwood purposes. The position is complicated by the existence of three recognised varieties in *P. caribaea*—var. *hondurensis*, var. *caribaea* and var. *bahamensis*. In Queensland the main var. planted is *hondurensis* but there are small trial plantings of the others and two preliminary studies were carried out on material available.

The first of these involved 11 year old trees of varieties *hondurensis* and *bahamensis* derived from adjacent plots on comparable sites at Beerburum. The study embraced anatomical and physical properties of the wood of 5 stems of each variety and whilst firm conclusions cannot be drawn because of the age and restricted nature of the sample, the indications are that var. *hondurensis* has superior wood characters.

Similar observations were made using trees from 30 year old plots at Imbil involving var. *bahamensis* and var. *caribaea*. Five trees of each variety (36-47 in. g.b.h.) were examined and these showed that var. *caribaea* had a greater and more variable fibre length but a lower basic density and percent. late-wood. Both varieties showed resin impregnation in the centre of the stems and further investigations will need to be made on the effect this will have on their use.

An advance was made in the method of taking wood samples from standing trees by the introduction of mechanised sampling using a Tas Petrol Drill P. 7 with modified imported plug cutters with a locally made jig designed to support and guide the cutter. The maximum size of sample that can be removed with this equipment is 17 in. long and 1.4 in. diameter.

#### V. Wood Chemistry and Preservation

During the year additional vacuum pressure plants were installed by the trade bringing to 26 the number of such installations in use. Four of these are using boron for immunisation against Lyctus attack and this is a departure from the conventional tank methods.

The need for constant attention to ensure that treatment techniques are fully and carefully applied is stressed. This is being recognised to an increasing extent by firms operating treatment plants and improved quality control has resulted. Neglect of minor points in technique can cause inadequate impregnation of portions of the charge and therefore operators should insist that all recognised procedures are followed. In this regard the attention of all plant operators was drawn to the need for providing protection from the weather to prevent leaching of water soluble salts from treated timber.

In the course of the year the approval for operation of two plants was withdrawn and their registrations were cancelled because of poor control of the treatment plant.

Experiments have been continued on the use of railway sleepers treated to prolong their life in use and to extend the range of species that are accepted by the Railways Department. These experiments have shown that with the species tried more than 80% of the failures are due to mechanical reasons and that decay is therefore not the limiting factor. However, it is considered that open tank treatment using oil borne preservatives would be practical and effective in protecting against both mechanical failure and decay.

Practically all poles used by Electricity Authorities are now treated with copper-chrome-arsenic salts and tests are being conducted on the use of these preservatives on timber for use in tropical waters. Small scale trials by C.S.I.R.O. have given variable results but tests conducted by the Department with treated piles in the Brisbane River at Oxley and in Moreton Bay are most promising and have proved very effective against *Nausitoria queenslandica*, the most destructive of the Teredino borers. Further tests have been laid down by the C.S.I.R.O. in tropical ports including Gladstone, Cairns and Weipa.

Demands placed on the staff by requests connected with the preservative treatment of timber have restricted the extension of research into fresh fields. However, some work has been possible on the treatment of veneers by dipping in solutions of non-leachable salts and on the use of copper and boron formulations in general preservative treatments.

#### Plywood and Veneer

Routine testing of plywood to Australian Standards specifications revealed that, although major factors such as glue-line quality have been satisfactory, sufficient attention has not been paid to such factors as tapes and staples in the interior veneers.

Tests on the treatment of veneers indicate that more attention should be paid to the control of veneer treatment.

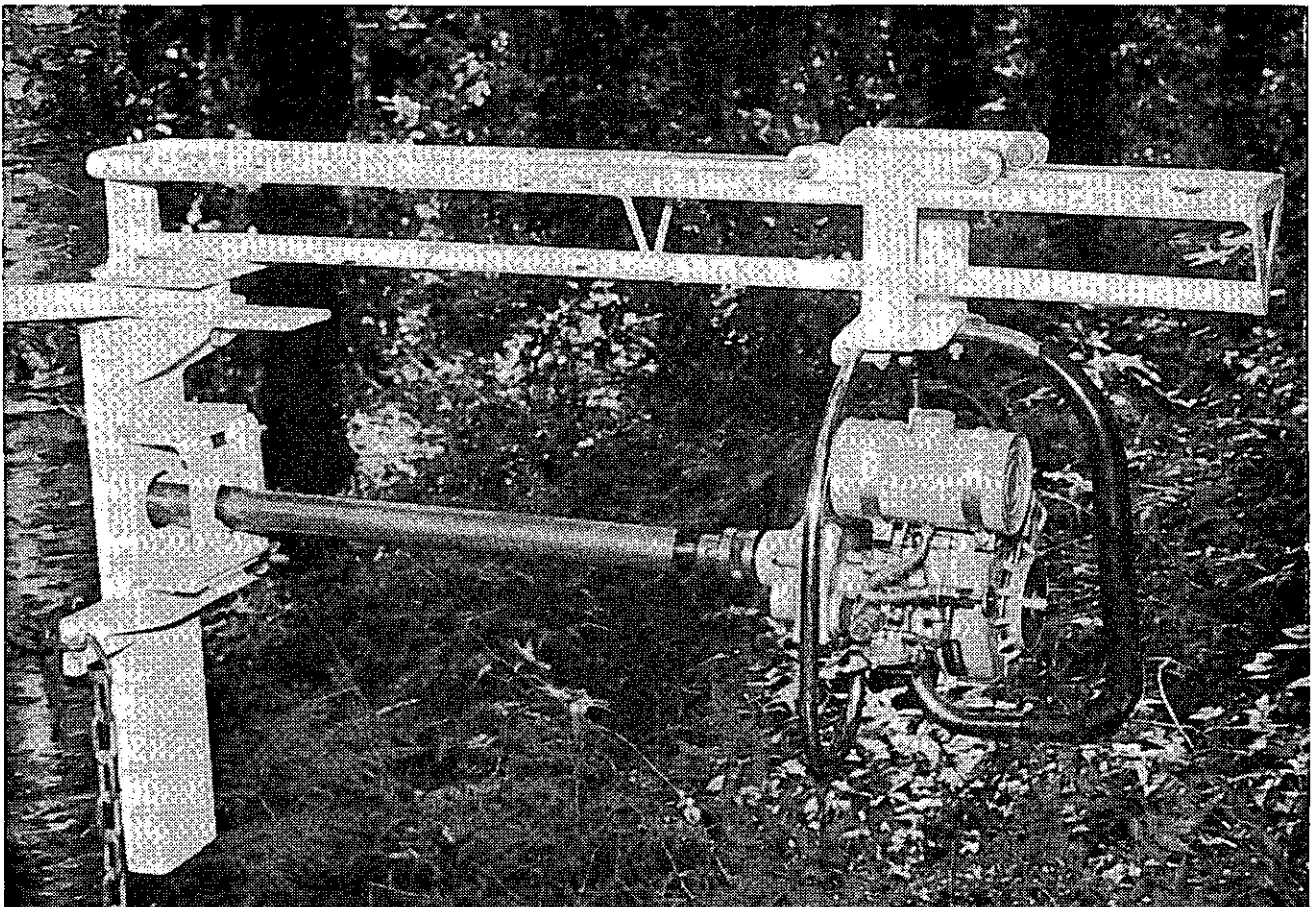
#### Laboratory

During the year some 3,000 spot tests and 3,400 chemical analyses were made relating to treatment of timber and some 4,500 moisture content determinations were carried out.

#### VI. Insects

There has been no falling off in the number of requests for identification of insects causing damage to timber and for advice on treatment to control such damage.

Following the discovery in Maryborough of the drywood termite (*Cryptotermes brevis*) a survey was undertaken to determine the extent of its occurrence. *C. brevis* is a native of the West Indies and is known to cause severe damage in some



Mechanical Core Extractor used for the extraction of wood sample cores from standing trees for parent tree selection purposes.

overseas countries. It is regarded as a much more serious pest than the local species *C. primus* which is known to be present in a number of towns in south-east Queensland. Two hundred and forty houses were inspected in the course of the survey in Maryborough and the presence of *C. brevis* was confirmed in 7 of them. The survey will be extended in the coming year.

#### VII. Education

The Certificate Course in Wood Technology at the Eagle Farm Technical College is in its second year with 12 students, but the number of first year students (14) fell to below half of those in the previous year when 30 students attended the Course.

It is hoped that industry maintains interest in this course as there is a need for education of users and producers of timber at this level.

Officers of this Department in addition to lecturing for such courses have given miscellaneous lectures and talks to specialist officers of the P.M.G., Customs and Quarantine Departments.

#### STAFF

As at 30th June, 1967, there were 460 salaried officers on the staff, comprising 192 in Head Office and 268 at district centres. This represents an increase of 26 on the number of staff as at 30th June, 1966. The number of wages staff employees was 1,791.

Twenty-five salaried officers left the Department during the year and four officers—Messrs. L. N. Kirkham, A. F. Nicholson, L. E. Young and J. A. Manning—retired.

It is with deep regret that the death is recorded of Mr. S. M. Camp, Senior Clerk, Maryborough. The sympathy of all members of the Department is extended to bereaved relatives.

Mr. A. J. Owens, the Senior Forester of the Department, resigned as from 20th May, 1967, for health reasons. Mr. Owens joined the Department as a Cadet Forester on 1st March, 1924, and, after securing his B.Sc. from Adelaide University and his Diploma of Forestry from the Australian Forestry School, served with distinction in many forestry districts of the State before coming to Head Office in 1953 where he remained until his resignation.

Mr. Owens contributed much to Forestry in Queensland during his 44 years of service. His outstanding ability, keen discernment, and wide experience will be greatly missed.

#### ACKNOWLEDGMENT

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, &amp;c., removed from Crown Lands during the Year ended 30th June, 1967

SPECIES	QUANTITY	
	Super. feet	Super. feet
Milling Timber—		
(a) Native Forests—		
Hoop and Bunya Pine—		
Ply .. .. .	2,922,300	
Logs .. .. .	9,241,912	
Tops .. .. .	8,980,277	
		21,144,489
Kauri Pine .. .. .	1,598,017	
Cypress Pine .. .. .	25,197,492	
Forest Hardwoods .. .. .	68,647,971	
Scrub Hardwoods .. .. .	11,190,541	
Cabinet Woods .. .. .	14,537,943	
Miscellaneous Species .. .. .	26,970,107	
Limb Logs, Head Logs, Stumps and Flitches .. .. .	4,586	
		148,146,657
(b) Plantation Thinnings—		
Hoop Pine .. .. .	27,918,412	
Bunya Pine .. .. .	23,604	
Kauri Pine .. .. .	3,670,014	
Slash Pine ( <i>Pinus elliotii</i> ) .. .. .	2,441,461	
Loblolly Pine ( <i>Pinus taeda</i> ) .. .. .	1,816,155	
<i>Pinus patula</i> .. .. .	730,869	
<i>Pinus radiata</i> .. .. .	681,412	
<i>Pinus caribaea</i> .. .. .	39,676	
<i>Pinus insularis</i> .. .. .	37,657	
<i>Pinus echinata</i> .. .. .	44,129	
Exotics (Miscellaneous) .. .. .	12,268	
Hardwood (Rosegum and Blackbutt) .. .. .	34,169	
Maple .. .. .	79	
		37,449,905
Pulp Wood—		
Slash .. .. .	2,255,061	
Loblolly .. .. .	1,644,196	
<i>Pinus echinata</i> .. .. .	26,046	
Hoop Pine .. .. .	963,834	
		4,889,137
		211,630,188

Other Classes—		Expressed as Superficial feet (Hoppus) Log Measure
Sleepers Hewn .. .. .	17,304 pieces	657,552
Sleepers Sawn—5 ft. .. .. .	112,760 pieces	3,157,280
Sleepers Sawn—7 ft. .. .. .	301,877 pieces	11,471,326
Sleeper Blocks (as sleepers contained) .. .. .	246,596 pieces	8,877,456
Transoms, Crossings, Headstocks, Longitudinals .. .. .	204,548 superficial feet	327,277
Girders, Corbels, Piles, Sills, Kerb Logs .. .. .	68,671 lineal feet	1,236,078
Girder Logs .. .. .	429,729 superficial feet	429,729
Poles .. .. .	212,051 lineal feet	1,484,357
House Blocks .. .. .	15,865 lineal feet	95,190
Fencing Material—Split .. .. .	143,114 pieces	1,288,026
Fencing Material—Round .. .. .	88,122 lineal feet	220,305
Mining Timber—Split .. .. .	33 pieces	132
Mining Timber—Round .. .. .	457,849 lineal feet	915,698
		30,160,406

## Other Classes—continued—

Fuel .. .. .	22,896 tons
Trees and Plants (number) .. .. .	534,869 plants
Sand, Gravel, Soil, Antbed, &c. .. .. .	467,981 cubic yards
Freestone .. .. .	2,958 cubic feet
Fibre, Bark, Dry Leaves, Reeds .. .. .	19 bags
Duboisia .. .. .	2,234 pounds
Flora .. .. .	647 pieces
Peat .. .. .	360 bags
Mulga Wood .. .. .	86 tons
Poling Timber (Copper Refining) .. .. .	2,107 tons
Charcoal .. .. .	797 bags
Lawyer Cane .. .. .	4 tons
Boat Knees .. .. .	85 pieces
Bee Hives .. .. .	24 hives

## APPENDIX B

## Total Receipts, Department of Forestry, for the Year ended 30th June, 1967

RECEIPTS FROM DISTRICTS	TOTALS
	\$
Group 1—South Queensland (Brisbane, Beerburum, Beerwah, Benarkin, Bundaberg, Fraser Island, Gallangowan, Gympie, Imbil, Jimna, Kalpowar, Maryborough, Monto, Murgon, Yarraman) .. .. .	2,082,015.22
Group 2—North Queensland (Atherton, Cairns, Cooktown, Charters Towers, Herberton, Hughenden, Ingham, Innisfail, Port Douglas, Ravenswood, Townsville) .. .. .	727,344.54
Group 3—Dalby, Roma, Taroom, Charleville, Mitchell, Quilpie .. .. .	262,199.37
Group 4—Warwick, Goondiwindi, Inglewood, St. George, Stanthorpe, Cunnamulla .. .. .	163,554.98
Group 5—Mackay, Rockhampton, Clermont, Bowen, Proserpine, Emerald, Springsure, Theodore .. .. .	125,449.88
Group 6—Barcaldine, Blackall, Jundah, Longreach, Mulla-burra, Stonehenge, Winton, Aramac, Isisford, Jericho .. .. .	453.88
Group 7—Cloncurry, Boulia, Kynuna, Mackinlay, Richmond .. .. .	398.75
Group 8—Burketown, Coen, Croydon, Georgetown, Normanton, Thursday Island .. .. .	Nil
	\$3,361,416.62

## OTHER RECEIPTS

Forestry and Lumbering .. .. .	402,527.38
Sale of Plants, Material, &c. .. .. .	47,297.77
Licenses† (See note after Appendix C) .. .. .	18,762.00
Rents .. .. .	10,683.01
Grazing Dues .. .. .	28,595.70
Miscellaneous, (Salisbury Area Timber Account, Forfeit Wages, Expenditure Recoveries, &c.) .. .. .	74,914.13
Sale of U.S. Tractors, Trucks, &c. .. .. .	36,248.34
	\$3,980,444.95
	\$
Plant Hire—	
Charged Loan Fund Projects .. .. .	595,325.99
Trust Fund Projects .. .. .	211,609.31
Revenue Fund Projects .. .. .	2,371.94
	809,307.24
	\$4,789,752.19

## APPENDIX C

## Proceeds of Sales of Timber, &amp;c., for the Period 1st July, 1963, to 30th June, 1967

Groups*	1963-64	1964-65	1965-66	1966-67
	\$	\$	\$	\$
Group 1 .. .. .	1,954,880.69	1,908,772.03	2,011,656.17	2,082,015.22
Group 2 .. .. .	772,136.51	817,934.78	831,938.94	727,344.54
Group 3 .. .. .	229,925.15	254,680.03	231,565.70	262,199.37
Group 4 .. .. .	151,421.80	132,461.89	168,362.89	163,554.98
Group 5 .. .. .	119,143.30	141,366.96	129,467.16	125,449.88
Group 6 .. .. .	1,518.33	2,131.89	804.97	453.88
Group 7 .. .. .	399.48	15.95	259.48	398.75
Group 8 .. .. .	..	..	..	..
	\$3,229,425.26	\$3,257,363.53	\$3,374,055.31	\$3,361,416.62
Receipts—Forestry and Lumbering .. .. .	569,252.20	359,518.58	348,852.41	402,527.38
Sale of Plants, Material, &c. .. .. .	17,884.72	24,777.14	39,041.37	47,297.77
Licenses† .. .. .	6,986.45	7,587.45	18,715.25	18,762.00
Rents and Grazing Dues .. .. .	23,995.64	26,809.12	33,007.67	39,278.71
Miscell. (Salisbury Area Timber Account, forfeit wages, Expenditure Recoveries &c.) .. .. .	69,468.56	38,730.48	497,167.13	74,914.13
Sale of U.S. Tractors, Trucks, &c. .. .. .	..	30,123.66	34,121.07	36,248.34
	\$3,917,012.83	\$3,744,909.96	\$4,344,960.21	\$3,980,444.95

\* 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 1965-66 and 1966-67

	1965-66	1966-67
	\$	\$
<b>Revenue—</b>		
Salaries .. .. .	1,344,455	1,463,830
Cryptotermes brevis Investigation ..	..	444 *
Fares, Printing, Stores, &c. .. ..	9,744	9,638
Travelling Expenses and Incidentals ..	100,980	86,075
National Parks .. .. .	61,999	62,191 *
Cash Equivalent of Long Service Leave	17,940	8,953
<b>Loan—</b>		
Reforestation .. .. .	3,980,947	3,999,865
Land Acquisition .. .. .	33,315	15,887
Purchase of Plant .. .. .	375,944	356,845
Access Roads .. .. .	235,594	186,314
Purchase of Radio Equipment .. ..	29,974	18,969
National Parks .. .. .	79,936	89,999
Purchase of Firefighting Equipment ..	..	17,832
<b>Trust—</b>		
Interest and Redemption on Loans ..	2,458,989	2,114,718
Hardwood Supplies to Railway Department and Others .. ..	324,454	364,562
Harvesting and Marketing Timber ..	1,211,759	1,235,745
Access Roads—Maintenance and Subsidies .. .. .	197,802	185,567
Maintenance of Plant .. .. .	559,945	638,395
Maintenance of Capital Improvements	115,978	124,215
<b>Total .. .. .</b>	<b>\$ 11,139,755</b>	<b>10,980,044</b>

## APPENDIX D

## Constructional Timbers Supplied During Financial Year 1966-67 under Forestry and Lumbering Operations

Class of Timber	Quantity	Sales Value
		\$
Hewn Crossings ..	27,267 super. feet ..	2,744.44
Sawn Crossings ..	17,348 super. feet ..	1,717.41
Headstock and Braces ..	2,317 super. feet ..	288.12
Hewn Transoms ..	30,246 super. feet ..	5,848.95
Sawn Transoms ..	20,813 super. feet ..	2,268.51
Piles .. .. .	6,563 lineal feet ..	5,934.96
Girders—Dressed ..	10,400 lineal feet ..	25,240.61
Hewn Sleepers ..	17,304 pieces ..	23,437.91
Sawn Sleepers ..	81,599 pieces ..	109,142.51
Sleeper Blocks (as sleepers contained) ..	246,596 pieces ..	209,754.90
Split Posts and Rails, &c.	12,831 pieces ..	4,616.67
<b>Total .. .. .</b>		<b>\$390,994.99</b>

## APPENDIX F

## Net Area of Plantation Established 1st April, 1966, to 31st March, 1967

Species	Brisbane	Gympie	Mackay	Maryborough	Monto	Murgon	North Queensland	Warwick	Yarraman	Totals
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
<b>1. Conifers</b>										
<b>A. Native Conifers—</b>										
Hoop Pine .. .. .	143.8	449.0	28.7	40.0	301.0	630.1	60.6	..	1,076.9	2,730.1
Kauri Pine .. .. .	..	..	..	..	..	..	1.4	..	..	1.4
Bunya Pine .. .. .	..	..	..	..	..	..	..	..	..	..
Other Native Conifers .. .. .	..	..	..	..	..	..	..	..	..	..
<b>Total—Native Conifers .. .. .</b>	<b>143.8</b>	<b>449.0</b>	<b>28.7</b>	<b>40.0</b>	<b>301.0</b>	<b>630.1</b>	<b>62.0</b>	<b>..</b>	<b>1,076.9</b>	<b>2,731.5</b>
<b>B. Exotic Conifers—</b>										
<i>P. elliotii</i> .. .. .	648.7	937.7	12.1	1,855.9	..	..	..	..	113.0	3,567.4
<i>P. taeda</i> .. .. .	..	17.9	..	..	1.3	11.9	..	..	11.2	42.3
<i>P. patula</i> .. .. .	..	..	..	..	1.3	16.8	..	..	120.8	138.9
<i>P. caribaea</i> .. .. .	15.6	31.4	677.2	112.3	1.4	4.7	204.4	..	..	1,047.0
<i>P. radiata</i> .. .. .	..	..	..	..	..	..	..	278.0	135.6	413.6
<i>P. palustris</i> .. .. .	..	..	..	..	..	..	..	..	..	..
Other Exotic Conifers .. .. .	11.3	..	3.2	..	0.8	0.3	1.6	..	..	17.2
<b>Total—Exotic Conifers .. .. .</b>	<b>675.6</b>	<b>987.0</b>	<b>692.5</b>	<b>1,968.2</b>	<b>4.8</b>	<b>33.7</b>	<b>206.0</b>	<b>278.0</b>	<b>380.6</b>	<b>5,226.4</b>
<b>Total—Conifers .. .. .</b>	<b>819.4</b>	<b>1,436.0</b>	<b>721.2</b>	<b>2,008.2</b>	<b>305.8</b>	<b>663.8</b>	<b>268.0</b>	<b>278.0</b>	<b>1,457.5</b>	<b>7,957.9</b>
<b>2. Broadleaved Species</b>										
<b>A. Native Forest Hardwoods—</b>										
<i>Euc. grandis</i> (and <i>E. saligna</i> ) ..	..	..	..	..	..	..	..	..	..	..
<i>Euc. drepanophylla</i> .. .. .	..	..	..	..	..	..	..	..	..	..
<i>Euc. microcorys</i> .. .. .	..	..	..	..	..	..	..	..	..	..
<i>Euc. pilularis</i> .. .. .	..	..	..	..	..	..	..	..	..	..
<i>Euc. cloeziana</i> .. .. .	..	..	..	..	..	..	..	..	..	..
Others .. .. .	..	..	..	..	..	..	..	..	..	..
<b>Total—Native Forest Hardwoods .. .. .</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>
<b>B. Other Broadleaved Species—</b>										
Silky Oak .. .. .	..	..	..	..	..	..	..	..	..	..
Queensland Maple .. .. .	..	..	..	..	..	..	..	..	..	..
Red Cedar .. .. .	..	..	..	..	..	..	..	..	..	..
Others .. .. .	..	..	..	..	..	..	..	..	..	..
<b>Total—Other Broadleaved Species .. .. .</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>
<b>Total—Broadleaved Species .. .. .</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>..</b>
Miscellaneous Experimental .. .. .	..	..	..	..	..	..	..	1.7	0.8	2.5
<b>Total—All Species .. .. .</b>	<b>819.4</b>	<b>1,436.0</b>	<b>721.2</b>	<b>2,008.2</b>	<b>305.8</b>	<b>663.8</b>	<b>268.0</b>	<b>279.7</b>	<b>1,458.3</b>	<b>7,960.4</b>

## APPENDIX G

## Net Area of Effective Plantation Classified into Forestry Districts to 31st March, 1967

Species	Brisbane	Gympie	Mackay	Mary- borough	Monto	Murgon	North Queens- land	Warwick	Yarraman	Totals
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
<i>1. Conifers</i>										
A. Native Conifers—										
Hoop Pine .. ..	992.5	18,695.2	62.2	310.5	4,217.0	11,691.6	1,436.2	3.7	22,521.7	59,930.6
Kauri Pine .. ..	5.3	1,070.9	2.5	69.7	3.6	4.9	284.9	0.8	7.4	1,450.0
Bunya Pine .. ..	0.9	452.8	..	0.8	1.2	64.8	0.2	..	50.0	570.7
Other Native Conifers	2.1	7.2	0.5	1.9	..	..	0.2	..	..	11.9
Total—Native Conifers	1,000.8	20,226.1	65.2	382.9	4,221.8	11,761.3	1,721.5	4.5	22,579.1	61,963.2
B. Exotic Conifers—										
<i>P. elliotii</i> .. ..	14,092.2	10,940.6	2,491.1	14,404.8	52.0	1.4	11.5	767.4	798.4	43,559.4
<i>P. taeda</i> .. ..	3,534.7	78.1	7.3	54.8	2.7	87.2	14.0	235.9	21.8	4,036.5
<i>P. patula</i> .. ..	19.8	37.1	8.1	8.2	24.0	190.2	35.0	459.9	3,555.3	4,337.6
<i>P. caribaea</i> .. ..	167.0	209.4	5,202.7	435.6	1.4	4.7	307.3	..	0.2	6,328.3
<i>P. radiata</i> .. ..	0.5	..	..	..	..	0.2	..	2,433.4	668.7	3,102.8
<i>P. palustris</i> .. ..	237.9	1.6	7.3	1.0	..	..	..	8.8	1.4	258.0
Other Exotic Conifers	55.8	25.2	108.3	17.3	9.5	0.9	9.3	29.1	38.6	294.0
Total—Exotic Conifers	18,107.9	11,292.0	7,824.8	14,921.7	89.6	284.6	377.1	3,934.5	5,084.4	61,916.6
Total—Conifers ..	19,108.7	31,518.1	7,890.0	15,304.6	4,311.4	12,045.9	2,098.6	3,939.0	27,663.5	123,879.8
<i>2. Broadleaved Species</i>										
A. Native Forest Hard- woods—										
<i>Euc. grandis</i> (and <i>E.</i> <i>saligna</i> ) .. ..	277.3	1,273.6	0.1	0.2	..	26.8	1.1	..	185.4	1,764.5
<i>Euc. drepanophylla</i> .. ..	203.4	182.2	0.1	0.1	..	71.1	37.8	..	468.6	963.3
<i>Euc. microcorys</i> .. ..	123.5	18.9	..	0.7	..	..	28.2	..	5.0	176.3
<i>Euc. pilularis</i> .. ..	200.2	220.9	..	0.3	..	..	..	..	0.5	421.9
<i>Euc. cloeziana</i> .. ..	..	258.4	..	0.1	..	..	..	..	..	258.5
Others .. ..	29.0	85.8	..	0.9	..	..	9.2	..	3.7	128.6
Total—Native Forest Hardwoods .. ..	833.4	2,039.8	0.2	2.3	..	97.9	76.3	..	663.2	3,713.1
B. Other Broadleaved species—										
Silky Oak .. ..	..	94.4	..	0.4	..	25.0	26.5	..	625.2	771.5
Queensland Maple .. ..	..	66.8	..	..	0.6	..	247.6	..	..	315.0
Red Cedar .. ..	..	2.8	..	..	..	..	31.3	..	..	34.1
Others .. ..	0.1	77.3	0.3	0.4	0.2	..	34.1	..	1.1	113.5
Total—Other Broad- leaved Species ..	0.1	241.3	0.3	0.8	0.8	25.0	339.5	..	626.3	1,234.1
Total — Broadleaved Species .. ..	833.5	2,281.1	0.5	3.1	0.8	122.9	415.8	..	1,289.5	4,947.2
Miscellaneous Experi- mental .. ..	56.1	37.7	21.4	..	..	0.1	10.4	14.3	65.2	205.2
Total—All Species ..	19,998.3	33,836.9	7,911.9	15,307.7	4,312.2	12,168.9	2,524.8	3,953.3	29,018.2	129,032.2

APPENDIX H  
Areas of Natural Forest Treated

## A.—EUCALYPTS

Sub-District	Treated 1966-67	First Treatment 1966-67	Total as at 30th June, 1967
	Acres	Acres	Acres
Brisbane .. ..	1,191	1,088	30,273
Beerburum .. ..	684	..	20,383
Gympie .. ..	88	73	20,162
Imbil .. ..	..	..	159
Mackay .. ..	2,049	2,049	10,691
Emerald .. ..	..	..	33,875
Maryborough .. ..	3,828	1,649	107,205
Bundaberg .. ..	1,113	..	36,303
Fraser Island .. ..	2,463	292	22,535
Monto .. ..	1,315	1,315	22,146
Murgon .. ..	2,924	2,670	40,757
Atherton .. ..	..	..	3,689
Ingham .. ..	..	..	2,985
Warwick .. ..	68	..	10,462
Inglewood .. ..	..	..	15,697
Yarraman .. ..	33	..	6,414
Benarkin .. ..	..	..	2,067
Dalby .. ..	117	117	80,835
<b>Total—Eucalypts</b>	<b>15,873</b>	<b>9,253</b>	<b>466,638</b>

## APPENDIX H—continued

## B.—CYPRESS PINE

Sub-District	Treated 1966-67	First Treatment 1966-67	Total as at 30th June, 1967
	Acres	Acres	Acres
Bundaberg .. ..	..	..	2,152
Fraser Island .. ..	..	..	4,424
Monto .. ..	..	..	2,496
Inglewood .. ..	4,025	2,136	95,362
Dalby .. ..	7,618	6,464	226,140
<b>Total—Cypress Pine</b>	<b>11,643</b>	<b>8,600</b>	<b>330,574</b>

## APPENDIX H—continued

## C.—RAIN FOREST

Sub-District	Subsequent Treatment 1966-67	First Treatment 1966-67				First Treatment Completed 1966-67	Total as at 30th June, 1967
		Brushed	Ringbarked and Thinned	Logged under Treemarking Conditions	Trees Interplanted		
	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Natural Hoop Pine—							
Maryborough .. ..	..	..	..	..	..	..	65
Bundaberg .. ..	..	..	..	..	..	..	9,973
<b>Total—Natural Hoop Pine</b>	..	..	..	..	..	..	<b>10,038</b>
Natural Rain Forest—							
Atherton .. ..	146	362	424	2,180	..	335	6,264
Ingham .. ..	162	22	22	4,790	..	22	1,316
Warwick .. ..	19	..	..	..	..	..	21
<b>Total—Natural Rain Forest</b>	<b>327</b>	<b>384</b>	<b>446</b>	<b>6,970</b>	<b>..</b>	<b>357</b>	<b>7,601</b>
<b>Total—Rain Forest..</b>	<b>327</b>	<b>384</b>	<b>446</b>	<b>6,970</b>	<b>..</b>	<b>357</b>	<b>17,639</b>

## APPENDIX H—continued

Grand Total—		Acres
Eucalypts .. ..	..	466,638
Cypress Pine .. ..	..	330,574
Rain Forest .. ..	..	17,639
		<u>814,851</u>

## APPENDIX I

State Forests, Timber Reserves, National Parks and Scenic Areas listed by Forestry Districts and Sub-Districts as at 30th June, 1967

District	Sub-District	State Forests			Timber Reserves			National Parks			Scenic Areas		
		No.	Area		No.	Area		No.	Area		No.	Area	
			A.	R. P.		A.	R. P.		A.	R. P.		A.	R. P.
Brisbane ..	Beerburrum Brisbane ..	29	100,423	3 8	16	6,742	1 29	1	1,669	3 20	10	2,422	0 8
		36	189,077	1 26	18	26,079	0 3	11	85,998	2 0	24	6,381	3 11.3
	Total ..	65	289,501	0 34	34	32,821	1 32	12	87,668	1 20	34	8,803	3 19.3
Dalby ..	Chinchilla- Barakula	16	820,932	2 18	3	17,911	0 0	1	22,000	0 0	..	..	..
	Dalby ..	17	478,614	2 35	5	5,977	0 39	1	13,145	0 0	..	..	..
	Roma ..	14	408,280	1 37	5	112,202	0 0	..	..	..	..	..	..
	Total ..	47	1,707,827	3 10	13	136,090	0 39	2	35,145	0 0	..	..	..
Gympie ..	Gympie ..	35	287,980	1 36	3	2,511	1 8	..	..	..	3	941	0 0
		10	143,614	2 0	2	148	2 3	..	..	..	1	640	0 0
	Total ..	45	431,594	3 36	5	2,659	3 11	..	..	..	4	1,581	0 0
Mackay ..	Emerald ..	3	132,358	3 35	10	210,762	2 0	3	1,379,400	0 0	..	..	..
		8	166,200	0 0	20	106,336	2 19.1	24	255,359	0 0	64	15,538	1 38
		23	423,320	0 4	15	129,576	2 22	2	12,954	0 0	13	1,020	0 0
	Total ..	34	721,878	3 39	45	446,675	3 1.1	29	1,647,713	0 0	77	16,558	1 38
Maryborough	Bundaberg ..	15	193,741	3 14	..	89,336	2 31	..	..	..	..	..	..
		1	371,890	0 0	22	..	..	..	..	..	..	..	..
		38	366,787	0 13	18	31,276	0 37	3	10,540	0 0	3	805	0 0
	Total ..	54	932,418	3 27	40	120,612	3 28	3	10,540	0 0	3	805	0 0
Monto ..	Kalpowar ..	4	28,077	2 0	14	46,635	0 35	..	..	..	..	..	..
		14	381,097	1 35	32	178,713	0 38	1	3,830	0 0	5	1,077	0 0
	Total ..	18	409,174	3 35	46	225,348	1 33	1	3,830	0 0	5	1,077	0 0
Murgon ..	Gallangowan	3	38,310	0 0	..	..	..	..	..	..	..	..	..
		7	99,511	1 14	..	..	..	..	..	..	..	..	..
		10	100,084	0 0	11	54,920	1 3	..	..	..	..	..	..
	Total ..	20	237,905	1 14	11	54,920	1 3	..	..	..	..	..	..
North Queensland	Atherton ..	36	842,838	3 6	35	828,753	0 13	13	252,259	0 0	31	6,806	0 19
		12	499,770	0 0	5	53,308	0 0	15	204,247	0 0	13	1,835	0 0
	Total ..	48	1,342,608	3 6	40	882,061	0 13	28	456,506	0 0	44	8,641	0 19
Warwick ..	Inglewood ..	22	384,072	2 31	5	16,764	0 8	..	..	..	..	..	..
		12	79,659	3 37	5	6,888	3 28	2	15,325	0 0	4	494	3 0
	Total ..	34	463,732	2 28	10	23,652	3 36	2	15,325	0 0	4	494	3 0
Yarraman ..	Benarkin ..	4	70,775	0 0	3	4,442	2 26	..	..	..	..	..	..
		16	111,914	0 0	9	14,978	2 25	0	11,085	0 0	2	614	3 0
	Total ..	20	182,689	0 0	12	19,421	1 11	0	11,085	0 0	2	614	3 0
Grand Total		385	6,719,332	2 29	256	1,944,264	1 7.1	77	2,267,812	1 20	173	38,575	3 36.3

At 30th June, 1967—

Total area set apart as—

State Forests .. .. .	..	..	..	..	..	..	..	6,719,332	2	29
Timber Reserves .. .. .	..	..	..	..	..	..	..	1,944,264	1	7.1
National Parks .. .. .	..	..	..	..	..	..	..	2,267,812	1	20
Scenic Areas .. .. .	..	..	..	..	..	..	..	38,575	3	36.3
Total Reservations .. .. .	..	..	..	..	..	..	..	10,969,985	1	12.4

## APPENDIX J

## Reservations for the Year ended 30th June, 1967

1st July, 1966, to 30th June, 1967

## STATE FORESTS

	No.	A.	R.	P.
At 1st July, 1966 .. .. .	374	6,553,343	3	10
Proclaimed 1-7-66 to 30-6-67 ..	12	113,858	1	0
Crown Land added to Existing State Forests .. .. .	..	28,318	3	16
Proclaimed Converted Timber Reserves .. .. .	3	36,092	2	39
Timber Reserves amalgamated with State Forests .. .. .	..	7,746	0	0
State Forests amalgamated with existing State Forests .. .. .	-3	..	..	..
Areas released .. .. .	-1	Less 8,463	0	20
Recomputation of boundary .. .. .	..	Less 11,563	3	16
<b>Total at 30th June, 1967 ..</b>	<b>385</b>	<b>6,719,332</b>	<b>2</b>	<b>29</b>

## TIMBER RESERVES

At 1st July, 1966 .. .. .	265	1,995,844	2	16.1
Timber Reserves Converted to State Forests or National Parks ..	-4	Less 42,728	2	39
Crown Land added to existing Timber Reserves .. .. .	..	47	0	0
Recomputation of Boundary .. .. .	..	963	0	0
Reserves cancelled .. .. .	-5	Less 9,856	2	10
Areas released .. .. .	..	Less 5	0	0
<b>Total at 30th June, 1967 ..</b>	<b>256</b>	<b>1,944,264</b>	<b>1</b>	<b>7.1</b>

## APPENDIX J—continued

## NATIONAL PARKS

	No.	A.	R.	P.
At 1st July, 1966 .. .. .	75	1,010,899	2	8
Proclaimed 1-7-66 to 30-6-67 ..	2	1,253,200	0	0
Crown Land added to existing National Parks .. .. .	..	786	2	19.1
Areas released .. .. .	..	Less 5	1	28
Proclaimed Converted Timber Reserves or Scenic Areas .. .. .	..	3,415	3	23
Recomputation of boundary .. .. .	..	Less 484	1	2.1
<b>Total at 30th June, 1967 ..</b>	<b>77</b>	<b>2,267,812</b>	<b>1</b>	<b>20</b>

## SCENIC AREAS

At 1st July, 1966 .. .. .	172	38,001	3	5.6
Proclaimed 1-7-66 to 30-6-67 ..	3	640	0	13.7
Crown Land added to existing Scenic Areas .. .. .	..	0	1	4
Areas released .. .. .	..	Less 23	0	0
Areas converted to National Parks ..	-2	Less 55	3	23
Recomputation of Boundary .. .. .	..	12	2	36
<b>Total at 30th June, 1967 ..</b>	<b>173</b>	<b>38,575</b>	<b>3</b>	<b>36.3</b>

## APPENDIX K

## Distribution of Personnel, 30th June, 1967

Salaried officers .. .. .	..	..	..	..	..	460
Other employees .. .. .	..	..	..	..	..	1,791
						<b>2,251</b>