THE REGENERATION OF COMMERCIAL EUCALYPT FORESTS ON SURREY HILLS, N.W. TASMANIA

BY

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Figures, diagrams, graphs and photographs

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TABLE 0.1

Summary of Regeneration Research Data

SAMPLE NUMBER	FOREST TYPE	TREATMENT	LOCATION	SIZE OF SAMPLE	MEAN % MILACRE STOCKING	% AREA * ADEQUATE STOCKED	MEAN ** SEEDLING NO/ACRE
1.	Eucalypt-sclerophyll scrub	Logging only	Natone Road Black Ck. Rd.	314	30%	49%	750
2.	Eucalypt-sclerophyll scrub	Logged & burnt	Mt. Housetop area	101	93%	97%	9000
3.	Eucalypt-rainforest scrub	Logged, seedbed prepared by dozing before logging	Mayday Road Cattley Road	254	45%	77%	1350
4.	Eucalypt-rainforest scrub	Logged & burnt by wild fire	Cattley Road	70	89%	100%	7000
5.	Eucalypt-rainforest scrub	Logged, seedbed prepared by dozing before logging	Main Road Blythe Road Peak Plain Rd.	99	44%	73%	1300
6.	Eucalypt-rainforest	Logged only	Old Park Rd. Blythe Road Dempsters Rd. Gin Creek Rd. Rawlings Road	259	17%	30%	350
7.	Eucalypt-rainforest	Logging only	29 Mile Road - Bunkers Road	150	40%	68%	1125
8.	Eucalypt-rainforest	Logged & burnt by wild fire	Leven Road	51	61%	80%	2350
9.	Eucalypt-rainforest	Logged, treated by slash felling and burnt	Loyetea Loongana	70	73%	100%	3500
10.	Eucalypt-grassland	Logged	Guildford Campbells Bunkers	333	37%	48%	1000
11.	Eucalypt-rainforest	Logged	Parrawe	100	20%	44%	375

* By mapping rules (see section 3A) 1801 Chns

** Calculated from the graph of seedling number/1% milacre stocking.

This data is a summarised form of the results which are included in Appendix I .

Figure 2.0

Map of the general area - scale 4 miles = 1 inch

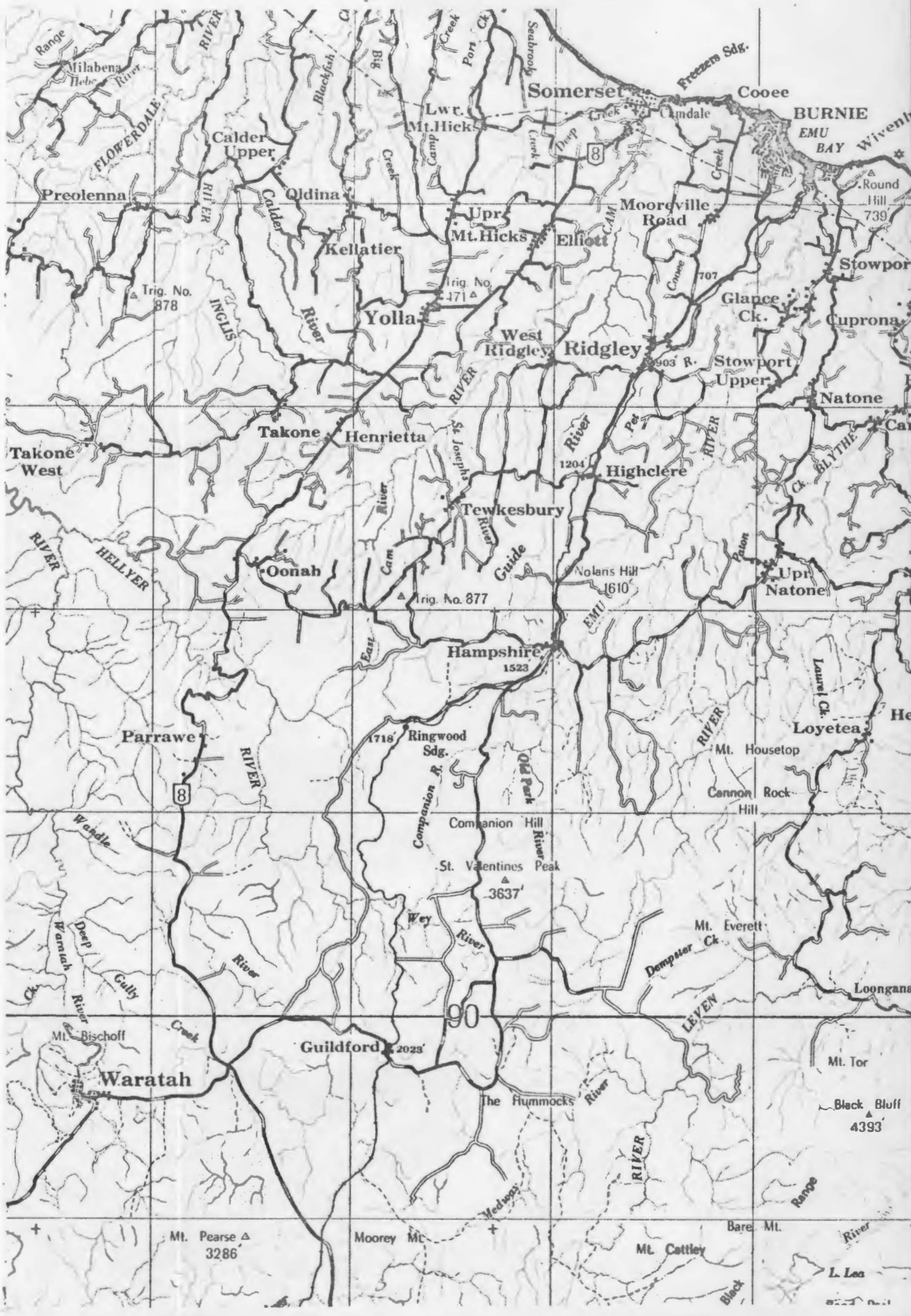

Table 2.2 Occurrence of plant communities and soil types at Surrey Hills, Parrawe and Loyetea.

Community	Soil Type		Fertility ⟶	
	Moor podzol peat	Yellow podzolic	Y.podzolic (granite)	Kraznozen
Rainforest	-	✓	✓	✓
Eucalypt-rainforest	-	✓	✓	✓
Eucalypt-rainforest scrub	-	✓	✓	✓
Eucalypt-sclerophyll scrub	-	✓	✓	*
Eucalypt-grassland	-	*	*	✓
Sedgeland	✓	-	-	-

* Excluded on altitude and rainfall rather than soil type.

Figure 2.1

An area of pure rainforest on the southern edge of the Mayday Plain. The dominant species is Nothofagus cunninghamii. The plain area was formerly rainforest which was destroyed by fire, Nothofagus stumps can be found on the plain.

Figure 2.2

An area of rainforest located on basalt at Kara. The tree species is Nothofagus cunninghamii, the fern is Dicksonia antarctica.

Figure 2.3

An area of rainforest dominated by Phyllocadus asplenifolius ; this is located adjacent to the track to St. Valentines Peak. This species is usually found on acidic soils and in this example it is situated on a shallow skeletal soil derived from Owen conglomerate.

Figure 2.4

An ecotone between Eucalypt - rainforest scrub and Eucalypt - sclerophyll scrub located near the 29 mile Rd. railway crossing (northern Surrey Hills). The eucalypt species are *E.dalrympleana* (white-trunk) and *E.delegatensis* .

Figure 2.5

An area of Eucalypt-rainforest at the Hatfield railway crossing (SW corner of Surrey Hills). The eucalypt species is E.delegatensis . Dieback is prevalent beyond the edge of the railway clearing, the age of the rainforest understorey is about 120 years.

Figure 2.6

Eucalypt-rainforest scrub at Cattley Rd., the area has been logged but not "pepper dozed".

Figure 2.7

An area of rainforest scrub understorey at Cattley Rd. In this case the species are *Telopea truncata* and *Phyllocladus asplenifolius* about forty years old

Figure 2.8

Eucalypt sedgeland-The dominant species of this sedgeland is the cyperaceous plant Gymnoschoenus sphaerocephala and the peripheral eucalypt is E.simmondsii .

Figure 2.9

An area at the Hatfield railway crossing which illustrates the sequence of forest succession at Surrey Hills. The grass areas are confined to the old railway location (the new works have only just been completed) which vanishes into the centre of the picture, On the left hand side of the old location is a stand of E.delegatensis regrowth which has an understorey of rainforest scrub species. On the right hand side is an area of Eucalypt-rainforest. Notice the incidence of Dieback in the Eucalypt-rainforest type (age of understorey 120 years). Constant firing of this area,due to the steam locomotives, has reduced a former Eucalypt-rainforest site to grassland. The dead eucalypt stags above the E.delegatensis regrowth crop were probably killed by the fire that was responsible for the regrowth itself.

Table 2.3. List of Prevalent Species in the Eucalypt-Rainforest Association

STRATA	UNDISTURBED FOREST (GOOD SITE QUALITY)	DISTURBED FOREST (GOOD SITE QUALITY)	UNDISTURBED FOREST (POOR SITE QUALITY)
Dominant Tree Species ≤180 feet	E. delegatensis E. obliqua E. dalrympleana	E. delegatensis E. obliqua E. dalrympleana	E. simmondsii E. gunnii
Understorey Species ≤120 feet	Nothofagus cunninghamii Atherosperma moschatum	Nothofagus cunninghamii Atherosperma moschatum Eucryphia lucida Acacia melanoxylon Acacia dealbata Phyllocladus aspleniifolius Leptospermum lanigerum Anodopetalum biglandulosum	Nothofagus cunninghamii Atherosperma moschatum Eucryphia lucida Acacia melanoxylon Acacia dealbata Phyllocladus aspleniifolius Leptospermum lanigerum Anodopetalum biglandulosum
Shrub Species ≤25 feet	Dicksonia antartica	Drimys lanceolata Aristotelia peduncularis Pultenaea juniperina Phebalium squameum Zieria arborescens Pittosporum bicolor Trochocarpa cunninghamii Gaultheria hispida Pomaderris apetala Cenarrhenes nitida Coprosma billardieri Telopea truncata	Drimys lanceolata Melaleuca squarrosa Trochocarpa cunninghamii Gaultheria hispida Cenarrhenes nitida Bauera rubioides
Species of the Forest Floor	Polystichum vestitum Blechnum spp.	Polystichum vestitum Histiopteris incisa Blechnum spp. Hypolepis rugosula	Histiopteris incisa Hypolepis rugosula Blechnum spp.

The aggregation effect of eucalypt seedling distribution can be described mathematically in terms of "h", the heterogeneity factor (see Mount 1961).

Figure 3.1

Seedling distribution with varying heterogeneity factors.

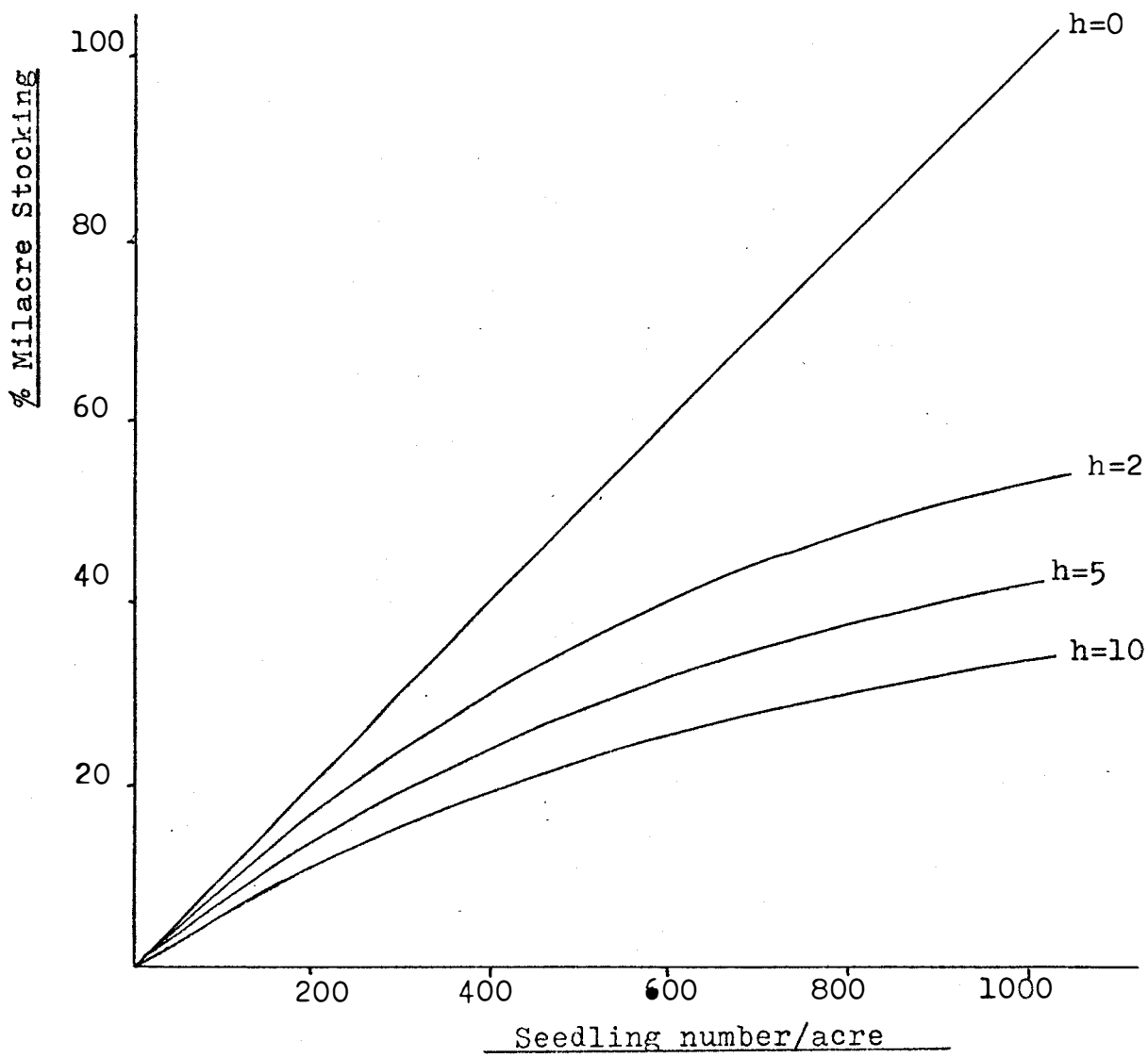

Figure 3.2

The field sheet used in the survey of regeneration at Surrey Hills.

Plot No. ..... **Date** ..... **Aspect** .....

Soil ..... **Drainage** .....

Original U/S Spp. .....

Age ..... **Ht.** ..... **Pres. Dens** .....

Seedlings	4- Milacre Tallest			Milacre
	%	Ht.	Age	No.
Seed-bed				
Burnt				
Disturbed				
Undisturbed ..				

Present veg.—4 Milacre

	Chance	Spp.	Ht.	Dens
Burnt				
Disturbed				
Undisturbed ..				

Remarks:

APPENDIX I RESEARCH REGENERATION SURVEY RESULTS

AREA AND VEGETATION TYPE	TIME SINCE LOGGING, WILDFIRE OR TREATMENT	NO OF PLOTS	BURNT UNBURNT	%1 MILACRE STOCKING	%4 MILACRE STOCKING	% AREA STOCKED STRIP COUNTS	% AREA STOCKED (MAPPING RULES)	NO. OF S'LINGS/ACRE STRIP ESTIMATE	NO. OF S'LINGS/ACRE PLOT COUNT	SPECIES	SEED TREES PER ACRE EUCALYPTUS (ESTIMATE)	STUMPS PER ACRE EUCALYPTUS (ESTIMATE)	SOIL DISTURBANCE TOTAL	SOIL DISTURBANCE ON STOCKED PLOTS	SOIL DISTURBANCE ON UNSTOCKED PLOTS
1	2	3	4	5	6	7.	8	9	10	11	12	13	14	15	16
EUCALYPT SCLEROPHYLL															
Black Ck. Rd.	2 years	31	U.B.	13%	45%	52%	48%	257	194	E. del. 83% E. sim. 17%	2	17	55%	70%	34%
	4-6 years	65	U.B.	37%	55%	52%	57%	304	1308	E. del. 10% E. obl. 90%	17	13	55%	70%	34%
	7-8 years	38	U.B.	21%	61%	61%	68%	297	1158	E. obl. 100%	6	21	55%	70%	34%
	Means	134	-	27%	54%	54%	56%	287	1007	-	11	17	55%	70%	34%
Natone Rd.	5-11 years	180	U.B.	32%	43%	41%	46%	193	761	E. obl. 62% E. sim. 28% E. del. 1 %	16	13	31%	52%	16%
Housetop Fire	4+ years	77	B.	93%	96%	97%	100%	4382	7899	E. obl. 56% E. del. 20% E. sim. 24%	20	13	100%	100%	100%
Feb. 1968 Fire Kara	1+ years	24	B.	92%	96%	100%	100%	2888	9125	E. obl. 78% E. del. 19% E. sim. 2%	8	8	100%	100%	100%
	Means	101	-	93%	96%	98%	100%	-	-	-	-	-	-	-	-
EUCALYPT PEPPER															
Mt. Cattley	2 years	70	B.	89%	100%	100%	100%	024	3925	E. del. 98% E. gun. 2%	10	6	100%	100%	100%
Mayday Rd.	1 year	38	U.B.	58%	71%	50%	84%	263	2211		7	8	74%	92%	12%
	2-3 years	43	U.B.	70%	98%	77%	100%	530	4209	E. del. 96% E. gun. 4%	10	8	74%	92%	12%
	6-8 years	173	U.B.	37%	61%	57%	69%	317	1607		10	8	74%	92%	12%
	Means	254	-	46%	69%	59%	77%	344	2140	-	-	-	74%	92%	12%
Blythe Rd. - Peak Plain	18 years	68	U.B.	43%	65%	66%	69%	161	750	E. del. 100%	3	6	33%	34%	27%
Main Road	17 years	31	U.B.	45%	68%	100%	84%	288	1300	E. del. 100%	6	4	-	-	-
	Means	99	-	44%	66%	74%	73%	198	913	-	4	5	-	-	-
EUCALYPT RAINFOREST															
Bunkers Rd.	4 years	95	U.B.	34%	52%	56%	60%	270	1729	E. del. 100%	3	6+ (18 myrtle)	17%	38%	3%
	5 years	55	U.B.	52%	72%	81%	81%	463+	2065	E. del. 100%	4	10	66%	75%	45%
	Means	150	-	40%	59%	65%	68%	341	1854	-	3	7	34%	53%	18%
Old Park Rd.	1-5 years	45	U.B.	11%	29%	14%	11%	50	111	E. del. 100%	2	2	24%	56%	11%
Blythe Rd.	6-10 years	118	U.B.	17%	29%	30%	32%	114+	305	E. del. 100%	2	4	21%	-	-
Dempsters Rd.	8 years	46	U.B.	20%	35%	41%	33%	208+	435	E. del. 85% E. sim. 15%	3	7	28%	54%	14%
Gin Ck. - Rawlings Rd.	17 years	50	U.B.	18%	42%	20%	49%	108	420	E. del. 100%	2	5	14%	15%	13%
	Means	259	-	17%	33%	26%	25%	197+	317	-	2	5	21%	42%	13%
Parrawe	6 years	100	U.B.	20%	44%	32%	44%	104	520	E. obl. 100%	4	8+ (12 myrtle)	31%	62%	7%
Query Rd.	2 years	30	B. & aerially seeded	57%	90%	60%	100%	199	1133	E. obl. 59% E. del. 41%	1	4	100%	100%	100%
Leven Rd.	3 years	20	B.	90%	100%	100%	100%	1200+	7250	E. obl. 99% E. del. 1%	2	13	100%	100%	100%
	B'nt 5 yrs. seeded 3½y.	51	B.	61%	75%	75%	80%	535+	2961	E. del. 50% E. sim. 49%	7	6	100%	100%	100%
Distant Spur	6 years	20	B.	80%	100%	100%	100%	1090+	7250	E. obl. 1% E. obl. 100%	6	10	100%	100%	100%
	Means	121	-	75%	86%	80%	92%	635+	3930	-	6	7	100%	100%	100%
EUCALYPT GRASS															
Campbells	5 years	63	U.B.	56%	78%	84%	-	-	1873	E. del. 97% E. gun. 3%	-	-	-	-	-
Bunkers	5 years	27	U.B.	63%	77%	85%	75%	404+	1815	E. del. 60% E. agy. 40%	9	8	3%	3%	8%
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N. of Campbells	10+ years	162	U.B.	32%	54%	43%	40%	180+	1336	E. agg. 3% E. del. 87% E. gun. 11% E. sim. 2%	6	4	5%	-	-
Guildford	21 years	41	U.B.	15%	29%	49%	32%	167	196	E. del. 100%	11	3	3%	3%	8%
	Means	333	-	37%	65%	55%	-	-	1273	-	-	-	4%	3%	8%

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	5 years	55	U.B.	52%	72%	81%	81%	463+	2065	E. del. 100%	4	10	66%	75%	43%
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	B'nt 5 yrs. seeded 3½y.	51	B.	61%	75%	75%	80%	535+	2961	E. del. 51% E. sim. 49%	7	6	100%	100%	100%
Distant Spur	6 years	20	B.	80%	100%	100%	100%	1090+	7250	E. obl. 1% E. obl. 100%	6	10	100%	100%	100%
	Means	121	-	75%	86%	80%	92%	635+	3330	-	6	7	100%	100%	100%
EUCALYPT GRASS Campbells	5 years	63	U.B.	56%	78%	84%	-	-	1873	E. del. 97% E. gun. 3%	-	-	-	-	-
Bunkers	5 years	27	U.B.	63%	77%	85%	75%	404+	1815	E. del. 60% E. agy. 40%	9	8	3%	3%	8%
S. of Campbells	7 years	40	Part Burnt	38%	78%	38%	78%	165	825	E. del. 76% E. gun. 12% E. sim. 9% E. agg. 3%	9	8	3%	3%	8%
N. of Campbells	10+ years	162	U.B.	32%	54%	43%	40%	180+	1336	E. del. 87% E. gun. 11% E. sim. 2%	6	4	5%	-	-
Guildford	21 years	41	U.B.	15%	29%	49%	32%	167	196	E. del. 100%	11	3	3%	3%	8%
	Means	333	-	37%	65%	55%	-	-	1273	-	-	-	4%	3%	8%

Table 4.1

Comparison of seedling numbers per acre within and between types and treatments

Forest type	Treatment		
	Logging	Logging and dozing	Logging and burning
Eucalypt-rainforest	378	1854	3930
Eucalypt-rainforest scrub	-	2020	3925
Eucalypt-sclerophyll scrub	855	-	8190
Eucalypt-grassland	1273	-	-

Table 4.2

Comparison of % area stocked

within and between types and treatments

Forest type	Treatment		
	Logging	Logging and dozing	Logging and burning
Eucalypt-rainforest	34%	68%	92%
Eucalypt-rainforest scrub	-	75%	100%
Eucalypt-sclerophyll scrub	51%	-	100%
Eucalypt-grassland	48%	-	-

Figures are % area stocked (mapping rules)

Table 4.3

Comparison of % milacre stocking within and between types and treatments

Forest type	Treatment		
	Logging	Logging and dozing	Logging and burning
Eucalypt-rainforest	18% * (53%)**	40% (59%)	75% (82%)
Eucalypt-rainforest scrub	-	45% (60%)	89% (100%)
Eucalypt-sclerophyll scrub	30% (52%)	-	93% (93%)
Eucalypt-grassland	37% (67%)	-	-

* Figures are % milacre stocking on a total area basis- this is usual figure quoted for milacre stocking,

** Figures are % milacre stocking on stocked areas- these estimates have been used to compile the productivity index

Figure 4.1

% milacre stocking / seedling number per acre

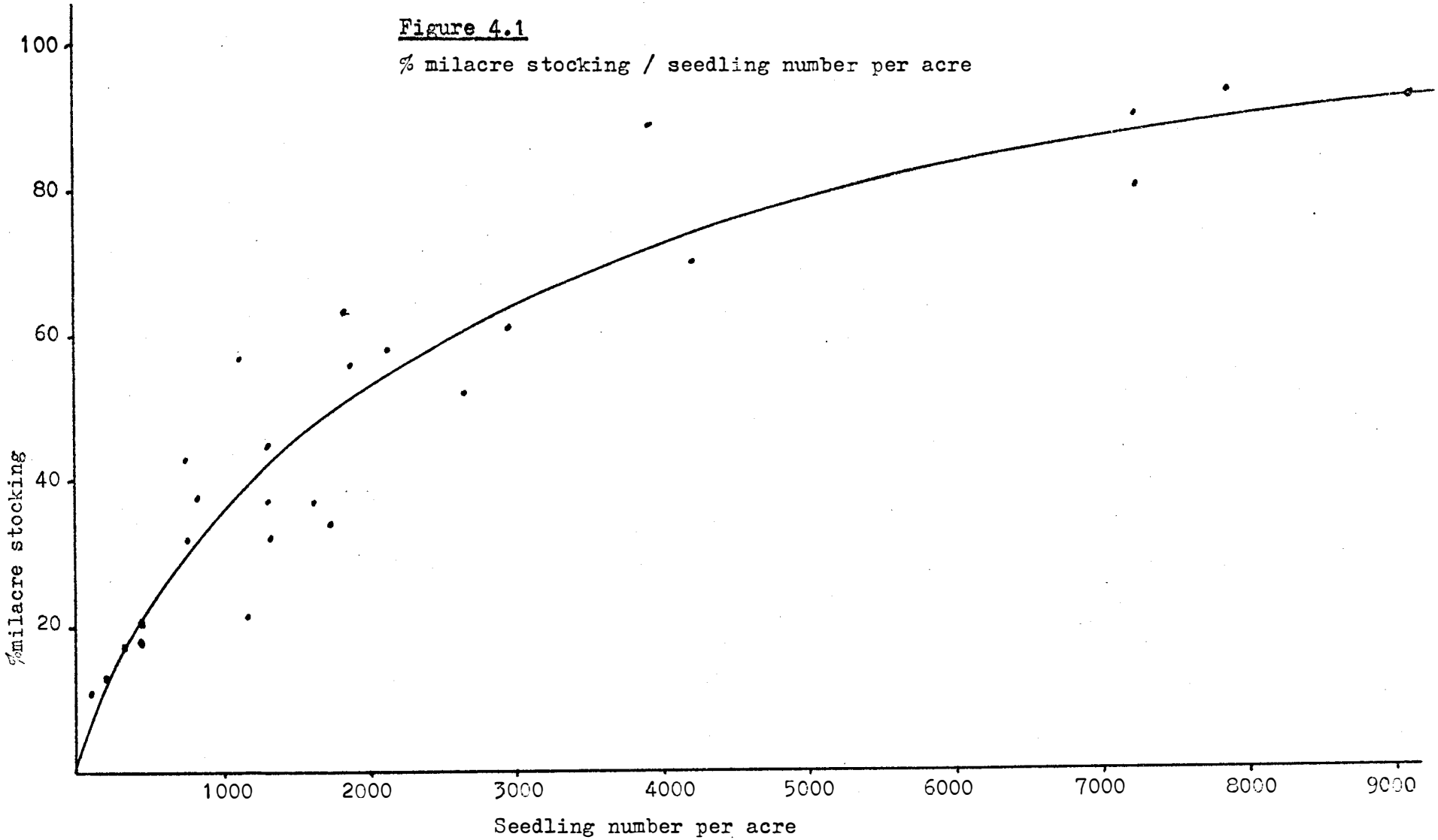


Figure 4.2

% 1 milacre stocking / % 4 milacre stocking

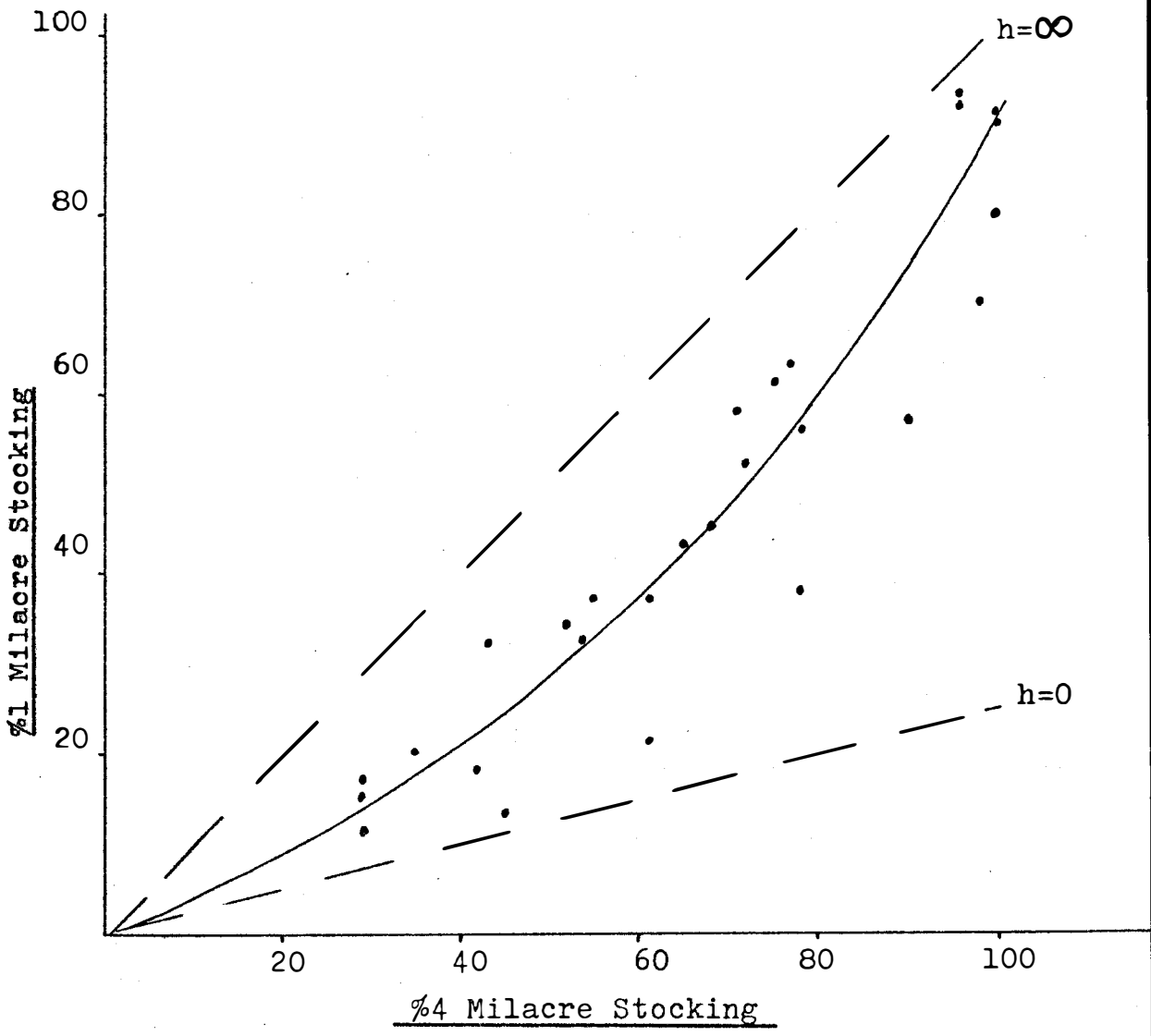


Figure 4.3

% milacre stocking / % Area stocked (mapping rules)

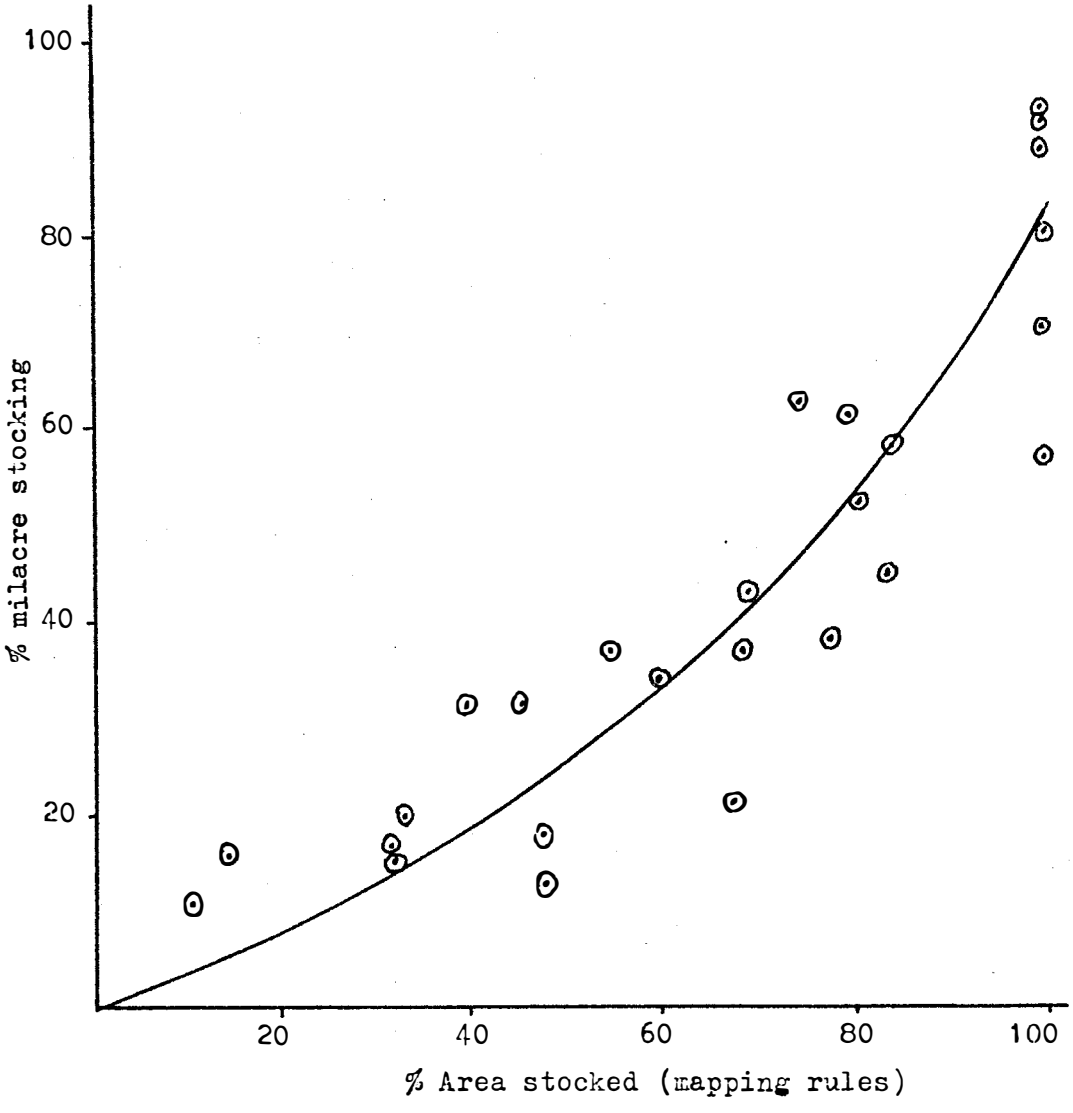


Figure 4.4

% 4 milacre stocking / % Area stocked (mapping rules)

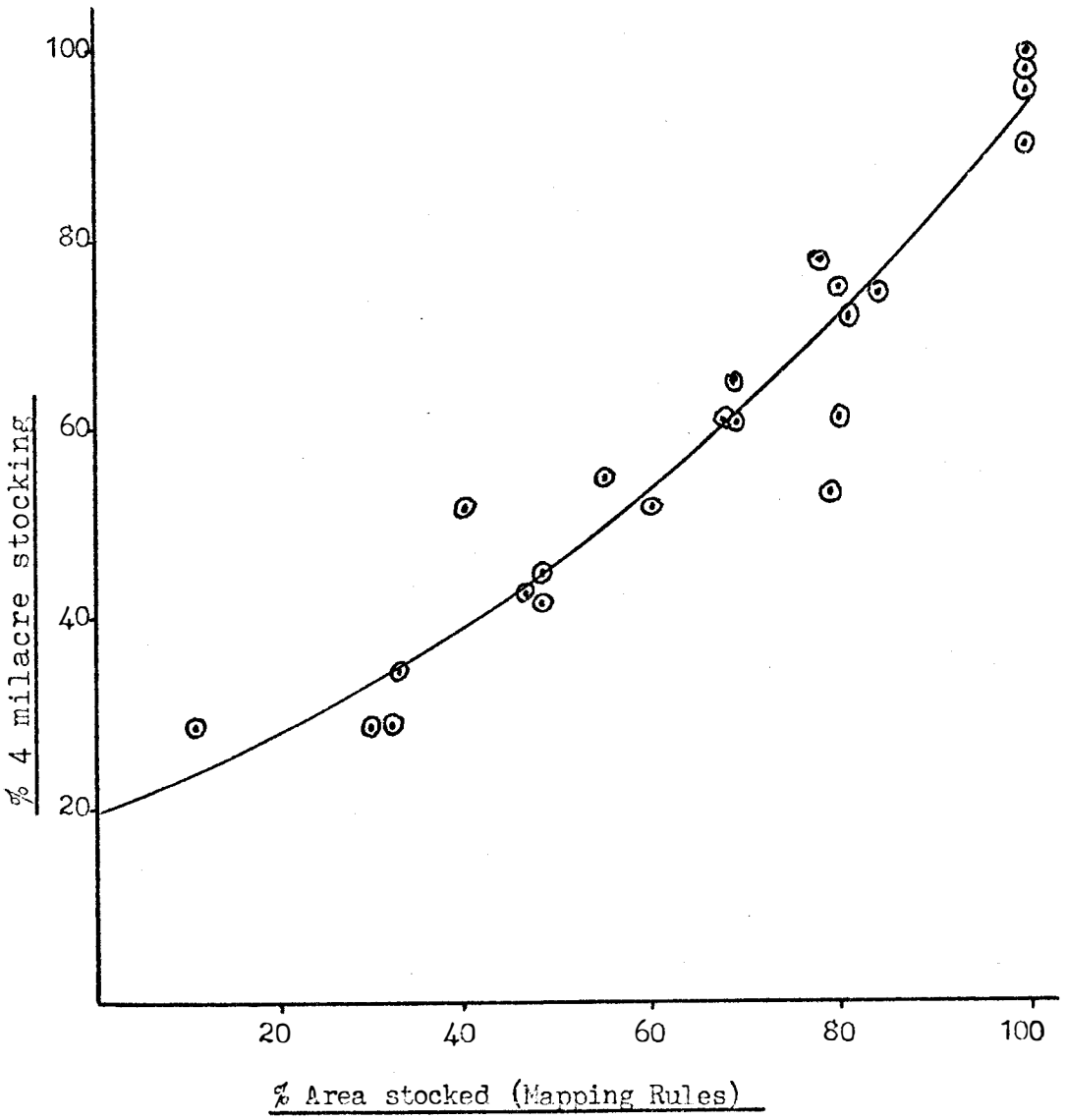


Figure 4.5

% Area stocked (mapping rules) / % Area stocked (stock mapping)

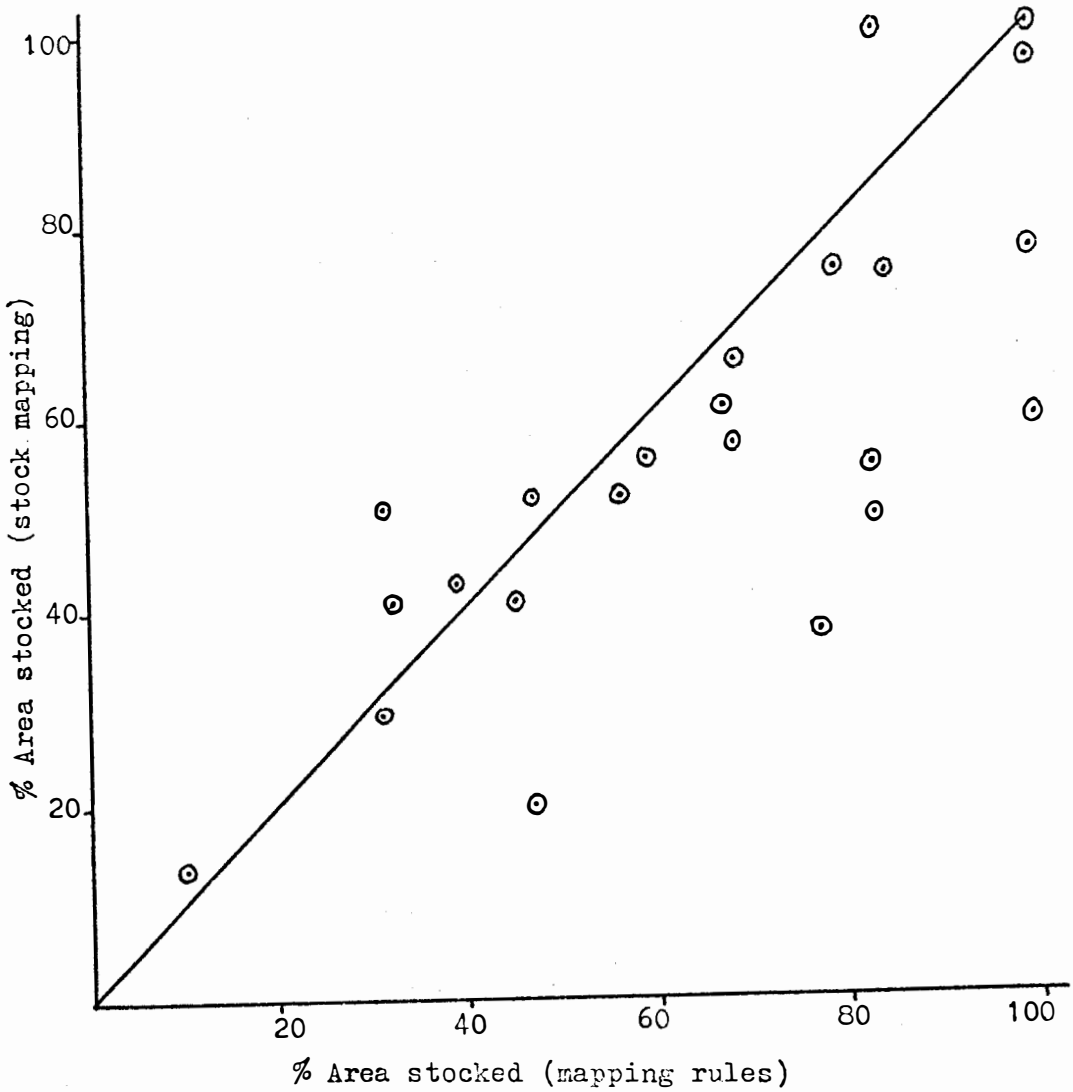


Table 4.5 Soil disturbance data

Area and type	Soil disturbance		
	Total	stocked plots	unstocked plots
Eucalypt-Sclerophyll			
Black Ck. Rd.	55%	70%	34%
Natone Rd.	31%	52%	16%
Burnt areas	100%	100%	100%
Eucalypt-Rainforest Scrub			
Mayday Rd.	74%	92%	12%
Peak plain	33%	34%	27%
Burnt areas	100%	100%	100%
Eucalypt-Rainforest			
Bunkers Rd.	34%	53%	18%
General areas	21%	42%	13%
Parrawe	31%	62%	7%
Burnt areas	100%	100%	100%
Eucalypt-Grassland			
Bunkers	3%	3%	8%
Guilford	3%	3%	8%

Table 4.6

Comparison of estimates of soil disturbance within and between types and treatments

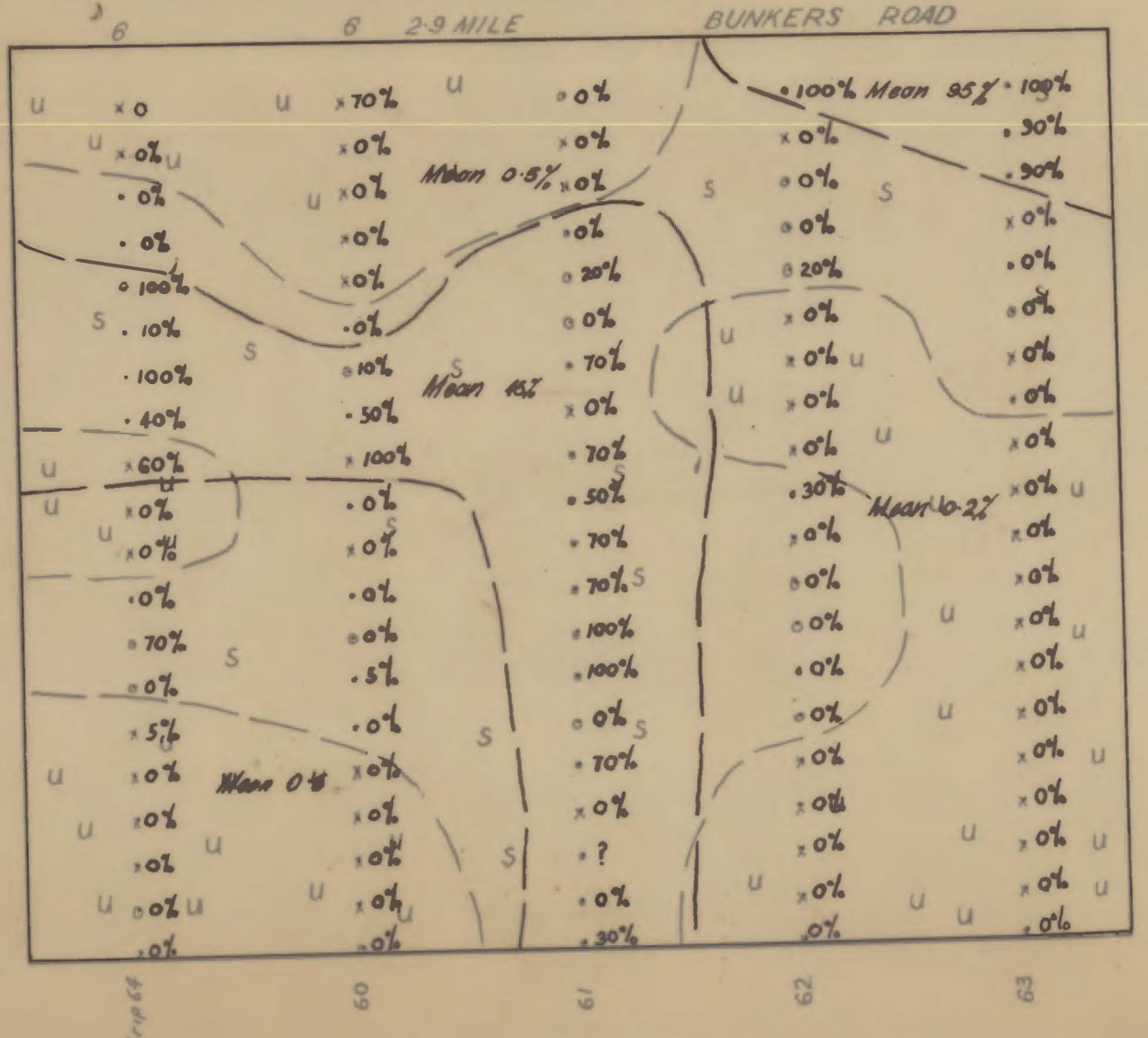
Forest type	Treatment		
	Logging	Logging and dozing	Logging and burning
Eucalypt-rainforest	26%	42%	100%
Eucalypt-rainforest scrub	-	74%	100%
Eucalypt-sclerophyll scrub	43%	-	100%
Eucalypt-grassland	4%	-	-

Figure 4.6

E. delegatensis regrowth does not establish on undisturbed soil. The snig track is covered with eucalypt regrowth and the area of fern is devoid of any regeneration.

FIGURE 4·7

A plot of an actual Regeneration Survey at Bunkers Rd The mapping rules have been used to Segregate stocked and unstocked areas.



x% 52 unstocked Plots
0% 48 4 m/a Stocking
·% 32 1 m/a Stocking

u unstocked area	239
S stocked areas	261
	500

Figure 47 (overlap)

Bunkers Rd - Soil Disturbance

Eucalypt Seedlings 3-4 years old. *Scale 4 ins = 1 chain*

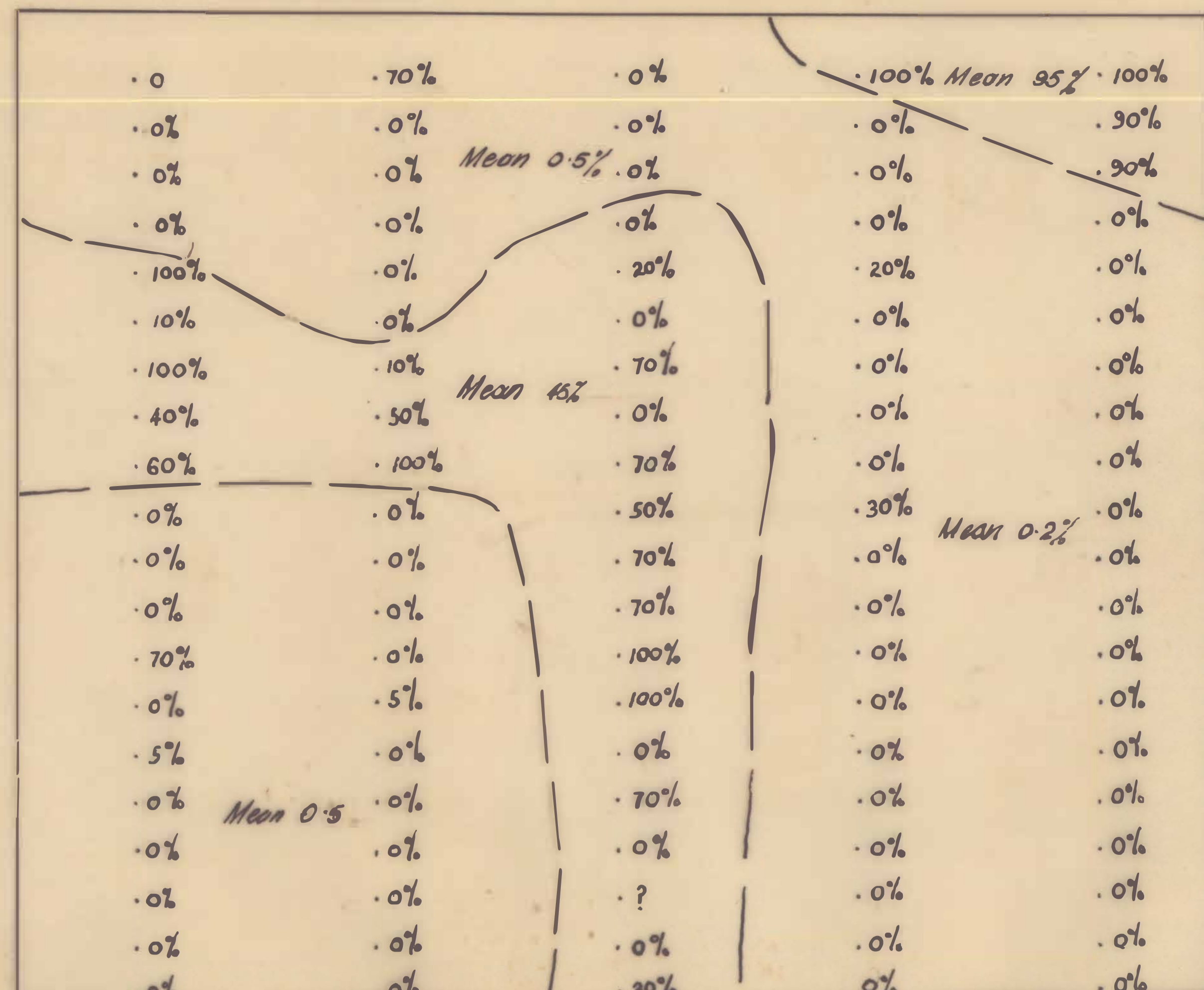
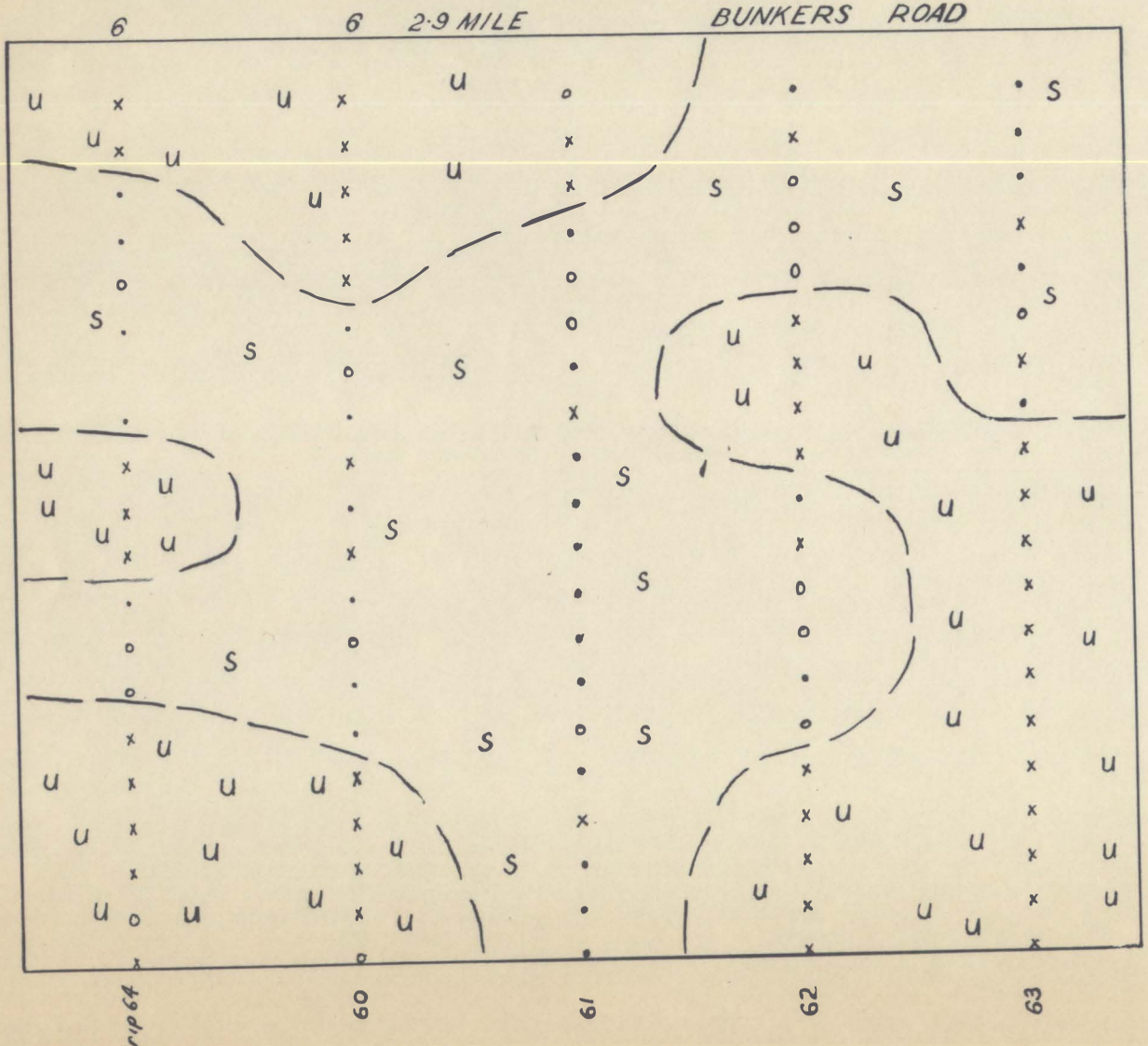


Figure 4.7 (overlap)

Bunkers Rd – Soil Disturbance

FIGURE 4·7

A plot of an actual Regeneration Survey at Bunkers Rd. The mapping rules have been used to Segregate stocked and unstocked areas.



x/. 52 unstocked Plots
0/. 48 4 m/a. Stocking
·/. 32 1 m/a Stocking

u unstocked area	239
S stocked areas.	261
	500

Eucalypt Seedlings 3–4 years old. Scale 4 ins = 1 chain.

Figure 4.8

Comparison of eucalypt seedling stocking and soil disturbance resulting from various treatments

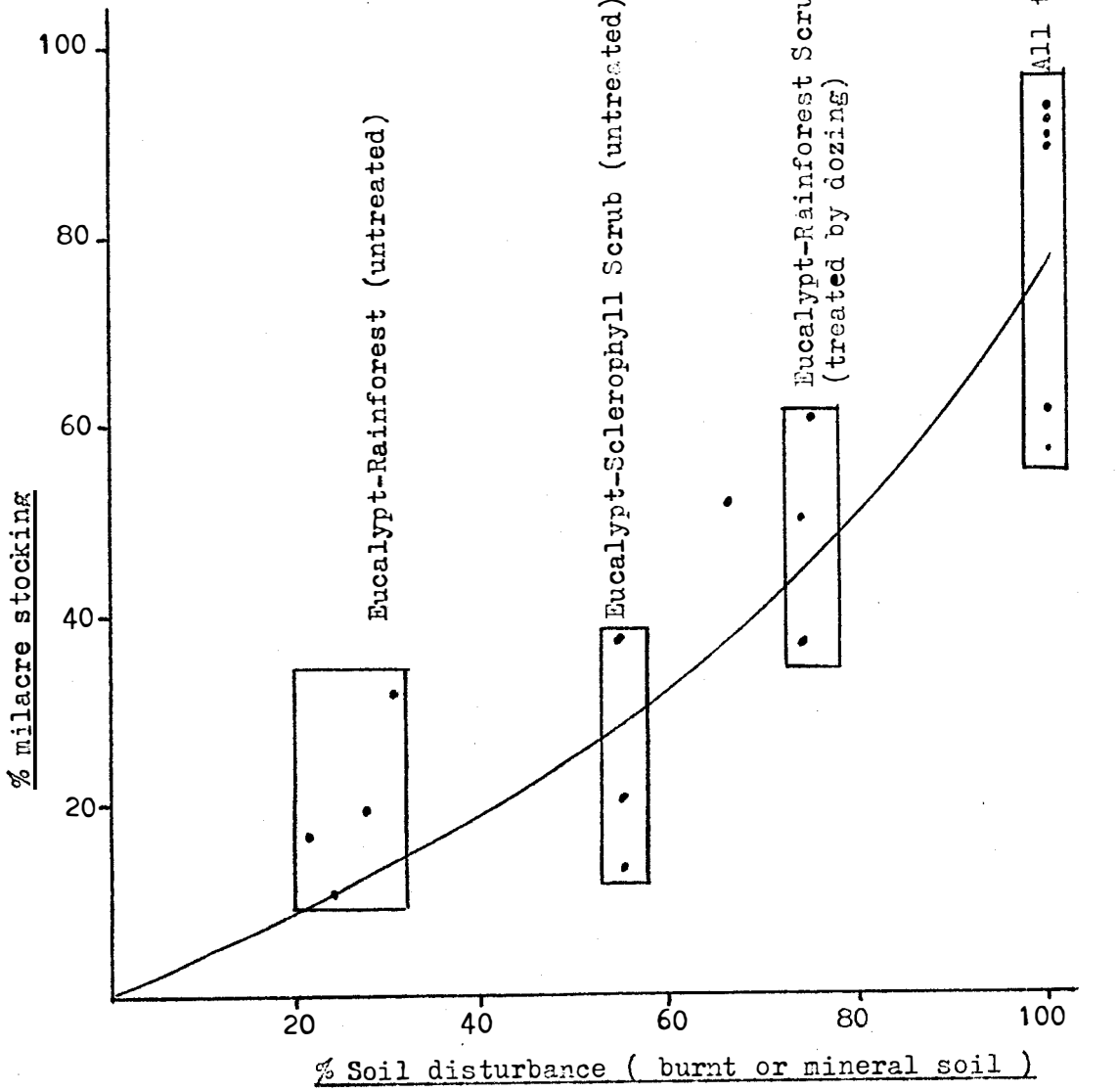


Table 4.13 A Table of Regression Equations of Seedling Height on Age Derived From Measurements taken from the Regeneration Surveys

SAMPLE NUMBER	SAMPLE TYPE	NO. OF OBSERVATIONS	REGRESSION EQUATION	STANDARD ERROR OF ESTIMATE (Inches)	STANDARD ERROR OF REGRESSION COEFFICIENT	SIGNIFICANCE
1.	Eucalypt-Sclerophyll	139	Y = 12.07 x- 12.30	4.74	2.31	* * *
3.	Eucalypt-Rainforest Scrub	143	Y = 16.48 x- 18.03	2.32	1.34	* * *
5.	Eucalypt-Rainforest Scrub	89	Y = 23.10 x- 63.73	2.37	0.48	* * *
6.	Eucalypt-Rainforest	131	Y = 27.74 x- 42.42	5.72	1.41	* * *
9.	Eucalypt-Rainforest	98	Y = 57.52 x- 97.2	4.04	2.68	* * *
10.	Eucalypt-Grassland	156	Y = 8.09 x+ 2.76	2.74	0.85	* *
11.	Eucalypt-Rainforest	84	Y = 49.5 x - 72.4	1.38	1.03	* * *

(Y= seedling height (inches))

(X= seedling age (years))

Table 4.14 Comparison of Height Growth of Eucalyptus Seedlings for Various Sites and Treatments

SAMPLE NUMBER	SAMPLE TYPE	TREATMENT	MEAN HEIGHT OF SEEDLINGS(Ins.) AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	BURNT UNBURNT
1 (A)	Eucalypt-Sclerophyll	Logging only	36	48	61	73	85	U.B.
2 (A)	Eucalypt-Sclerophyll	Logged and burnt by wild fire	-	-	162	-	-	B.
3 (B)	Eucalypt-Rainforest Scrub	Logged, seedbed prepared by dozing before logging	15	31	48	64	81	U.B.
4 (B)	Eucalypt-Rainforest Scrub	Logged & burnt by wild fire	15	-	-	-	-	B.
5	Eucalypt-Rainforest Scrub	Logged, seedbed prepared by dozing before logging	-	6	29	52	75	U.B.
6 (D)	Eucalypt-Rainforest	Logging only	13	41	69	96	124	U.B.
7	Eucalypt-Rainforest	Logging only	15	54	116	121	-	U.B.
8	Eucalypt-Rainforest	Logging and burnt by wild fire	-	41	-	-	-	B.
9 (D)	Eucalypt-Rainforest	Logged, treated by slash felling and burnt	17	75	133	190	248	B.
10	Eucalypt-Grassland	Logged	19	27	35	43	51	U.B.& B.
11								

The mean heights have been obtained from the following sources:-
Samples 1,3,5,6,9,10 from regression equations, Sample 7 from the mean height of seedlings of each age (Regression equation could not be derived), Samples 2,4,8 mean height of seedlings measured (al seedlings in each sample are the same age). A,B, etc. - Results from similar sites.

Table 4.15

Comparison of seedling heights at age four years within and between types and treatments

Forest type	Treatment		
	Logging	Logging and dozing	Logging and burning
Eucalypt-rainforest	69 in. (153)	116 (167)	133 (206)
Eucalypt-rainforest scrub	-	38 (150)	-
Eucalypt-sclerophyll scrub	61 (106)	-	162 (227)
Eucalypt-grassland	35 (73)	-	-

Figures in the table are expressed in inches

Estimates derived from 2 tallest seedlings on 4 milacre plots (i.e. tallest 500 seedlings per acre

(---) Values are estimates of dominant seedling heights (i.e. tallest 12 seedlings per acre)

FIGURE 4·9 MAP OF THE AREA WHERE THE INVESTIGATION OCCURRED

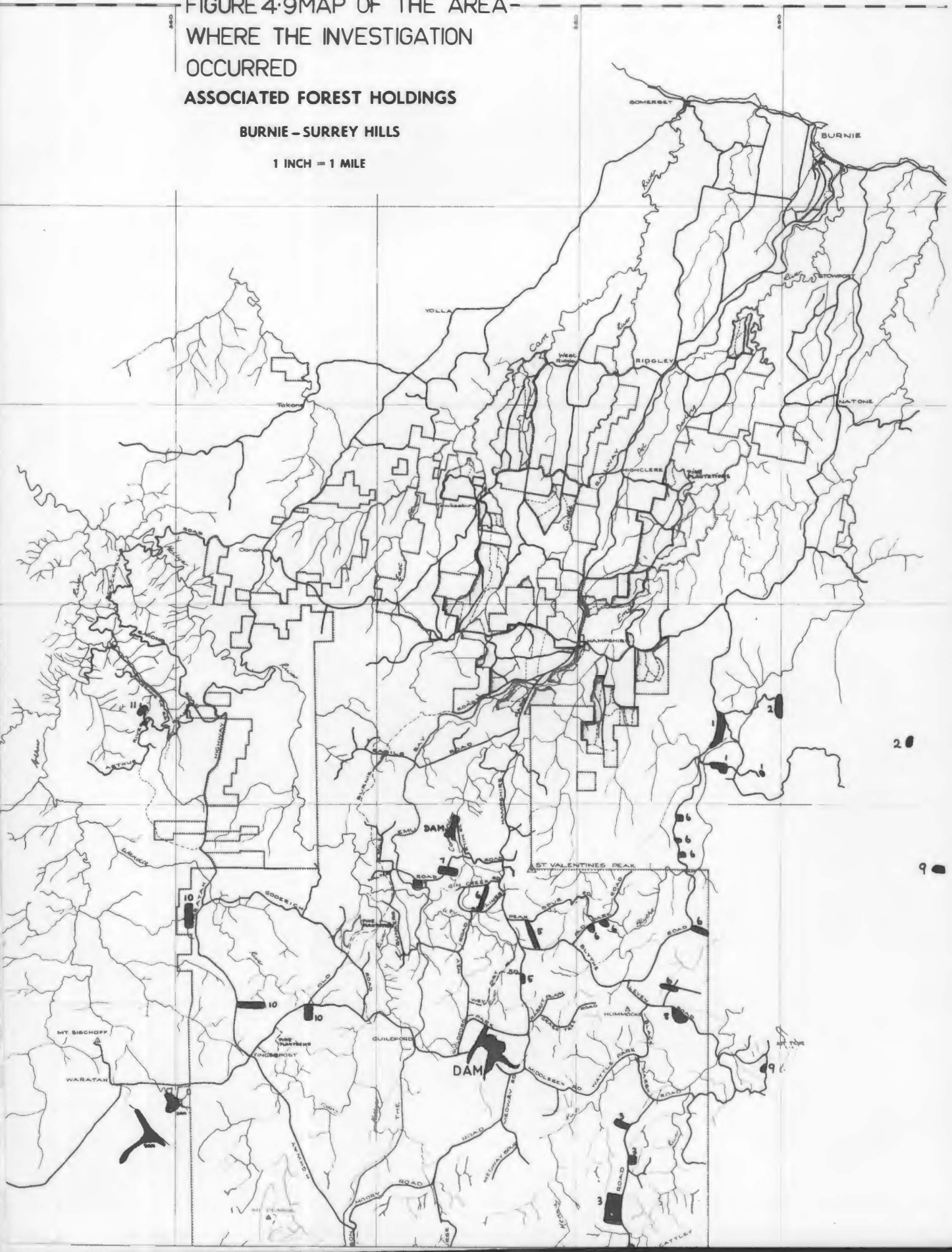


Table 4.6 Comparison of three Similar Sites at Mt. Cattley, July, 1971.

Treatment	Plot A Pepper dozed Winter 1967 logged Winter 1967	Plot B Pepper dozed Winter 1967 logged Winter 1967 burnt by fire January 1968	Plot C Pepper dozed Winter 1968 logged Winter 1968
Seedlings			
Estimated date of seedling germination	Spring 1967 Spring 1968	Spring 1968	Spring 1968 Spring 1969
Stocking	2080/acre	2840/acre	2000/acre
%Milacre stocking	68%	96%	92%
*Mean height of tallest seedling	76.6 ins.	75.2 ins.	62.7 ins.
Standard Error	±17.3 ins.	±10.3 ins.	±29.9 ins.
No. of seedlings measured	45	50	46
Incidence of multi-stemmed seedlings	65%	96%	37%
% *E. delegatensis* (Bal. *E. gunnii*)	98%	97%	100%
Seedbed			
Original area of available seed-bed	66%	91%	57%
Area covered by Grasses, Mosses, & Euc. s/lings	51%	80%	47%
Wet Ferns	9%	-	-

/cont..

Table 4.16 continued

Treatment	Plot A Pepper dozed Winter 1967 logged Winter 1967	Plot B Pepper dozed Winter 1967 logged Winter 1967 burnt by fire January 1968	Plot C Pepper dozed Winter 1968 logged Winter 1968
Mineral Soil	6%	11%	10%
Logging Slash and residual understorey	34%	9%	33%
Overstorey			
No. of trees originally on plot (Basal Areas ft.^{2}/acre)	3 gun. 9 del. (248)	10 del. 3 gun. (132)	6 del. (173)
No. of trees logged (B.A.)	5 del. (178)	5 del. (110)	3 del. (164)
No. of trees killed by fire or Dieback (B.A.)	1 del. 2 gun. (8)	5 del. 3 gun. (12)	2 del. (3)
Residual trees (B.A.)	3 del. 1 gun. (62)	nil	1 del. (6)

Data obtained from twenty five four milacre plots located at random within plots A,B, and C. The area of each plot is an half an acre. The basal area has been measured at stump height. (3 ft. 6 in.)

*Derived from the measurement of the two tallest seedlings on the four milacre plot. (i.e. the tallest 500 seedlings per acre)

Figure 4.10
Location of the plots at Cattley Rd.

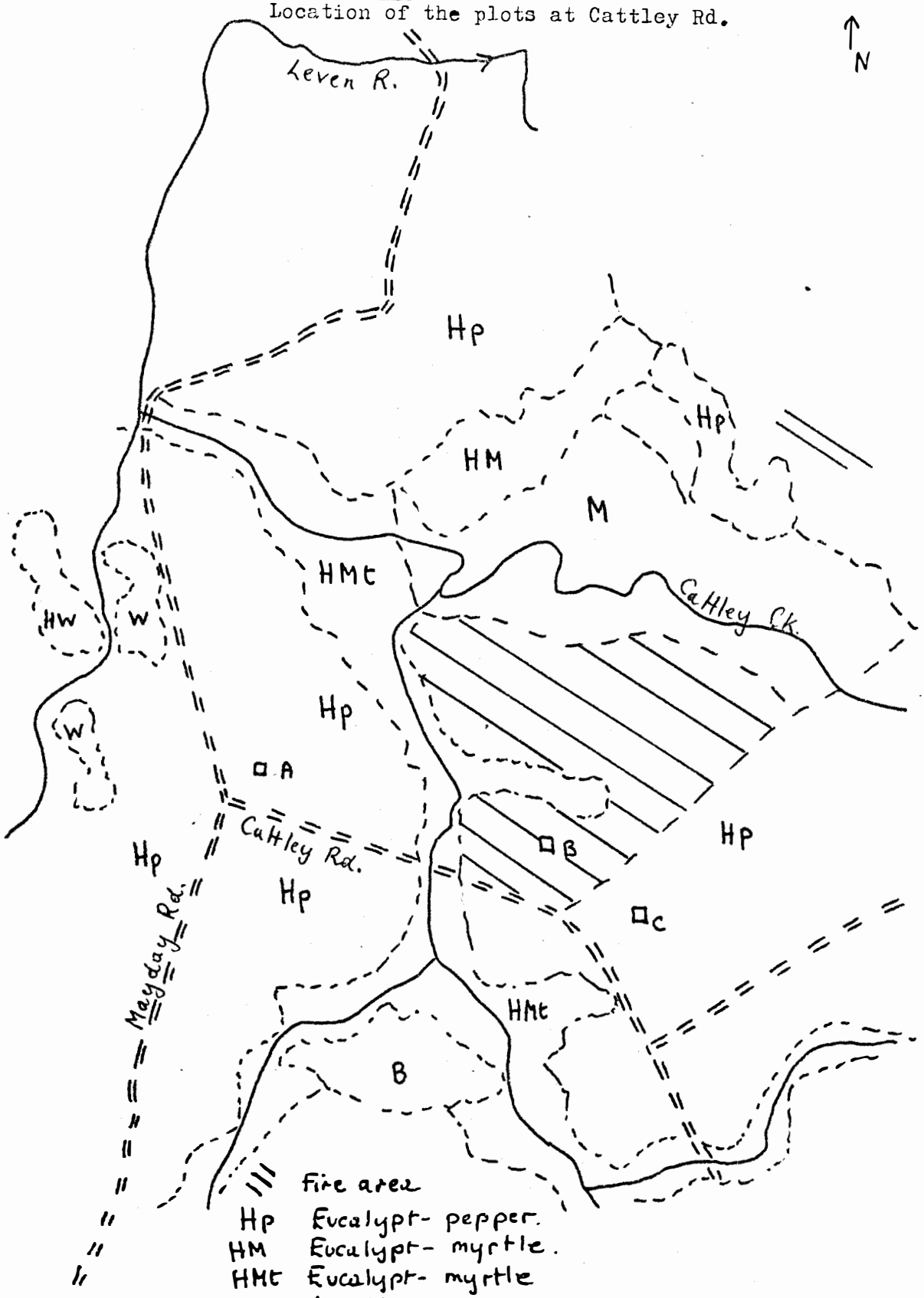


Figure 4.11 Seedling distribution on permament plots located at Mt. Cattley, July 1971

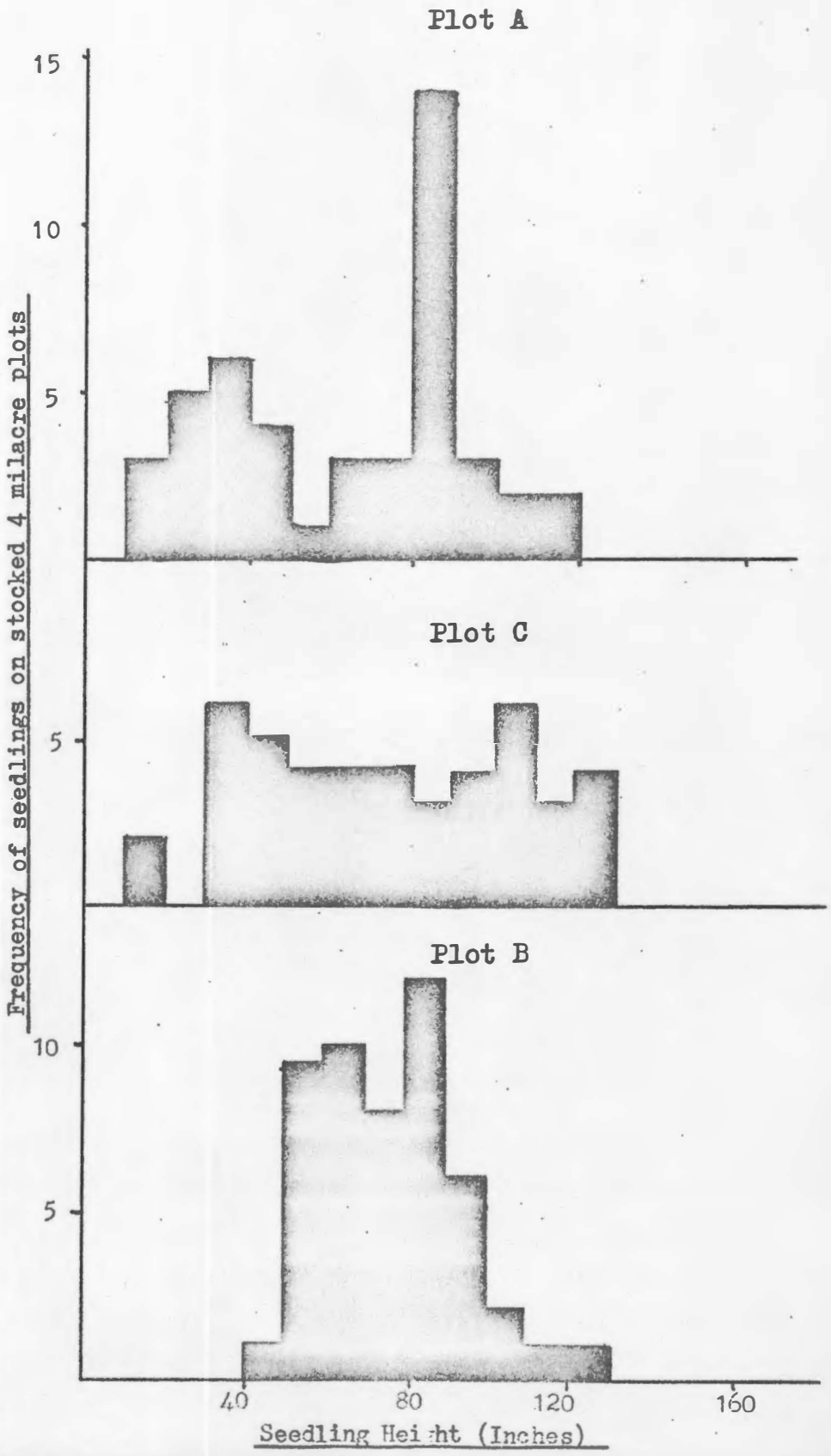


Figure 4.12

Eucalypt-rainforest scrub which has been treated by "pepper-dozing" in Winter 1968. Location Mayday Rd. near Cattley Rd. turn-off
Photograph December 1969

Figure 4.13

The above area re-photographed in May 1971.

Table 5.1

Comparison of site productivity indices within and between types and treatments

Forest type	Treatment		
	Logging	Logging and dozing	Logging and burning
Eucalypt-rainforest	34 x 53 x 69 (124)	68 x 59 x 116 (464)	92 x 82 x 133 (1003)
Eucalypt-rainforest scrub	-	75 x 60 x 38 (172)	89 x 100 x 100 (890)
Eucalypt-sclerophyll scrub	51 x 52 x 61 (162)	-	100 x 93 x 162 (1507)
Eucalypt-grassland	48 x 67 x 35 (112)	-	-

The unit is % area stocked x % milacre stocking on stocked areas x inches x 10^{-3}

Table 5.2

Comparison of actual site productivity * and present potential productivity ** within and between types and types and treatments

Forest type	Treatment		
	Logging	Logging and dozing	Logging and burning
Eucalypt-rainforest	$\frac{124}{1380}$ 9%	$\frac{464}{1500}$ 31%	$\frac{1003}{1824}$ 55%
Eucalypt-rainforest scrub	-	$\frac{172}{1350}$ 13%	$\frac{890}{?}$
Eucalypt-sclerophyll scrub	$\frac{162}{960}$ 17%	-	$\frac{1507}{2040}$ 74%
Eucalypt-grassland	$\frac{112}{660}$ 17%	-	-

Productivity unit is % area stocked x % milacre stocking on stocked areas x seedling height at age four (inches) x 10^{-3}.

* Figures are derived from actual sample means compounded as above

** Figures are derived by using 90% milacre stocking, 100% area stocked and the heights of the dominant seedlings (inches) for each sample. The index gives an estimate of the efficiency of present practices related to the maximum potential productivity assuming complete random stocking. The potential index could obviously be raised considerably by the adoption of burning techniques.

Figure 5.1

Eucalypt-rainforest in the Mayday Rd.-Cattley Rd. area. Note the prevalence of E. delegatensis dieback; the age of the rainforest is about 120 years.

Figure 5.2

An area of Eucalypt-rainforest at Hatfield Rd., SW Surrey Hills. Note the severe effect of Dieback to the E.delegatensis crop and yet the age of the rainforest understorey is only 70 years!

Figure 6.1

The end result, in terms of plentiful vigorous eucalypt regeneration, of slash burning techniques; *E. delegatensis* and *E. regnans* regrowth (4 year old) at about the 2600 ft. level, Misery Block, Florentine Valley, Tas.

Figure 6.2

E.delegatensis regeneration (5 years) in an area that has been pepper-dozed; this area is adjacent to Mayday Rd. Note the large accumulation of logging slash which would, if ignited in the summer, destroy this regeneration; this situation has already occurred at Cattley Rd. If the area had been treated by slash burning techniques this would not have been possible as this technique renders the regeneration safe from fire for many years.

Figure 6.3

Eucalypt regeneration in the Westfield block, Florentine Valley. *E. regnans* (green) *E. delegatensis* (blue) five year old, at the 2500 ft. level

Figure 6.4

The distribution of E.regnans related to altitude and latitude. (After Eldridge 1970)

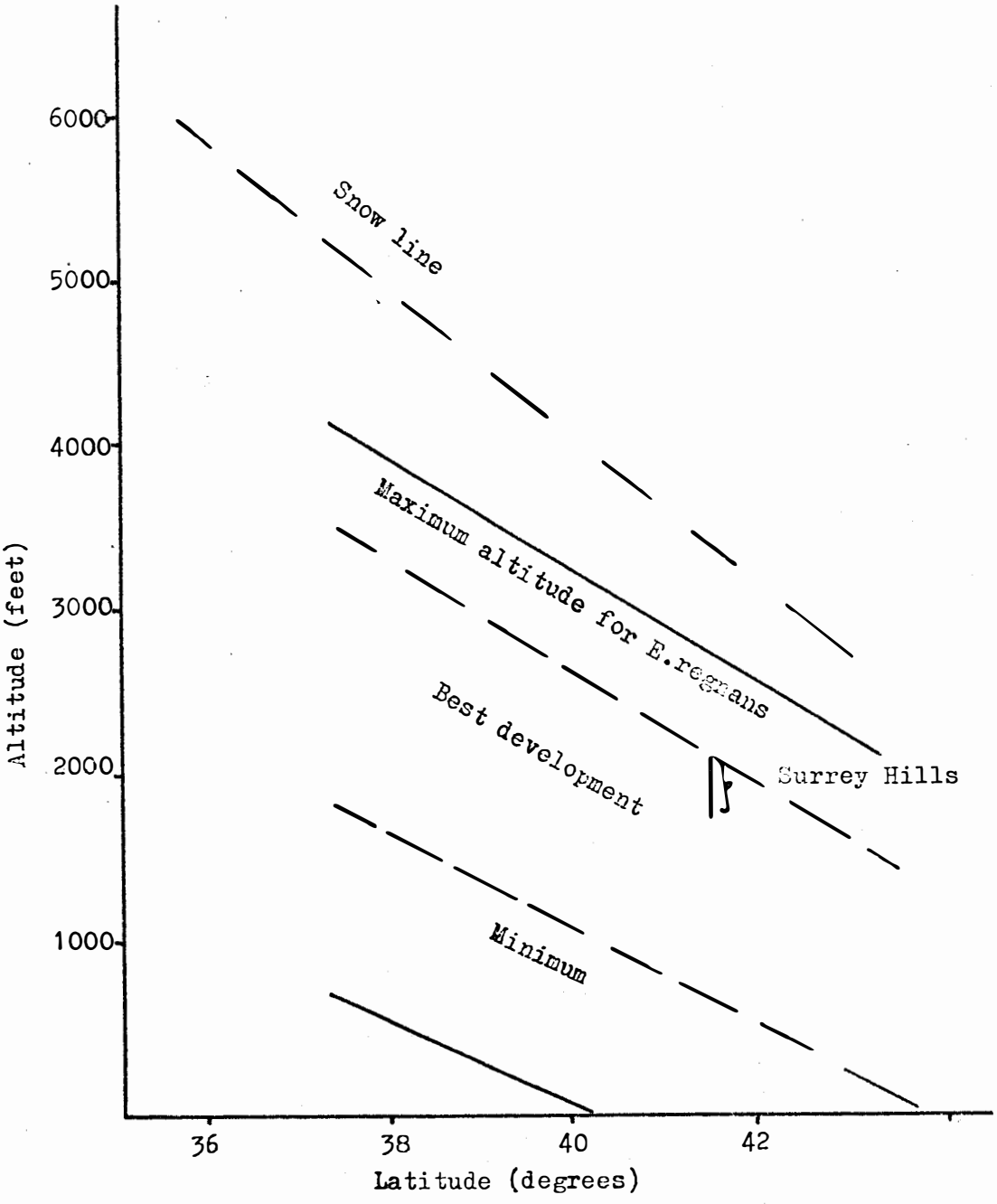
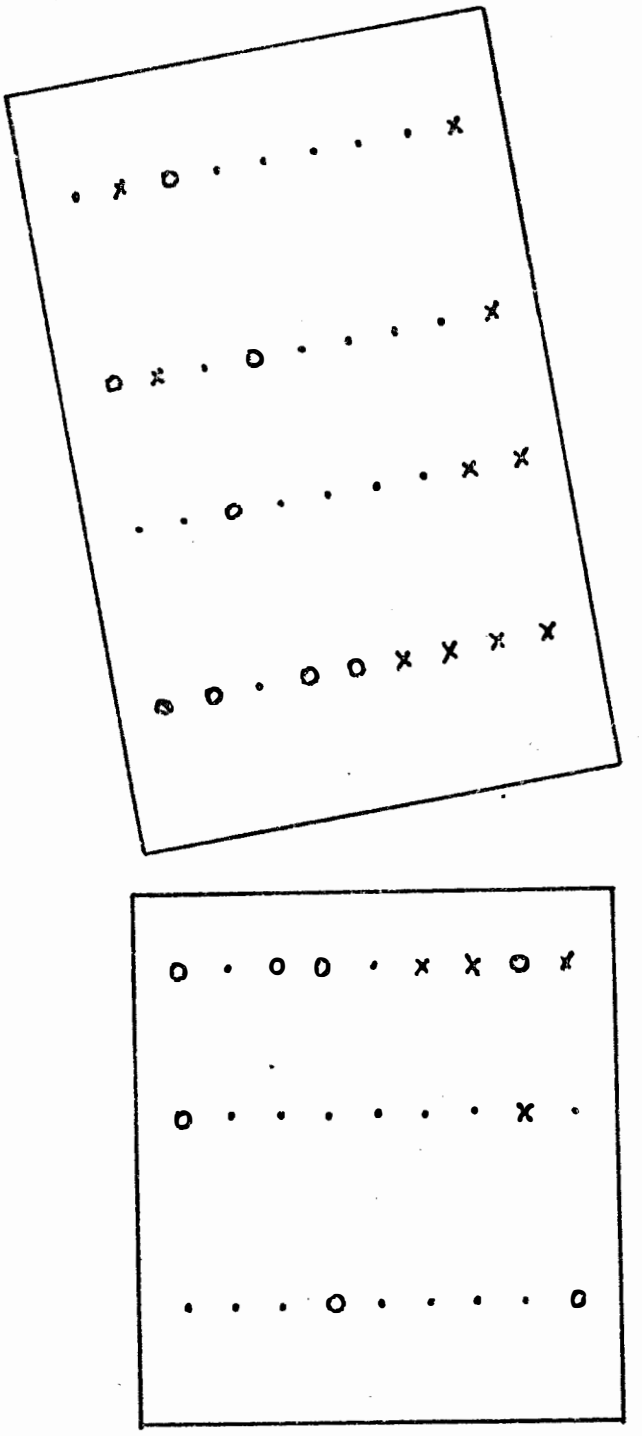


Figure 6.5

An area which was pepper-dozed in 1962-63 and has not regenerated successfully. Mayday Rd. Dec. 1969

SECTION 2

"CAMPBELLS"



milacre plot stocked
4 milacre plot stocked
plot unstocked

Figure 1.1 Plot of regeneration survey conducted at "Campbells" before any treatment October 1969
A larger more detailed map is included in the appendix
Scale 4 chns = 1 inch

Figure 1.2
SEEDLING HEIGHT AND AGE DISTRIBUTIONS AT CAMPBELLS

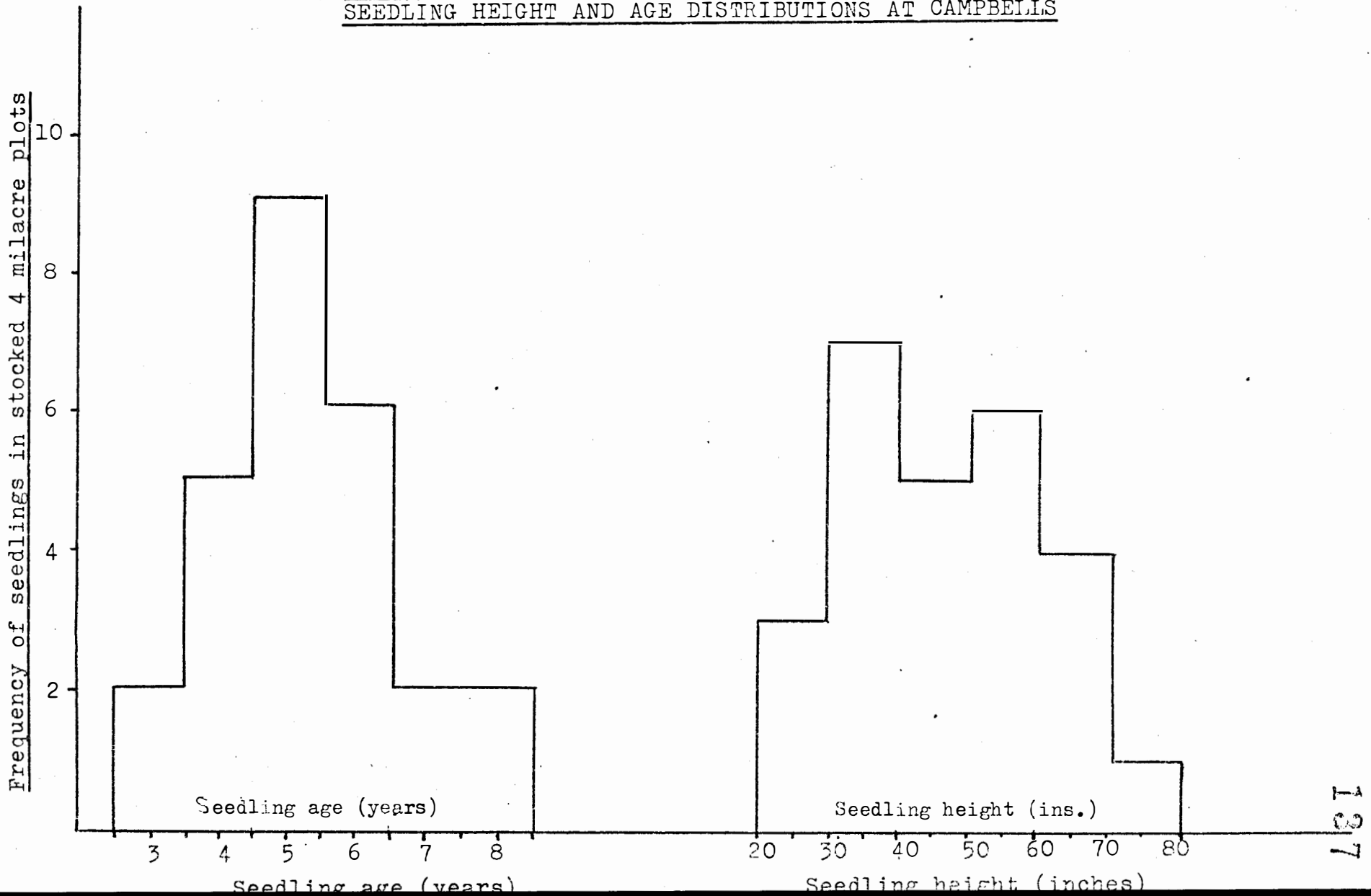
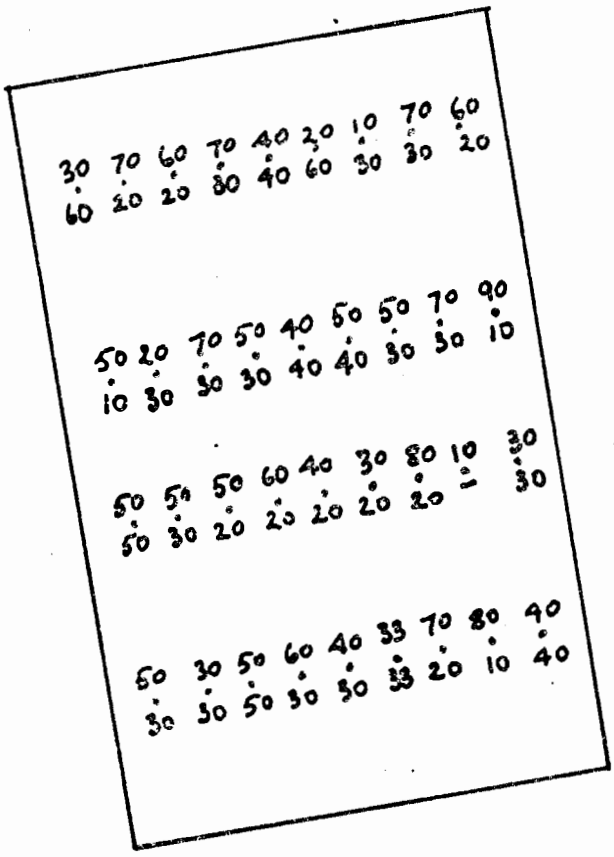
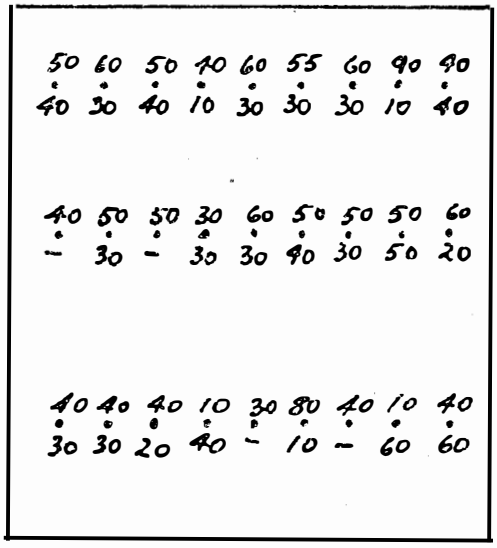


Figure 1.3

General view of a Eucalypt-grassland area at Campbells, near Waratah. *Eucalyptus delegatensis* is the main species present.

"CAMPBELLS"



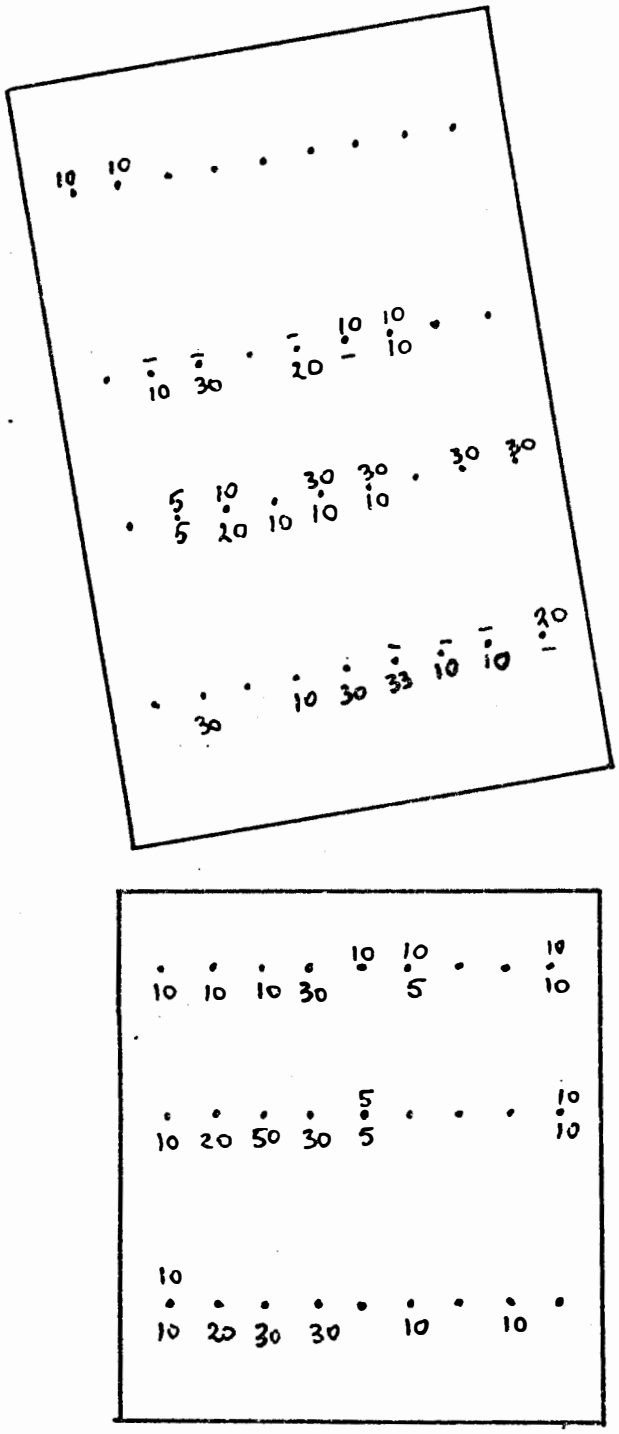


10 Crown cover of Poa caespitosa (%)

20 Crown cover of Diplarrhena moraea (%)

Figure 1.4 Distribution of commonly occurring plants at "Campbells" prior to any treatment

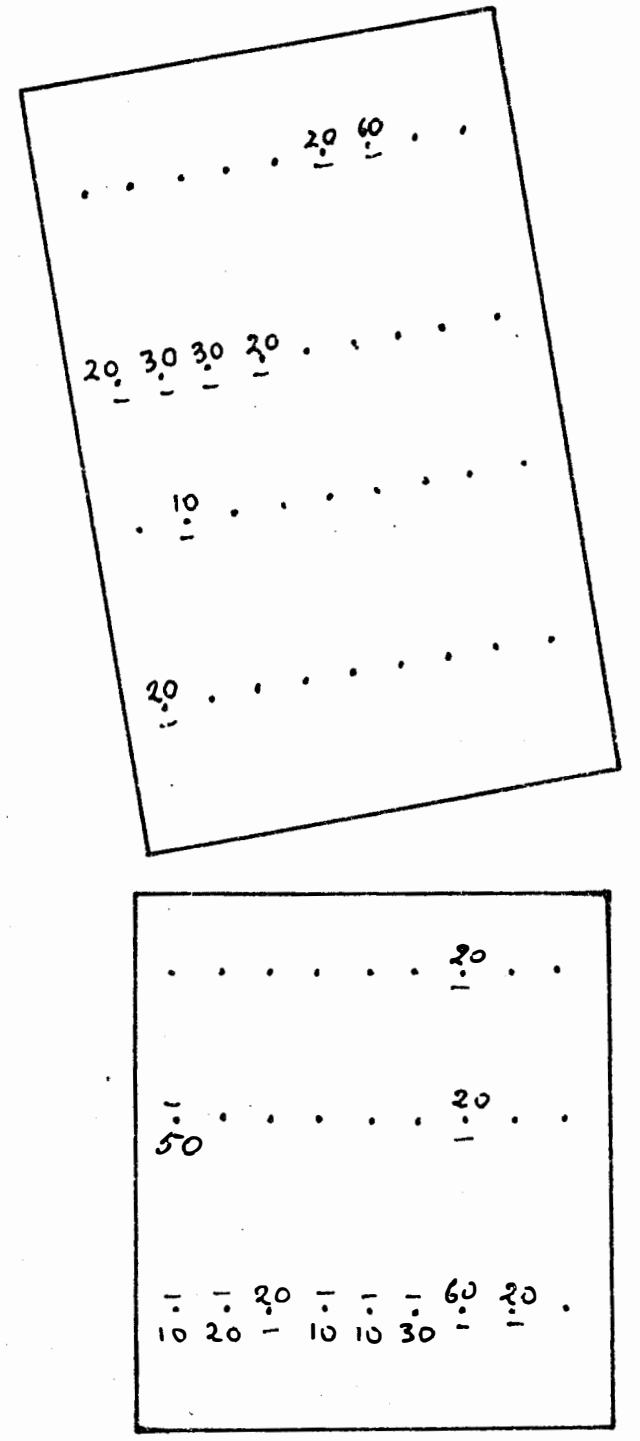
Scale 4 chns= 1 inch



10 Crown cover of Cyathodes juniperina(%)

20 Crown cover of Pultenaea juniperina(%)

Figure 1.5 Distribution of commonly occurring plants at "Campbells" prior to any treatment
Scale 4 chns= 1 inch



10 % Crown cover of Lomatia tinctora

20 % Crown cover of Pteridium aquilinum

Figure 1.6 Distribution of commonly occurring plant species at Campbells prior to any treatment.

Scale 4chns. = 1 inch

Figure 2.1

An example of the ploughing technique used at Campbells (disc harrows + disc plough)

Figure 2.3
Mound ploughing technique

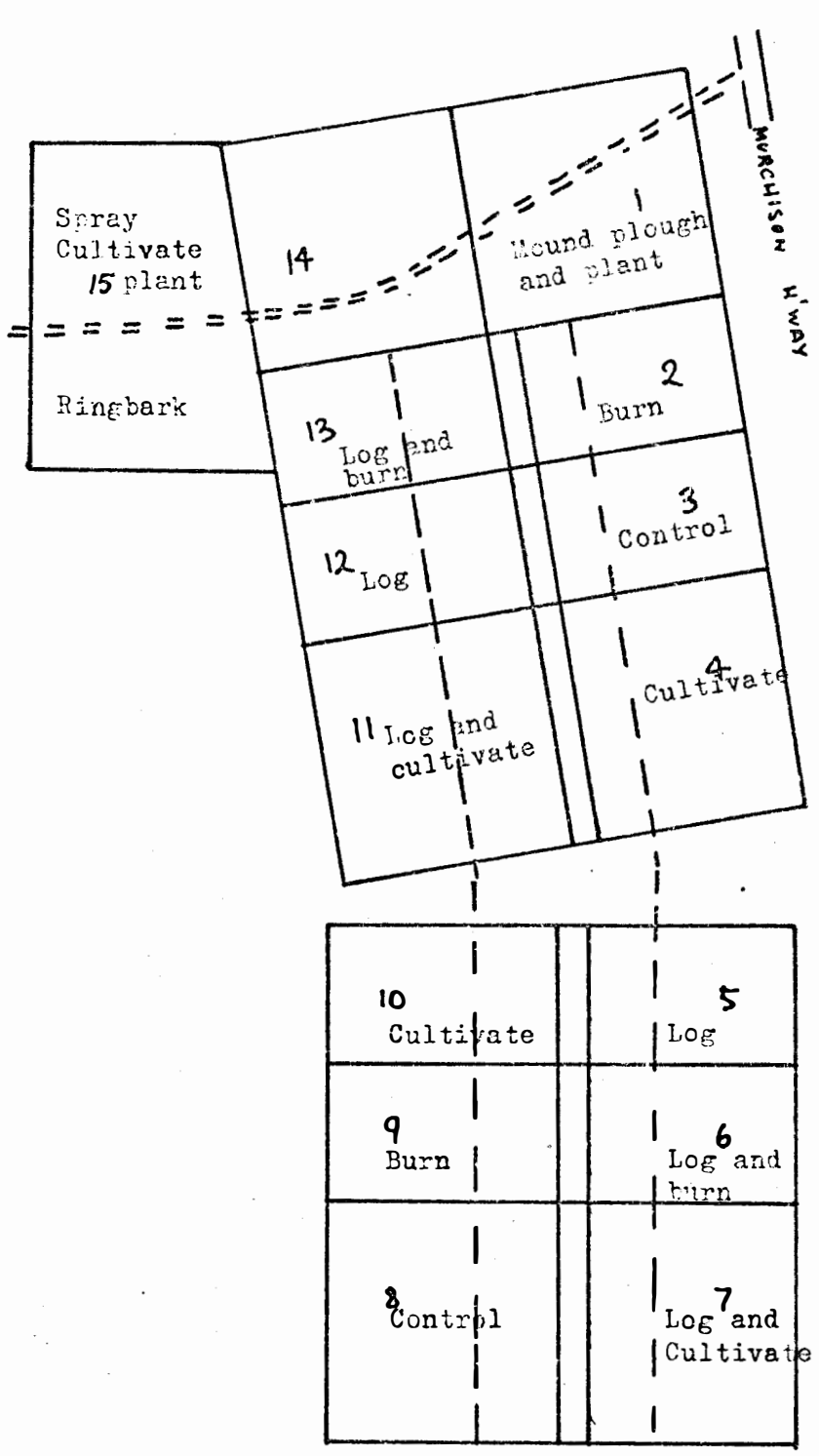


Figure 2.2 Layout of Campbells Experimental Plot
See also the larger map in the appendix
Scale 4chns = 1 inch

Table 3.1 Climatic Data recorded at Waratah, Guildford and Campbells.

Place	Date	Average Monthly Rainfall (Inches)												
		J	F	M	A	M	J	J	A	S	O	N	D	Total
Waratah	1882-1970	4.4	3.8	4.9	7.0	8.4	9.2	10.0	9.9	8.8	8.1	6.7	5.7	86.9 ins
Guildford	1917-1966	3.6	3.8	3.8	5.8	7.9	8.2	9.9	9.4	7.7	6.7	5.4	4.4	76.6 ins
Rainfall recorded during 1970														
Waratah 1970		4.6	1.2	3.2	9.4	8.5	6.6	16.8	16.5	10.0	8.1	1.8	4.5	89.9 ins
Campbells		3.8	1.2	3.0	6.5	8.1	10.8	11.9	14.4	9.8	7.2	2.4	3.9	82.8 ins
Average monthly temperature patterns														
Mean Minimum Temperature °F for Waratah		43.2	44.2	42.4	39.5	37.1	34.5	33.4	33.5	35.0	36.8	41.1	38.3	
Mean Maximum Temperature °F for Waratah		63.6	64.2	60.1	54.2	49.7	46.1	45.0	46.3	49.5	53.3	57.0	60.7	

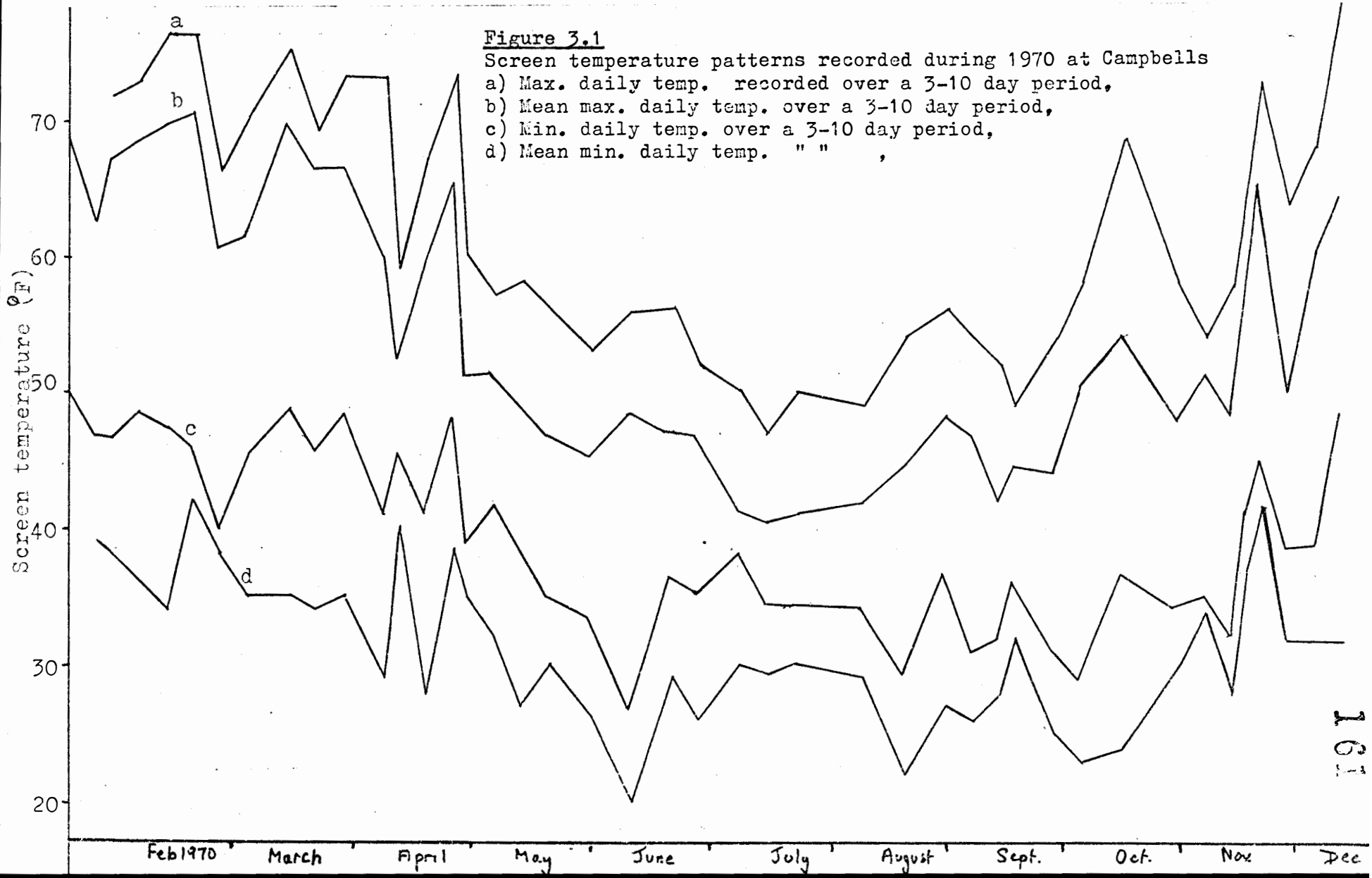


Figure 3.1
Screen temperature patterns recorded during 1970 at Campbells
a) Max. daily temp. recorded over a 3-10 day period,
b) Mean max. daily temp. over a 3-10 day period,
c) Min. daily temp. over a 3-10 day period,
d) Mean min. daily temp. " " ,

FIGURE 3.2
Typical Diurnal Temperature and Relative Humidity Pattern at Campbells during Winter 1970 (Clear Nights)

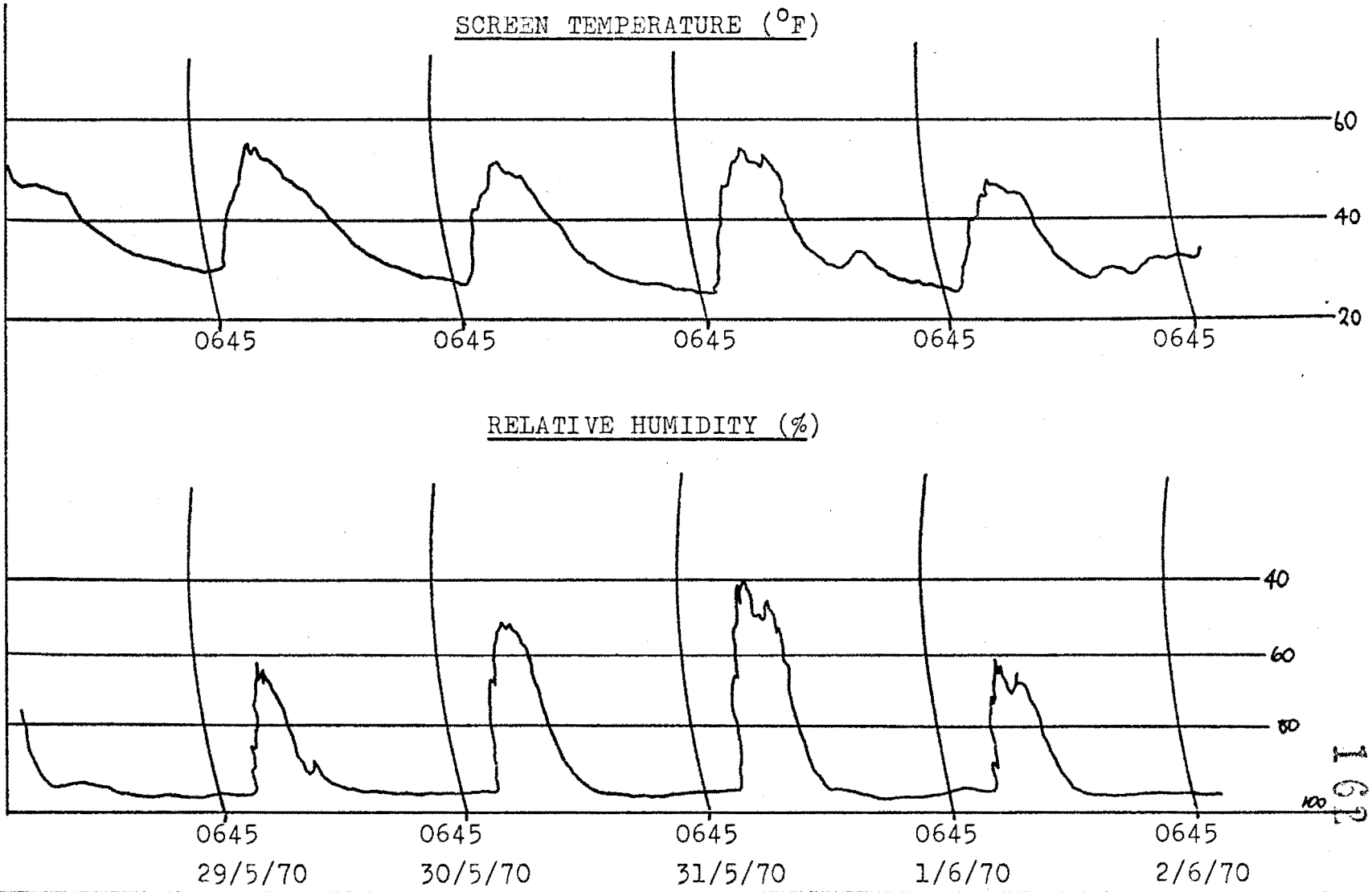


Figure 3.3

Typical diurnal temperature and relative humidity pattern at Campbells during Winter 1970 (cloudy nights)

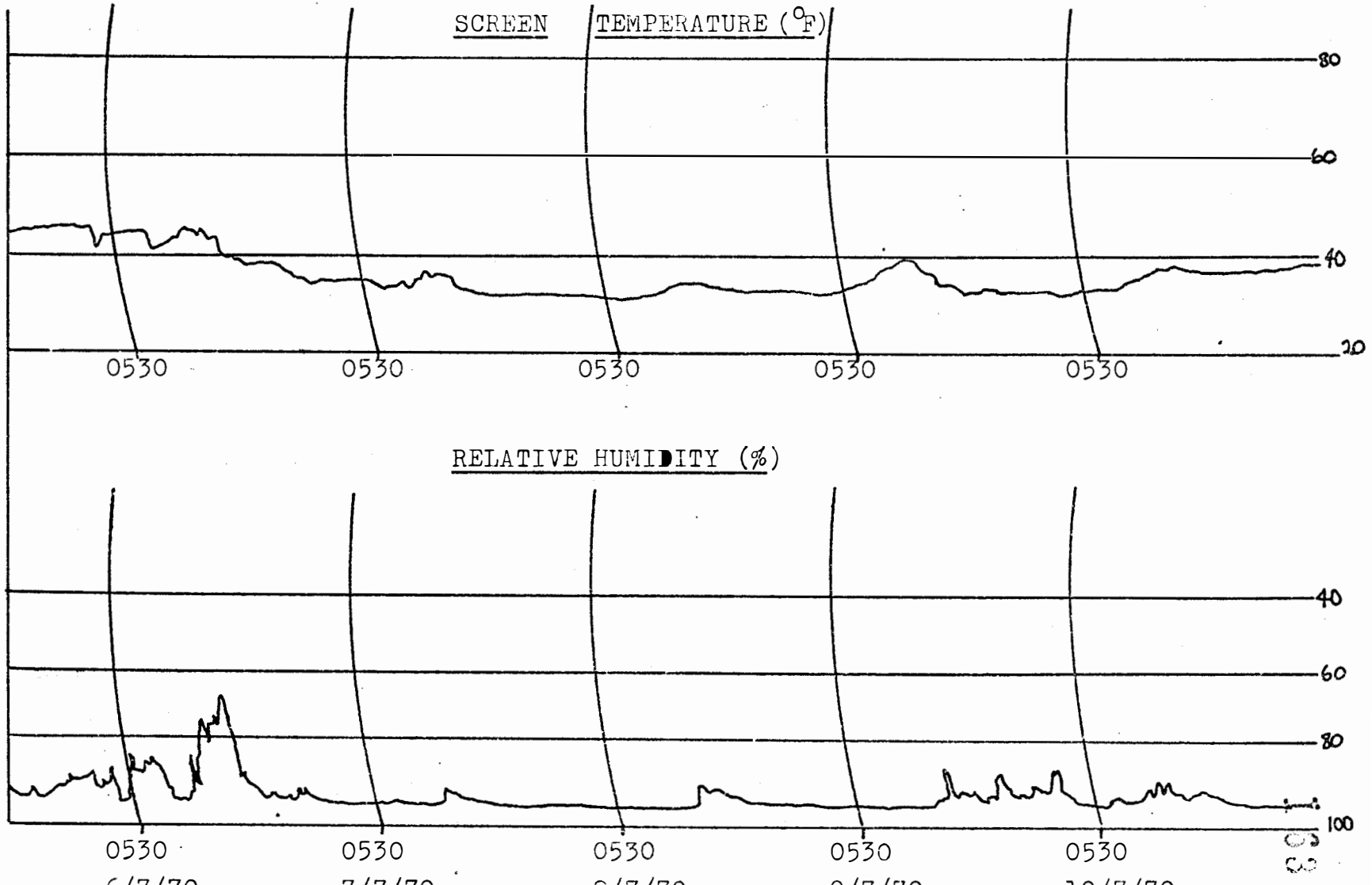


Figure 3.4

Typical diurnal temperature and relative humidity pattern at Campbells during Summer 1970

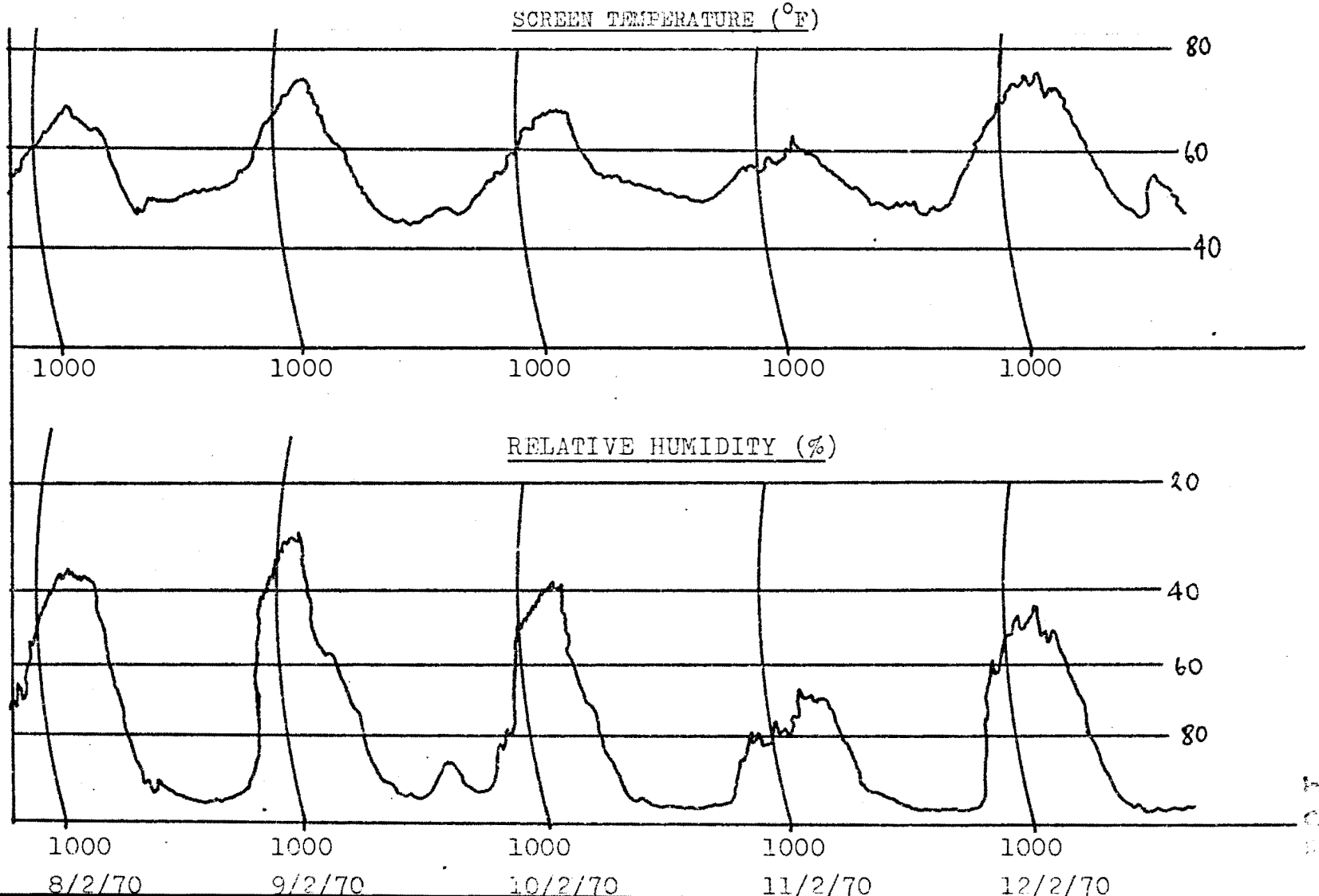


Figure 3.5

Relationships existing between screen temperature and temperature recorded above various seedbed types

a) Ploughed surface Y= 0.93x - 0.72 r= 0.89 *** n=23

b) Ashbed surface Y= 1.09x - 8.18 r= 0.71 *** n=24

c) Grass surface Y= 1.31x - 15.32 r= 0.91 *** n=26

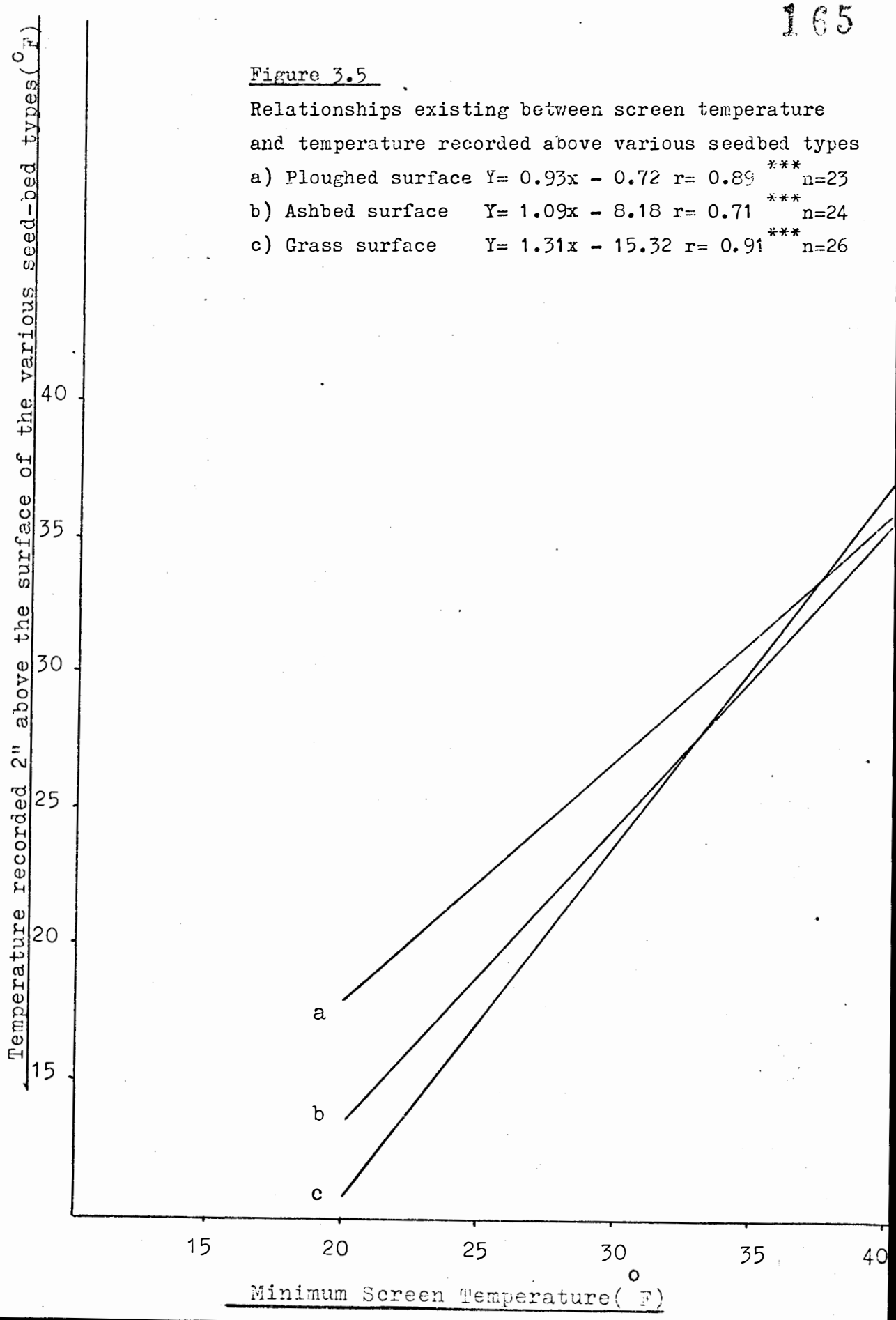


Figure 3.6

Device used to measure temperature gradients

Diplarrhena moraea has a wide lamina

Poa caespitosa has a narrow lamina

Figure 3.7
Temperature gradients above different surfaces

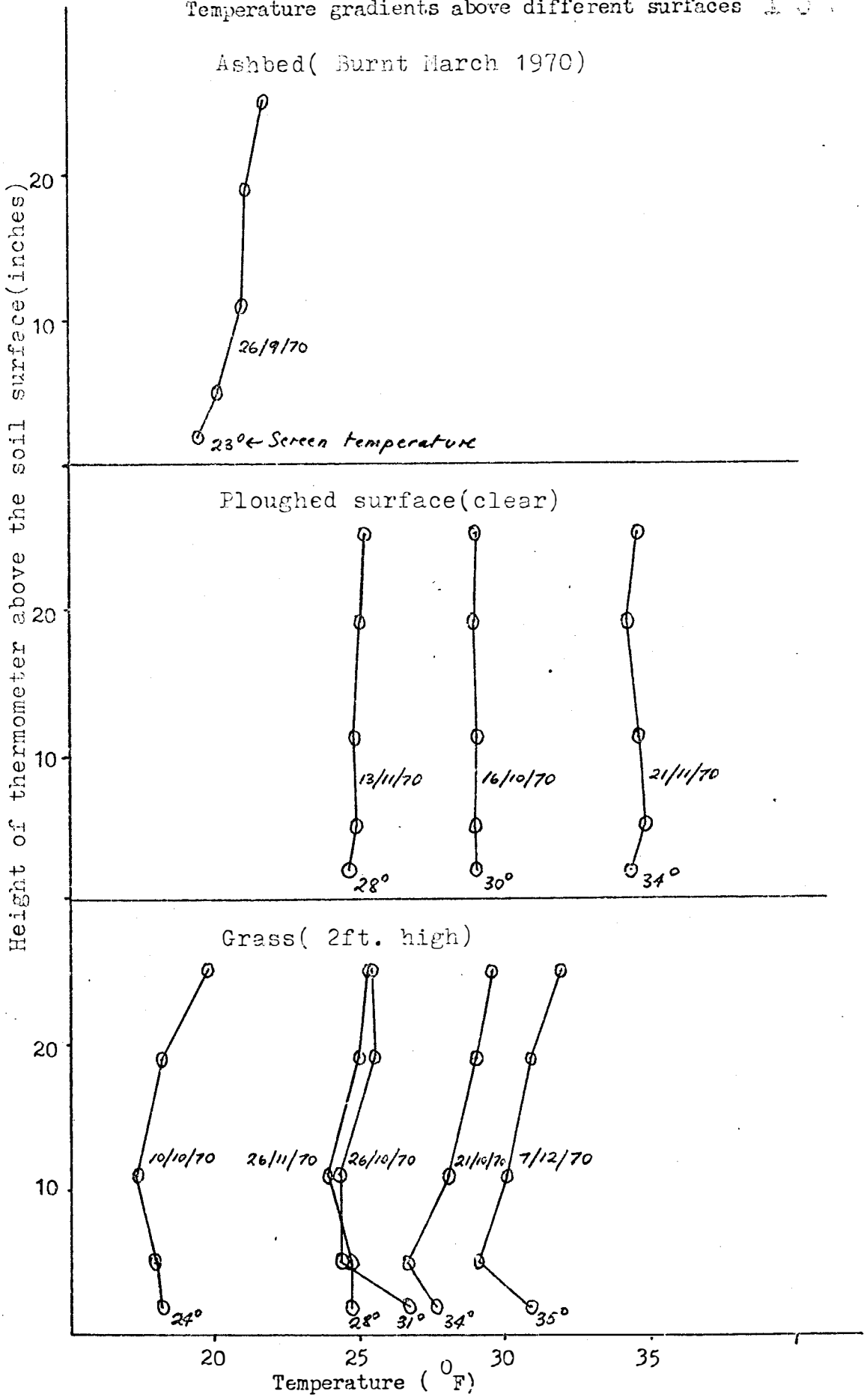


Table 3.3 Statistical Tabulations of the Climatic Data of Waratah

Populations	Number of Observations	Mean (inches)	Variance (inches^2)	Standard Error (inches)	Significance of apparent differences between a & b
1. a Annual rainfall of period 1883-1927	43	85.78	150	±12.2	
b Annual rainfall of period 1928-1970	43	87.98	215	±14.7	N.S.D.
2. a Annual rainfall of period 1883-1970	86	86.9	181	±13.5	≠≠
b Hypothetical rainfall data	86	93.7	328	±18.1	
3. a Rainfall in Jan.1883-1927	42	4.70	3.86	± 2.0	
b Rainfall in Jan.1928-1970	43	4.30	4.99	± 2.2	N.S.D.
4. a Rainfall in July 1882-1926	44	9.52	14.98	± 3.87	
b Rainfall in July 1927-1970	44	10.51	12.63	± 3.55	N.S.D.
		(°F)	(°F^2)		
5. a Min.temperature July 1883-1933	38	32.1	22.6	± 4.8	
b Min.temperature July 1934-1970	38	33.8	33.3	± 5.8	N.S.D.

Figure 3.9 Frequency distribution of the annual rainfall data from Waratah and the associated normal curves

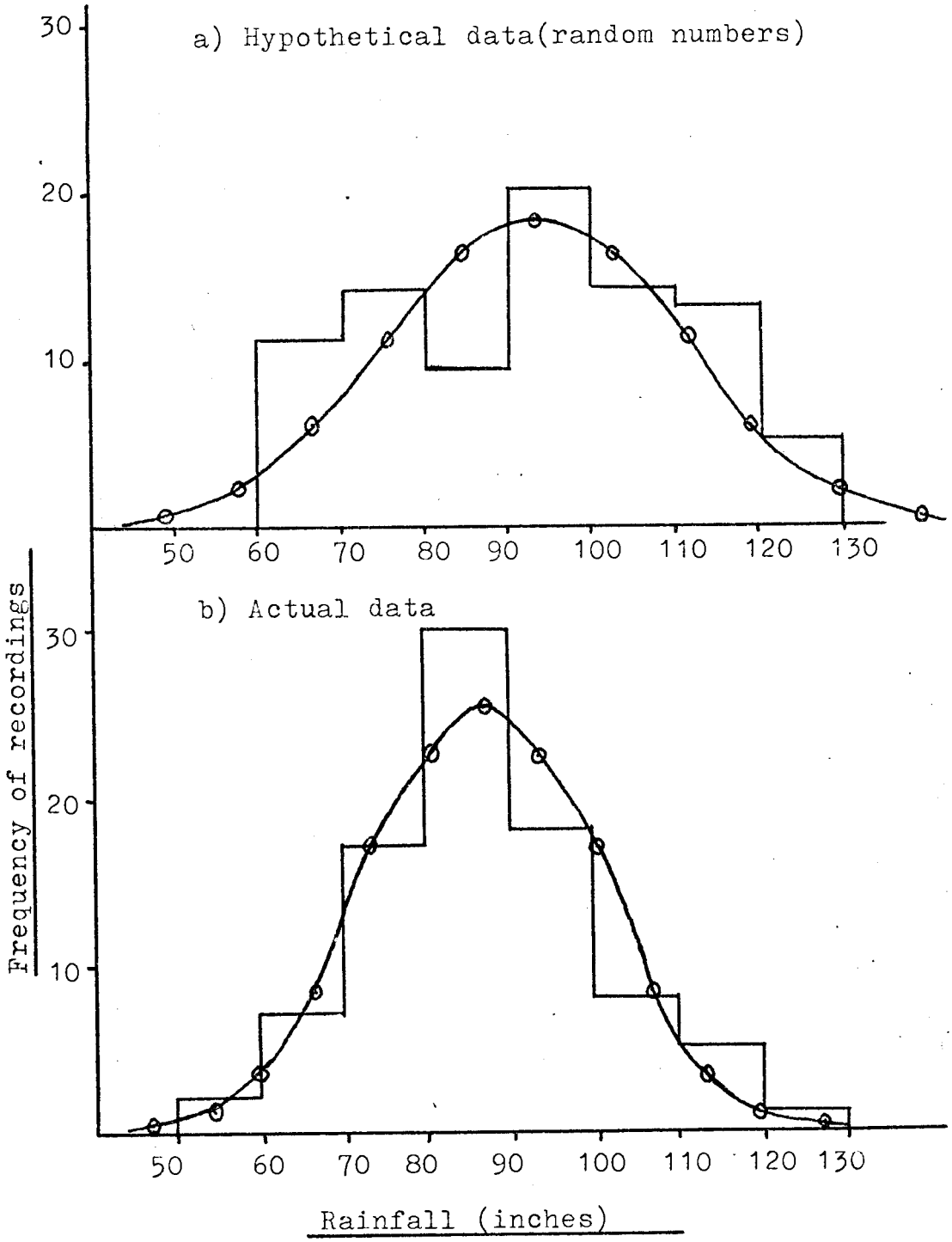
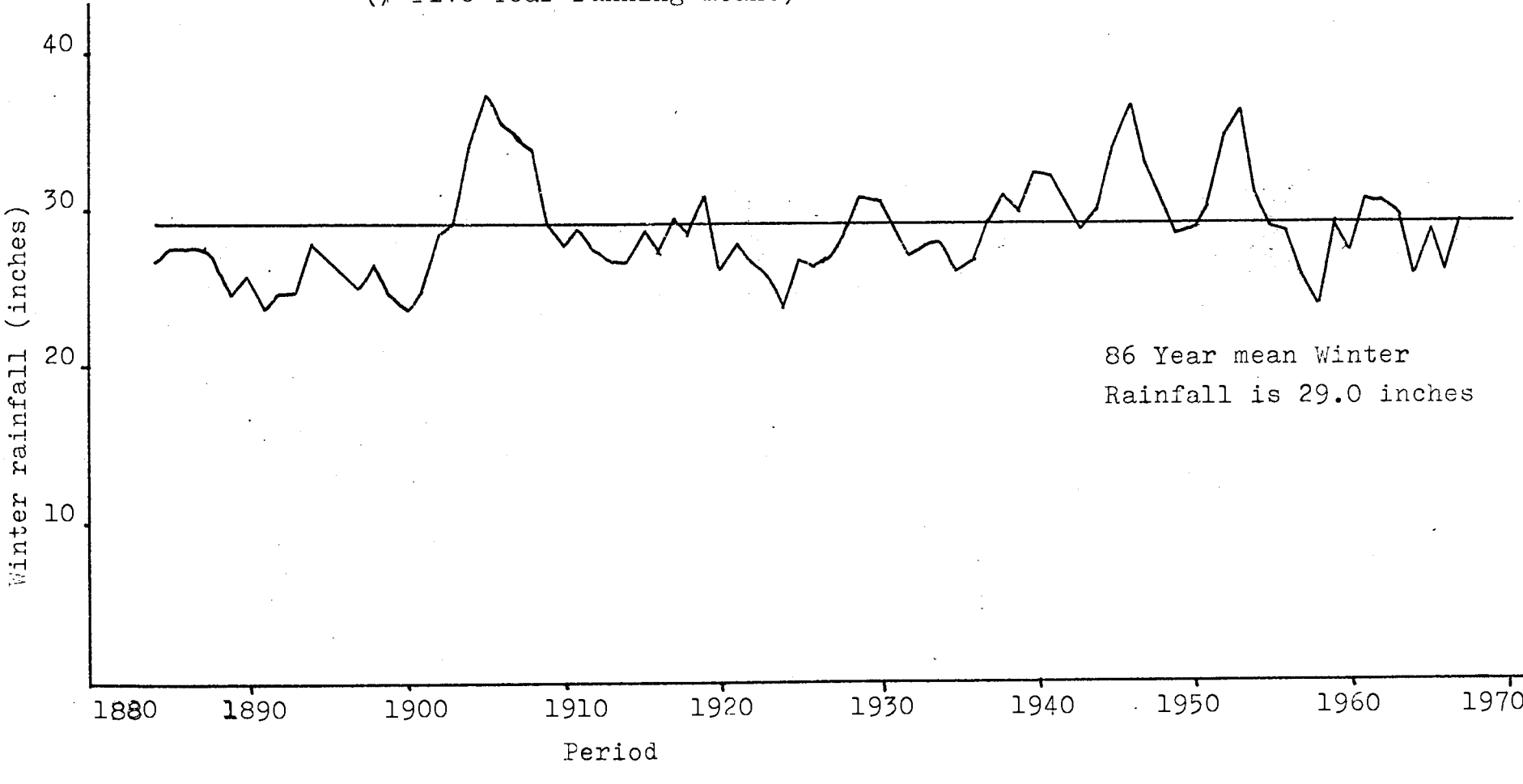


Figure 3.10 Graph of Winter Rainfall records of Waratah, Tasmania, 2,047 feet above M.S.L.
(≠ Five Year running means)



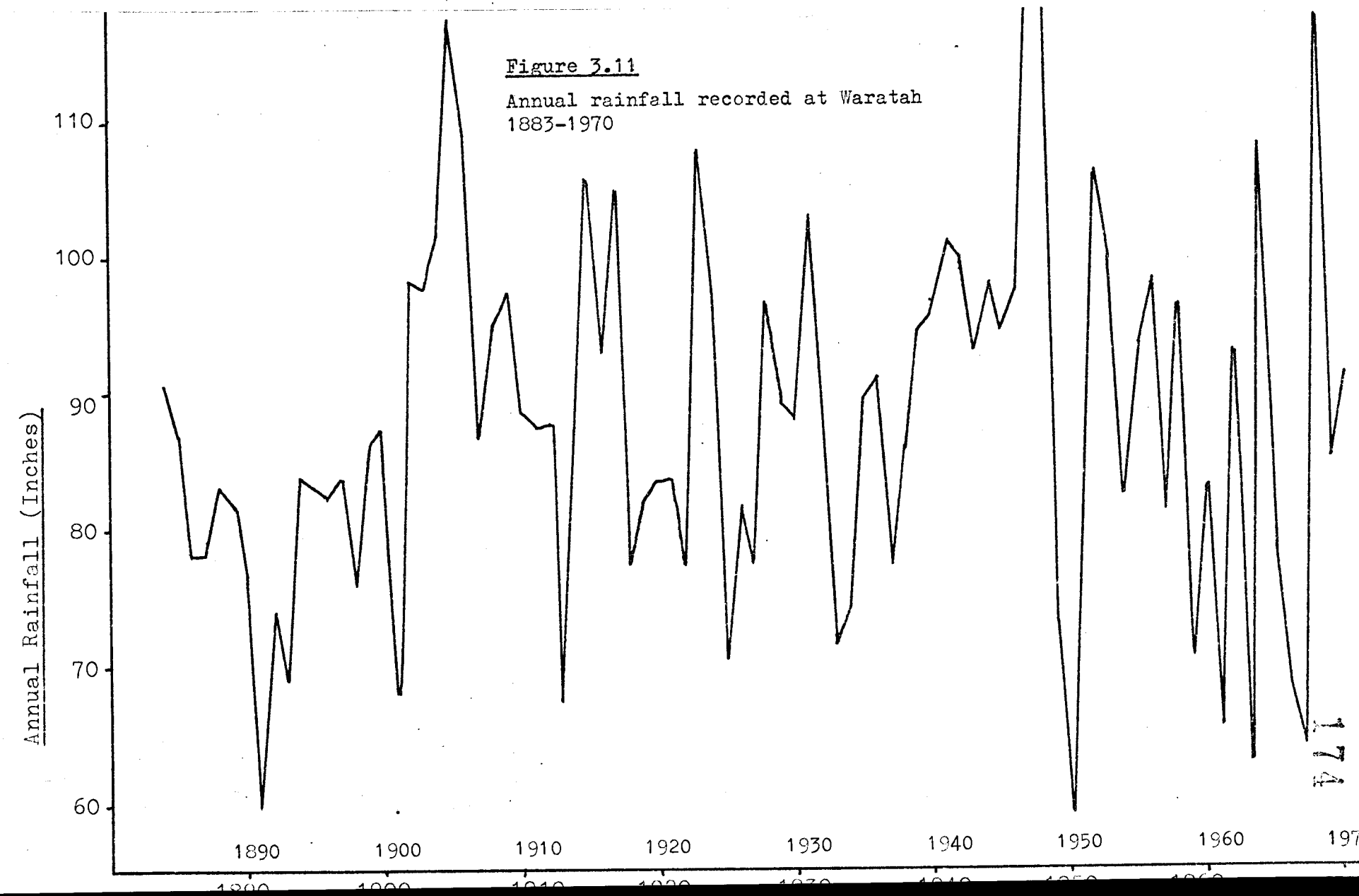


Figure 3.11

Annual rainfall recorded at Waratah
1883-1970

Figure 3.12

Temperature records of Waratah 1883-1970.

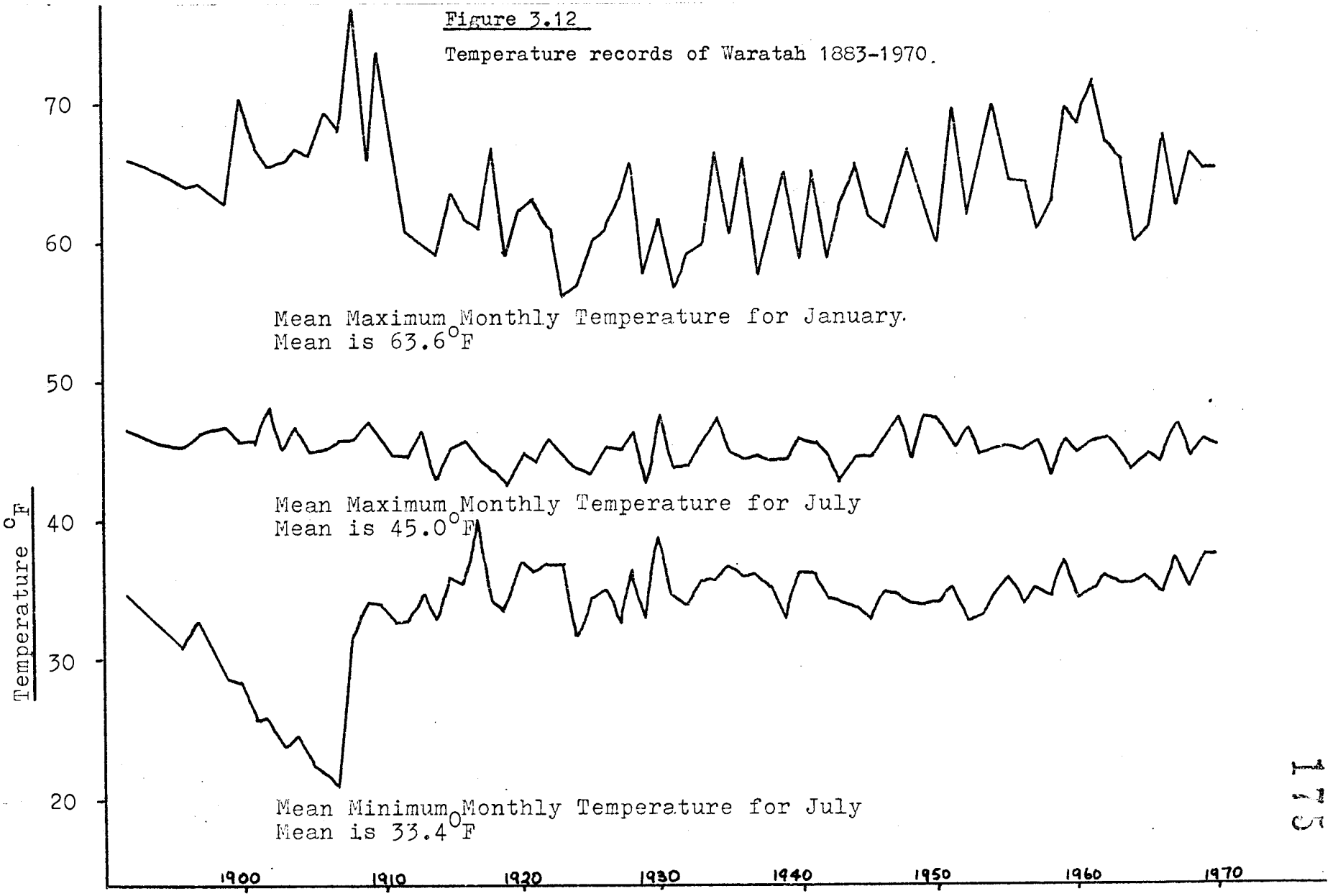
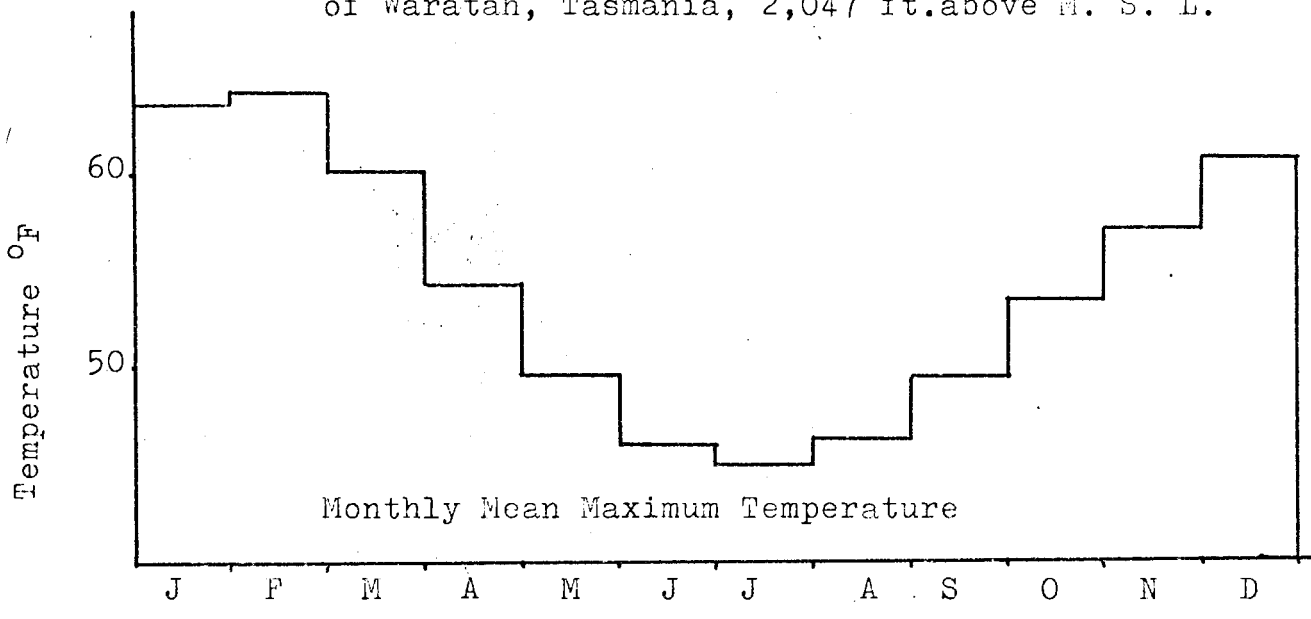


Figure 3.13
Monthly Temperature Patterns
of Waratah, Tasmania, 2,047 ft.above M. S. L.



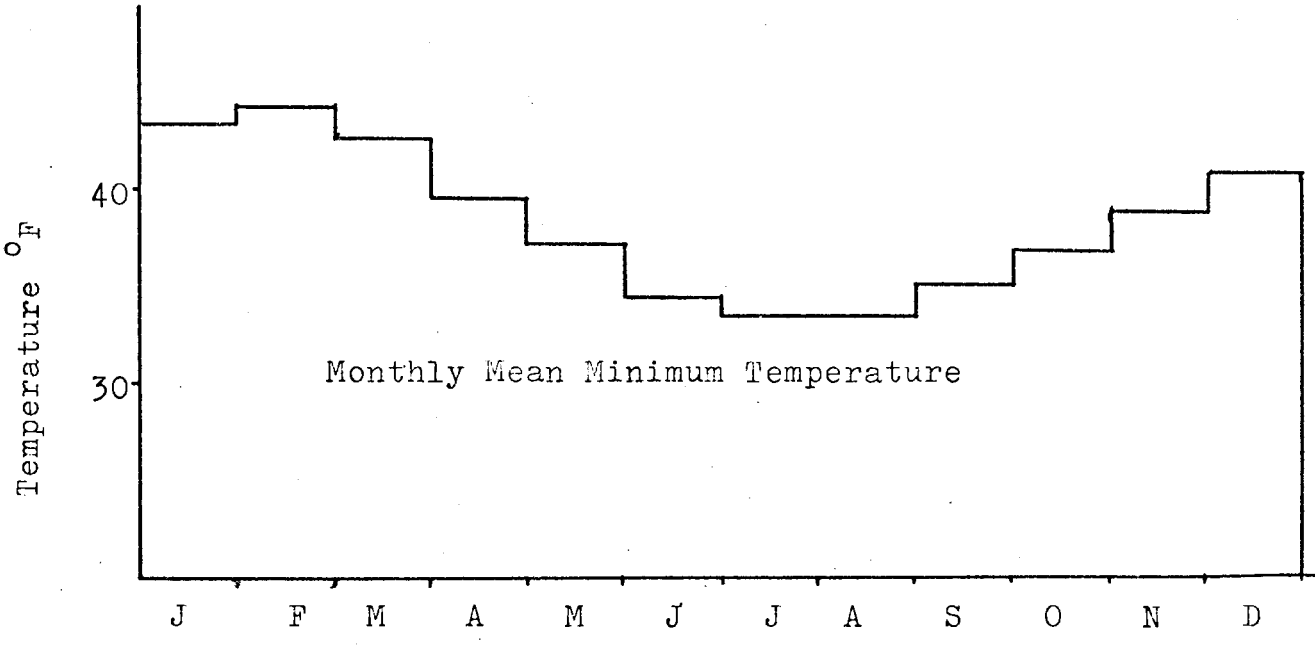


Table 4.1 Frequencies of Fires at Campbells

Main Fire Years	Error Allowed in calculation	Canopy Class of Tree Measured															Totals
		CD	CD	D	CD	D	CD	CD	CD	S	D	D	CD	D	D	D	
1700	± 6 years																
1770	"	s	*														2
1836	± 4 years	*	–					*			s						3
1845	"	*	–				*	*			*						4
1855	"	–	–	s				–		s	–	*			*		4
1865	"						*				*						2
1873	"	–	–	–		*		–			*	*					3
1880	"						*					*				s	3
1890	"	*	*	*	*	*		–		*	–	*	*		*	*	10
1896	"	–	–	*	–	–		–		–	–	–	*		–	*	3
1902	± 2 years	–	–	*	–	–	*	–		*	*	–	*		–	*	6
1910	"									*	*	–	–		–	*	3
1914	"	*	–	–	–	–	*	–		–	–	–	–		–	*	3
1934	"	–	–	–	–	–	–	–	*	*	*	–	*		–	–	4

no trace of fire ring

Other years recorded once in one of the above samples - 1907, 1918, 1920, 1922, 1927, 1930, 1936, 1942, 1948, 1950, 1954, 1957, 1959, 1960, 1962.

Figure 4.1

Frequency of past fires that have occurred at Campbells since 1800.

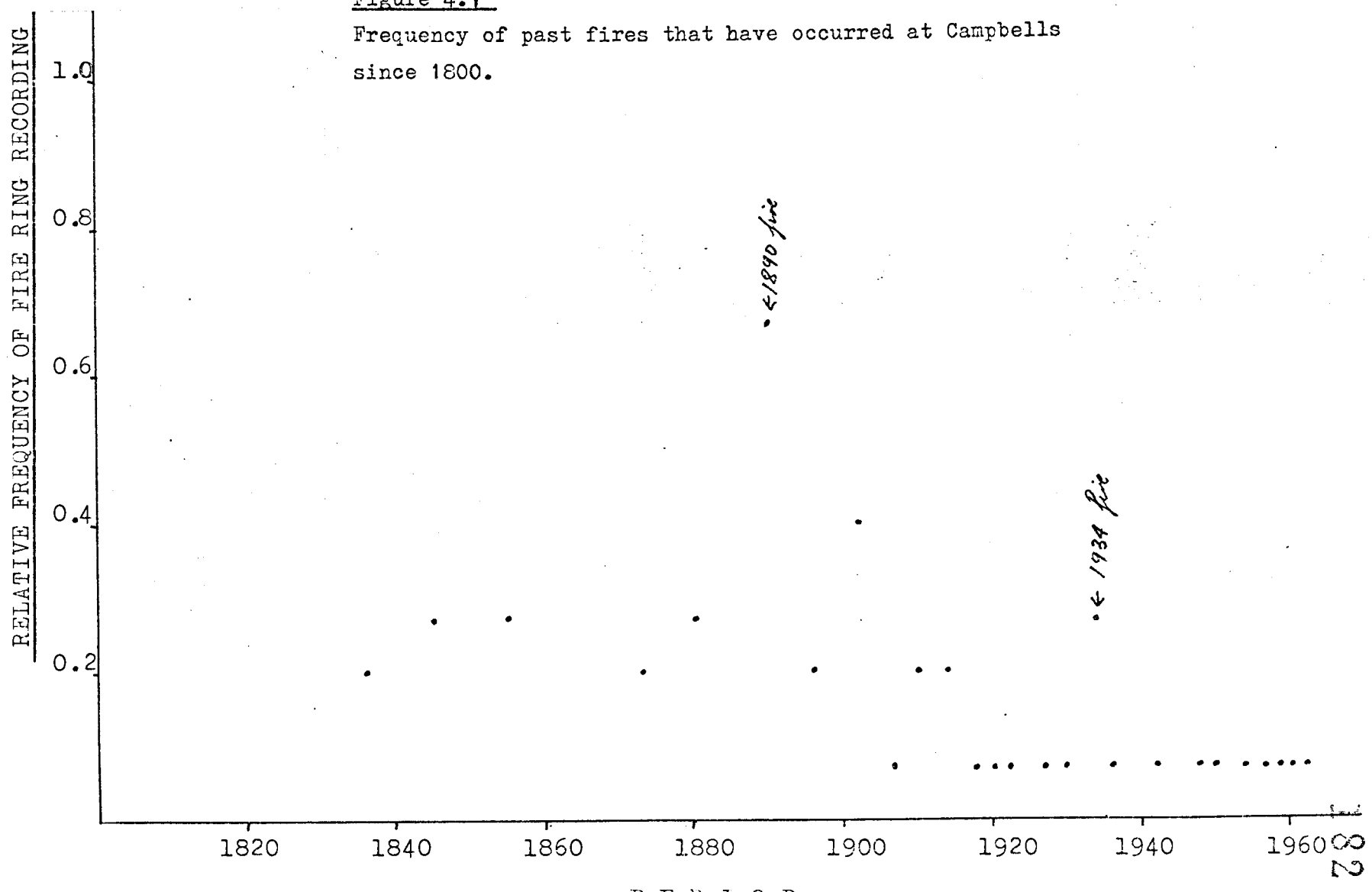


Table 4.2 Estimates of Periodic Diameter Increments at Campbells

PERIOD	Diameter Increments (in.)																
	Canopy Class of Trees Measured																
	D	CD	CD	CD	CD	S	D	D	CD	D	D	D	D	D	CD	TOTALS	MEAN
1700-1750													.26			.26	0.26
1750-1800												0.45	.22	.34		1.01	0.34
1800-1850				0.31			.14					.56	.40	.36		1.77	0.35
1850-1900	0.67		0.45	0.56		0.29	.6	.31	.53		.24	.48	.20	.36	0.3	4.99	0.42
1900-1950	0.38	0.38	0.38	0.40	0.45	.18	.26	.58	.30	.42	.52	0.16	.20	.20	0.40	5.21	0.35
1950-1970	0.35	0.50	0.55	0.10	0.70	.10	.14	.55	.55	.56	.50	0.07	.25	.15	0.35	4.92	0.35

Table 5.1 Records of germinations and deaths on the measured milacre plots

Treatment	No. of plots	14th Oct.70			3rd Nov.			24th Nov.			23rd Dec.			8th Mar.71			12th July 71		
		G	D	B	G	D	B	G	D	B	G	D	B	G	D	B	G	D	B
Control	10	5	-	5	8	1	12	1	1	12	1	2	11	-	2	9	3	-	12
Burn only	8	46	-	46	23	13	56	16	13	59	19	9	69	-	25	44	12	4	52
Cultivate only	16	70	-	70	66	23	113	37	13	137	41	19	159	-	19	140	11	14	137
Log only	8	2	-	2	-	1	1	-	-	1	-	1	-	-	-	-	-	-	-
Log and cultivate	16	37	-	37	33	12	58	20	8	70	12	7	75	4	9	70	9	16	63
Log and burn	8	19	-	19	8	7	20	5	1	24	3	8	19	2	3	18	-	4	14
Totals	64	179	-	179	138	57	260	79	36	303	76	46	333	6	58	281	35	38	278

G = number of germinations recorded at each scoring

D = number of deaths recorded at each scoring

B = number of seedlings remaining at each scoring.

Table 5.2 Percentage Survival of seedlings on permanent milacre plots at Campbells

Treatment	No. of Plots	8/3/71 % Survival of Total Germinations		12/7/71 % Survival of Total Germinations	
1. Control	10	60%	(15)*	67%	(18)
2. Log	8	0%	(2)	0%	(2)
3. Burn	8	38%	(104)	45%	(116)
4. Cultivate	16	79%	(214)	61%	(225)
5. Cultivate & Log	16	66%	(106)	55%	(115)
6. Fell & burn	8	51%	(37)	38%	(37)

* Total number of germinations recorded on plots.
Seedlings germinated Spring 1970.

Table 5.3 Mean Heights of seedlings on permanent milacre plots at Campbells

Treatment	8/3/71 No. of seedlings	8/3/71 Mean Height	12/7/71 No. of seedlings	12/7/71 Mean Height
1. Control	9	0.6 ins.	12	0.9 ins.
2. Log	-	-	-	-
3. Burn	44	2.1 ins.	51	2.4 ins.
4. Cultivate	156	2.0 ins.	113	3.2 ins.
5. Cultivate & Log	72	3.1 ins.	54	5.3 ins.
6. Fell and Burn	18	4.5 ins.	14	6.5 ins.

Seedlings germinated Spring 1970.

Table 5.4 The effect of soil sterilization on growth rate of planted Eucalypt seedlings at Campbells.

Plot	Treatment	Mean height of seedlings (in.)	Standard error (in.)	No.
A	Burnt March 1970 fumigated May 1970	31.6	± 8.8	21
B	Burnt March 1970 Not fumigated	11.7	± 2.3	11
C	Ploughed Oct. 1969 Fumigated May 1970	26.8	± 3.1	19
D	Ploughed Oct. 1969 Not fumigated	10.0	± 3.1	10

Tubed seedlings of E. delegatensis (6 in.) were planted in May 1970.

Plots A and C were refilled in October 1970 with similar stock. Seedling heights were measured July 1971.

Figure 5.1

Germination of E.delegatensis seedlings on the permanent milacre plots at Campbells during the Spring and Summer of 1970 and 1971.

a) Control
b) Log
c) Cultivate & Log
d) Fell & burn
e) Burn
f) Cultivate

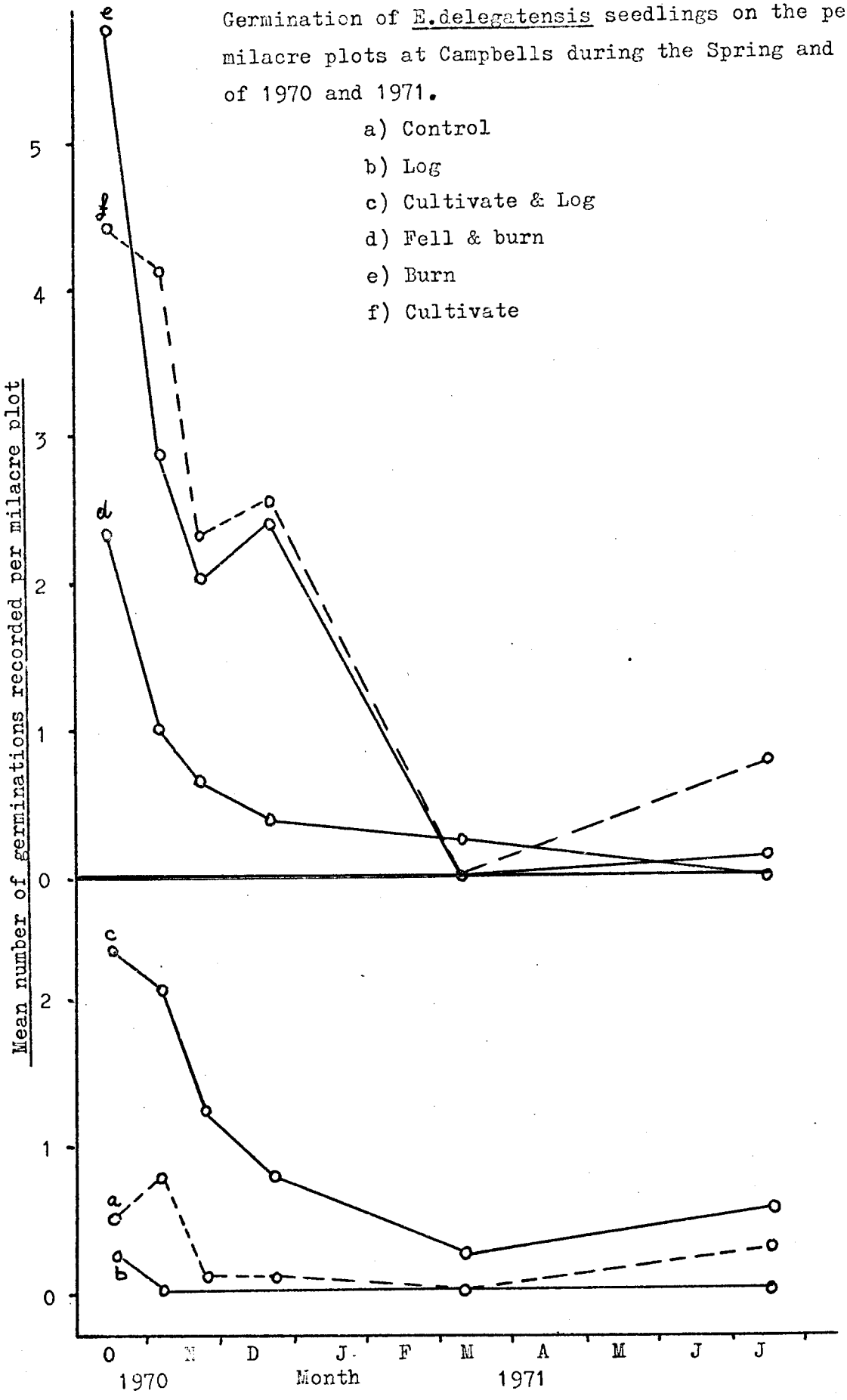


Figure 5.2

Total germinations and deaths recorded on the permanent milacre plots at Campbells during the Spring of 1970 and Summer of 1971.

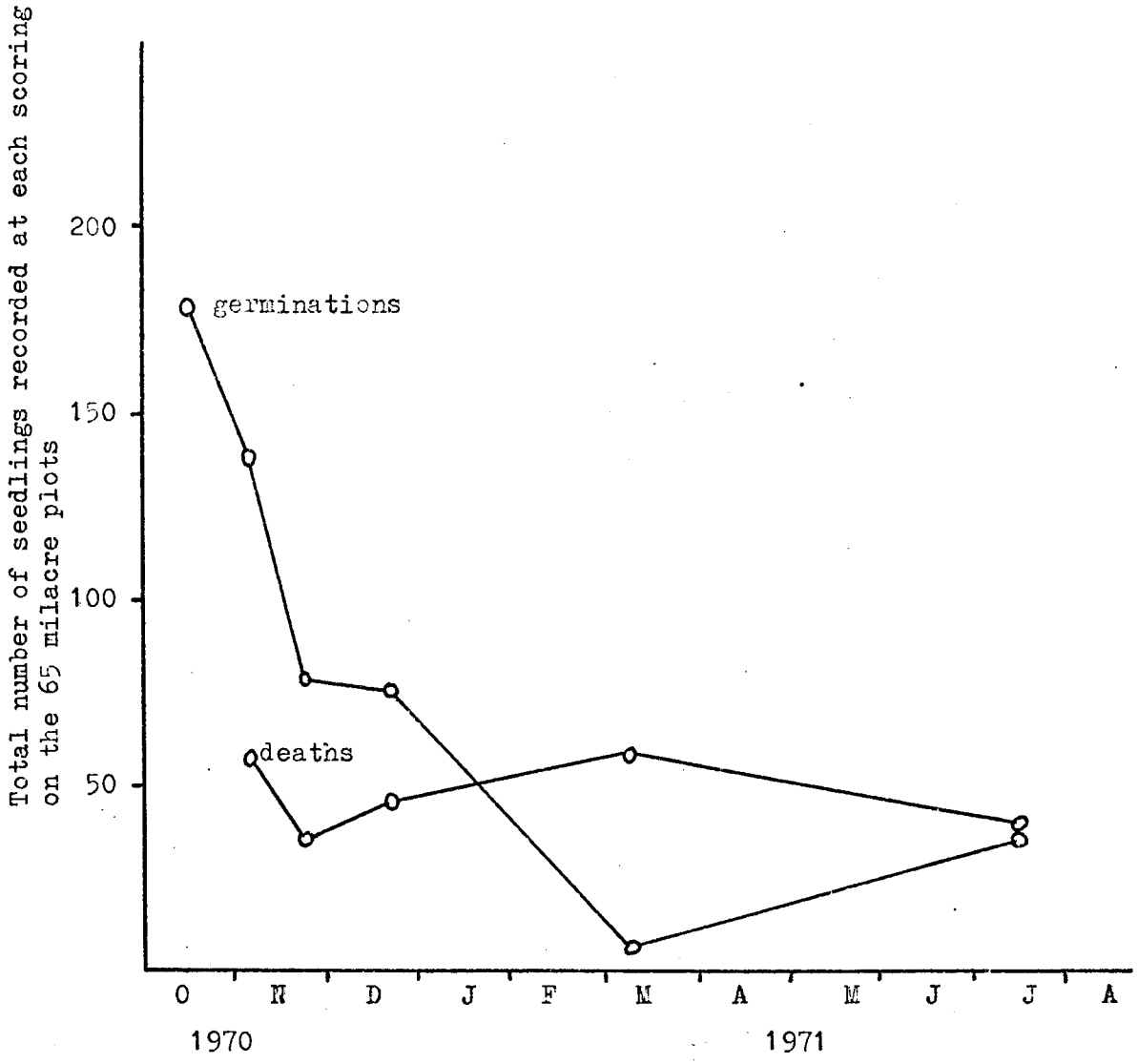


Figure 5.3

The effect of soil sterilization on growth rate of E.delegatensis seedlings . For details see Table 5.4 At the end of the first growing season the mean height of these seedlings is 32" (Plot A).

Figure 6.1

The ash-bed effect at Campbells - seedlings germinated October 1970 on an area burnt in March 1970, Photograph May 1971

The species of plant about 2 feet high in the background is Lomatia tinctora.

Figure 6.2

Area 2, photograph taken from corner I looking SE

Photograph 1 taken March 1970 immediately after the burning treatment.

Photograph 2 taken May 1971
The area was sprayed prior to burning but the grass sward re-established within a month of burning which is hopeless for the regeneration of Eucalyptus .

Figure 6.3

Area 6, photograph taken from near corner V looking SSE

Photograph 1 taken March 1970 immediately after the burning treatment.

Photograph 2 taken May 1971

Note the very poor quality of the burning treatment.

Figure 6.4

Area 13, photograph taken from slightly north of milacre 34 looking SE , the pegs in the right-hand side of the photograph are the NW corner of the plots labelled ⊖ in the map.

Photograph 1 taken March 1970

Photograph 2 taken May 1971

Notice the ash-bed deliberately created by the accumulation of slash in the lower right hand side of photograph 1 and the slight colour change in this area due to different plant species in photograph 2.

Figure 6.5

Area 8, photograph taken slightly east of Z looking SE.

The grassland vegetation in this case has not been burnt for about ten years. There is a fair amount of Pulteneae juniperina (dark green) present which is quite inflammable. Also in this area there are rainforest species such as Drimys and Acacia present.

Figure 6.6

An area of grassland at Campbells between the corners F and W. This area has not been burnt for about five years.

Figure 6.7

Area 13, photograph taken to illustrate the sparse fuel for burning purposes, Although the area had been sprayed prior to burning the fire has only burnt the surface and has not penetrated into the rhizomatous zone of the soil.

List of Appendices

APPENDIX I RESEARCH REGENERATION SURVEY RESULTS

AREA AND VEGETATION TYPE	TIME SINCE LOGGING, WILDFIRE OR TREATMENT	NO. OF PLOTS	BURNT UNBURNT	$1 MILACRE STOCKING	$4 MILACRE STOCKING	% AREA STOCKED STRIP COUNTS	% AREA STOCKED (MAPPING RULES)	NO. OF S'LINGS/ACRE		SPECIES	SEED TREES PER ACRE EUCALYPTUS (ESTIMATE)	STUMPS PER ACRE - EUCALYPTUS (ESTIMATE)	SOIL DISTURBANCE TOTAL	SOIL DISTURBANCE ON STOCKED PLOTS	SOIL DISTURBANCE ON UNSTOCKED PLOTS
								STRIP ESTIMATE	PLOT COUNT						
1	2	3	4	5	6	7.	8	9	10	11	12	13	14	15	16
EUCALYPT SCLEROPHYLL															
Black Ck. Rd.	2 years	31	U.B.	13%	45%	52%	48%	237	193	E. del. 83% E. sim. 17%	2	17	55%	70%	34%
	4-6 years	65	U.B.	37%	55%	52%	57%	304	1300	E. del. 10% E. obl. 90%	17	13	55%	70%	34%
	7-8 years	38	U.B.	21%	61%	61%	68%	297	1158	E. obl. 100%	6	21	55%	70%	34%
	Means	134	-	27%	54%	54%	56%	287	1007	-	11	17	55%	70%	34%
Batone Rd.	5-11 years	180	U.B.	32%	43%	41%	46%	193	761	E. obl. 62% E. sim. 28% E. del. 10%	16	13	31%	52%	16%
Housetop Fire	4+ years	77	B.	93%	96%	97%	100%	4382	7899	E. obl. 56% E. del. 20% E. sim. 24%	20	13	100%	100%	100%
Feb. 1968 Fire Kara	1+ years	24	B.	92%	96%	100%	100%	2888	9125	E. obl. 79% E. del. 19% E. sim. 2%	8	8	100%	100%	100%
	Means	101	-	93%	96%	98%	100%	-	-	-	-	-	-	-	-
EUCALYPT PEPPER															
Mt. Cattley	2 years	70	B.	89%	100%	100%	100%	8024	3925	E. del. 98% E. gun. 2%	10	6	100%	100%	100%
Mayday Rd.	1 year	38	U.B.	58%	71%	50%	84%	263	2211		7	8	74%	92%	12%
	2-3 years	43	U.B.	70%	98%	77%	100%	530	4209	E. del. 96% E. gun. 4%	10	8	74%	92%	12%
	6-8 years	173	U.B.	37%	61%	57%	69%	317	1607		10	8	74%	92%	12%
	Means	254	-	46%	69%	59%	77%	344	2140	-	-	-	74%	92%	12%
Blythe Rd. - Peak Plain	18 years	68	U.B.	43%	65%	66%	69%	161	750	E. del. 100%	3	6	33%	34%	27%
Main Road	17 years	31	U.B.	45%	68%	100%	84%	288	1300	E. del. 100%	6	4	-	-	-
	Means	99	-	44%	66%	74%	73%	198	913	-	4	5	-	-	-
EUCALYPT RAINFOREST															
Bunkers Rd.	4 years	95	U.B.	34%	52%	56%	60%	270	1729	E. del. 100%	3	6+ (18 myrtle)	17%	38%	3%
	5 years	55	U.B.	52%	72%	81%	81%	463+	2065	E. del. 100%	4	10	66%	75%	45%
	Means	150	-	40%	59%	65%	68%	341	1854	-	3	7	34%	53%	18%
Old Park Rd.	1-5 years	45	U.B.	11%	29%	14%	11%	50	111	E. del. 100%	2	2	24%	56%	11%
Blythe Rd.	6-10 years	118	U.B.	17%	29%	30%	32%	114+	305	E. del. 100%	2	4	21%	-	-
Dempsters Rd.	8 years	46	U.B.	20%	35%	41%	33%	206+	435	E. del. 85% E. sim. 15%	3	7	28%	54%	14%
Gin Ck. - Rawlings Rd.	17 years	50	U.B.	18%	42%	20%	48%	108	420	E. del. 100%	2	5	14%	15%	13%
	Means	259	-	17%	33%	26%	25%	197+	317	-	2	5	21%	42%	13%
Farrawe	6 years	100	U.B.	20%	44%	32%	44%	104	520	E. obl. 100%	4	8+ (12 myrtle)	31%	62%	7%
Query Rd.	2 years	30	B. & aerially seeded	57%	90%	60%	100%	199	1133	E. obl. 59% E. del. 41%	1	4	100%	100%	100%
Leven Rd.	3 years	20	B.	90%	100%	100%	100%	1200+	7250	E. obl. 99% E. del. 1%	2	13	100%	100%	100%
	B'nt 5 yrs, seeded 3 yr.	51	B.	61%	75%	75%	80%	535+	2961	E. del. 56% E. sim. 43% E. obl. 1%	7	6	100%	100%	100%
Distant Spur	6 years	20	B.	80%	100%	100%	100%	1090+	7250	E. obl. 100%	6	10	100%	100%	100%
	Means	121	-	75%	86%	80%	92%	635+	3930	-	6	7	100%	100%	100%
EUCALYPT GRASS															
Campbells Bunkers	5 years	63	U.B.	56%	78%	84%	-	-	1873	E. del. 97% E. gun. 3%	-	-	-	-	-
	5 years	27	U.B.	63%	77%	85%	75%	404+	1815	E. del. 60% E. agy. 40%	9	8	3%	3%	8%
S. of Campbells	7 years	40	Part Burnt	38%	78%	38%	78%	165	825	E. del. 76% E. gun. 12% E. sim. 9% E. agg. 3%	9	8	3%	3%	8%
N. of Campbells	10+ years	162	U.B.	32%	54%	43%	40%	180+	1336	E. del. 89% E. gun. 11%	6	4	5%	-	-
Guildford	21 years	41	U.B.	15%	29%	49%	32%	167	196	E. sim. 2% E. del. 100%	11	3	3%	3%	8%
	Means	333	-	37%	65%	55%	-	-	1273	-	-	-	4%	3%	8%

APPENDIX I RESEARCH REGENERATION SURVEY RESULTS

AREA AND VEGETATION TYPE	TIME SINCE LOGGING, WILDFIRE OR TREATMENT	NO. OF PLOTS	BURNT UNBURNT	$1 MILACRE STOCKING	$4 MILACRE STOCKING	% AREA STOCKED STRIP COUNTS	% AREA STOCKED (MAPPING RULES)	NO. OF S'LINGS/ACRE STRIP ESTIMATE	NO. OF S'LINGS/ACRE PLOT COUNT	SPECIES	SEED TREES PER ACRE EUCALYPTUS (ESTIMATE)	STUMPS PER ACRE - EUCALYPTUS (ESTIMATE)	SOIL DISTURBANCE TOTAL	SOIL DISTURBANCE ON STOCKED PLOTS	SOIL DISTURBANCE ON UNSTOCKED PLOTS
1	2	3	4	5	6	7.	8	9	10	11	12	13	14	15	16
EUCALYPT SCLEROPHYLL															
Black Ck. Rd.	2 years	31	U.B.	13%	45%	52%	41%	237	181	E. del. 83% E. sim. 17%	2	17	55%	70%	31%
	4-6 years	65	U.B.	37%	55%	52%	57%	304	1303	E. del. 10% E. obl. 90%	17	13	55%	70%	34%
	7-b years	38	U.B.	21%	61%	61%	60%	297	1158	E. obl. 100%	6	21	55%	70%	34%
	Means	134	-	27%	54%	54%	56%	287	1007	-	11	17	55%	70%	34%
Natone Rd.	5-11 years	180	U.B.	32%	43%	41%	46%	193	761	E. obl. 62% E. sim. 28% E. del. 10%	16	13	31%	52%	16%
Housetop Fire	4+ years	77	B.	93%	96%	97%	100%	4382	7899	E. obl. 56% E. del. 20% E. sim. 24%	20	13	100%	100%	100%
Feb. 1968 Fire Kara	1+ years	24	B.	92%	96%	100%	100%	2888	9125	E. obl. 79% E. del. 19% E. sim. 2%	8	8	100%	100%	100%
	Means	101	-	93%	96%	98%	100%	-	-	-	-	-	-	-	-
EUCALYPT PEPPER															
Mt. Cattley	2 years	70	B.	89%	100%	100%	100%	8024	3925	E. del. 98% E. gun. 2%	10	6	100%	100%	100%
Mayday Rd.	1 year	38	U.B.	58%	71%	50%	84%	263	2211		7	8	74%	92%	12%
	2-3 years	43	U.B.	70%	98%	77%	100%	530	4209	E. del. 96% E. gun. 4%	10	8	74%	92%	12%
	6-8 years	173	U.B.	37%	61%	57%	69%	317	1607		10	8	74%	92%	12%
	Means	254	-	46%	69%	59%	77%	344	2140	-	-	-	74%	92%	12%
Blythe Rd. - Peak Plain	18 years	68	U.B.	43%	65%	66%	69%	161	750	E. del. 100%	3	6	33%	34%	27%
Main Road	17 years	31	U.B.	45%	68%	100%	84%	288	1300	E. del. 100%	6	4	-	-	-
	Means	99	-	44%	66%	74%	73%	198	913	-	4	5	-	-	-
EUCALYPT RAINFOREST															
Bunkers Rd.	4 years	95	U.B.	34%	52%	56%	60%	270	1729	E. del. 100%	3	6+ (18 myrtle)	17%	38%	3%
	5 years	55	U.B.	52%	72%	81%	81%	463+	2065	E. del. 100%	4	10	66%	75%	45%
	Means	150	-	40%	59%	65%	68%	341	1854	-	3	7	34%	53%	18%
Old Park Rd.	1-5 years	45	U.B.	11%	29%	14%	11%	50	111	E. del. 100%	2	2	24%	56%	11%
Blythe Rd.	6-10 years	118	U.B.	17%	29%	30%	32%	114+	305	E. del. 100%	2	4	21%	-	-
Dempsters Rd.	8 years	46	U.B.	20%	35%	41%	33%	208+	435	E. del. 85% E. sim. 15%	3	7	28%	54%	14%
Gin Ck. - Rawlings Rd.	17 years	50	U.B.	18%	42%	20%	48%	108	420	E. del. 100%	2	5	14%	15%	13%
	Means	259	-	17%	33%	26%	25%	197+	317	-	2	5	21%	42%	13%
Parrawe	6 years	100	U.B.	20%	44%	32%	44%	104	520	E. obl. 100%	4	8+ (12 myrtle)	31%	62%	7%
Query Rd.	2 years	30	B. & aerially seeded	57%	90%	60%	100%	199	1133	E. obl. 59% E. del. 41%	1	4	100%	100%	100%
Leven Rd.	3 years	20	B.	90%	100%	100%	100%	1200+	7250	E. obl. 99% E. del. 1%	2	13	100%	100%	100%
	B'nt 5 yrs. seeded 3½y.	51	B.	61%	75%	75%	80%	535+	2961	E. del. 50% E. sim. 49%	7	6	100%	100%	100%
Distant Spur	6 years	20	B.	80%	100%	100%	100%	1090+	7250	E. obl. 1% E. obl. 100%	6	10	100%	100%	100%
	Means	121	-	75%	86%	80%	92%	635+	3930	-	6	7	100%	100%	100%
EUCALYPT DRASC															
Campbells Bunkers	5 years	63	U.B.	56%	78%	84%	-	-	1873	E. del. 97% E. gun. 3%	-	-	-	-	-
	5 years	27	U.B.	63%	77%	85%	75%	404+	1815	E. del. 60%	9	8	3%	3%	8%
S. of Campbells	7 years	40	Part Burnt	38%	78%	38%	78%	165	825	E. agy. 40% E. del. 76% E. gun. 12% E. sim. 9%	9	8	3%	3%	8%
N. of Campbells	10+ years	162	U.B.	32%	54%	43%	40%	180+	1336	E. agg. 3% E. del. 83% E. gun. 11% E. sim. 2%	6	4	5%	-	-
Guildford	21 years	41	U.B.	15%	29%	49%	32%	167	196	E. del. 100%	11	3	3%	3%	8%
	Means	333	-	37%	65%	55%	-	-	1273	-	-	-	4%	3%	8%

APPENDIX II

The % area stocked is that area that can be defined as stocked according to the following set of rules. These are:-

a. If the milacre is unstocked it can only be included in the stocked area if its 4 milacre is stocked or if both its neighbours on the same strip are either stocked on the one or four milacre.

b. If the milacre is stocked it may be in the understocked area if its neighbours on the same strip have the milacre nor the 4 milacre stocked.

c. Where a stocked milacre occurs after the two unstocked plots following the end of a stocked portion of the strip, and where the field notes suggest no obvious change in stocking all three plots may be added to the stocked portion of the strip.

e.g. if 1 = 1 milacre stocked
4 = 4 milacre stocked
0 = neither stocked

1,1,4,0,0,1 1,1,1,0,0,1, are stocked

1,1,4,0,0,4 1,1,1,0,0,4 1,1,1,0,0,0,1 are only stocked for the first three plots.

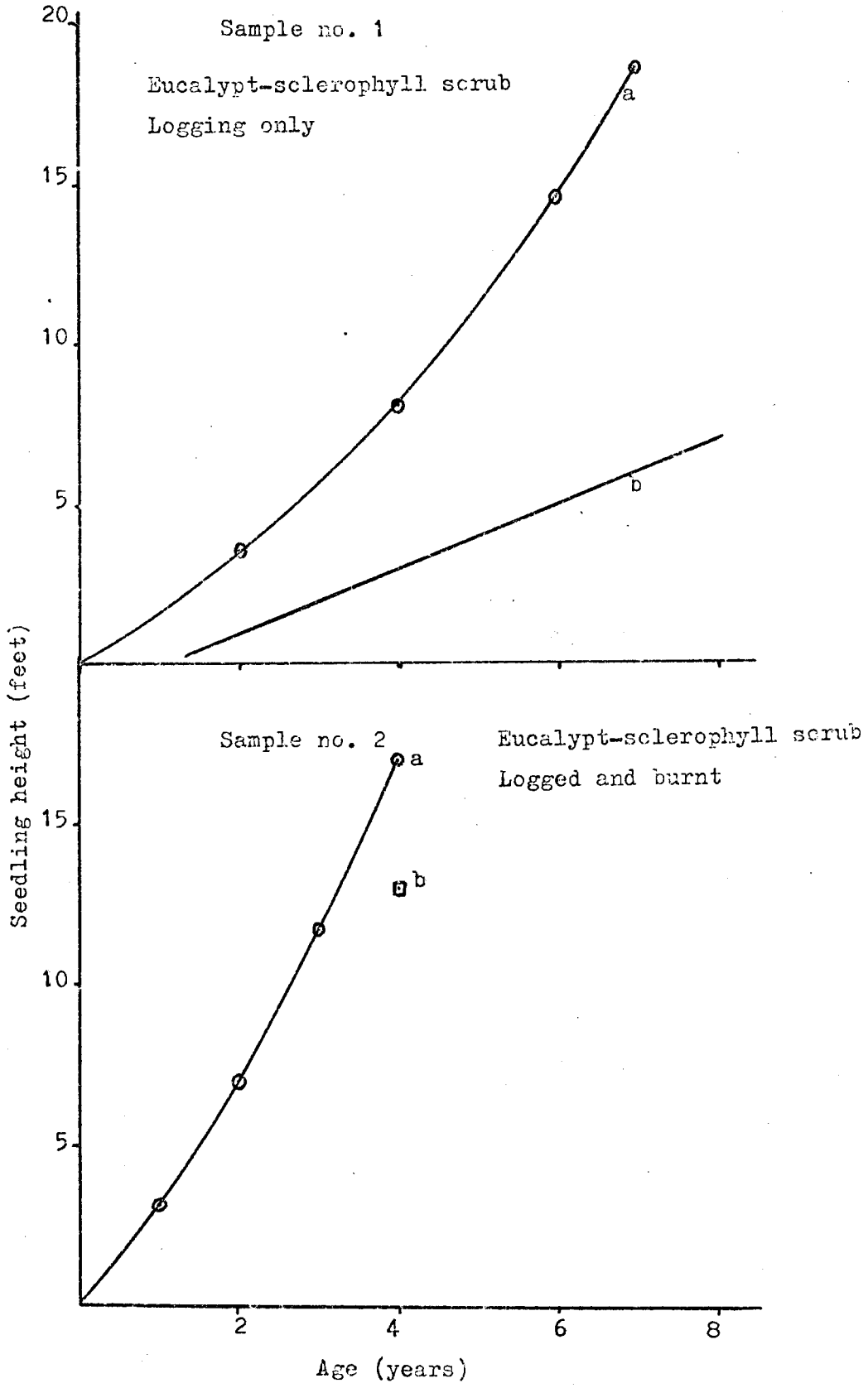
APPENDIX 3

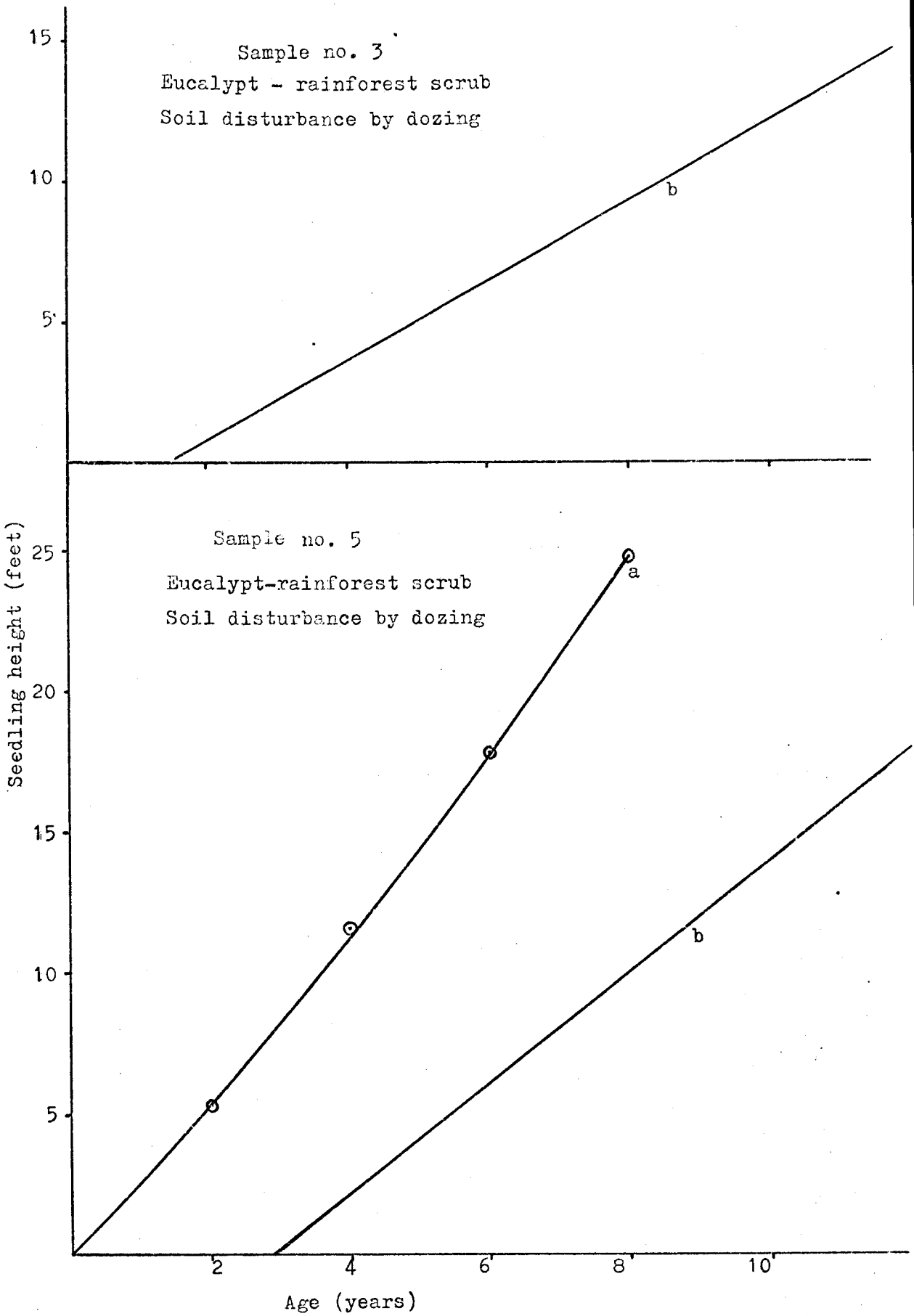
Plots of the height/age data collected.

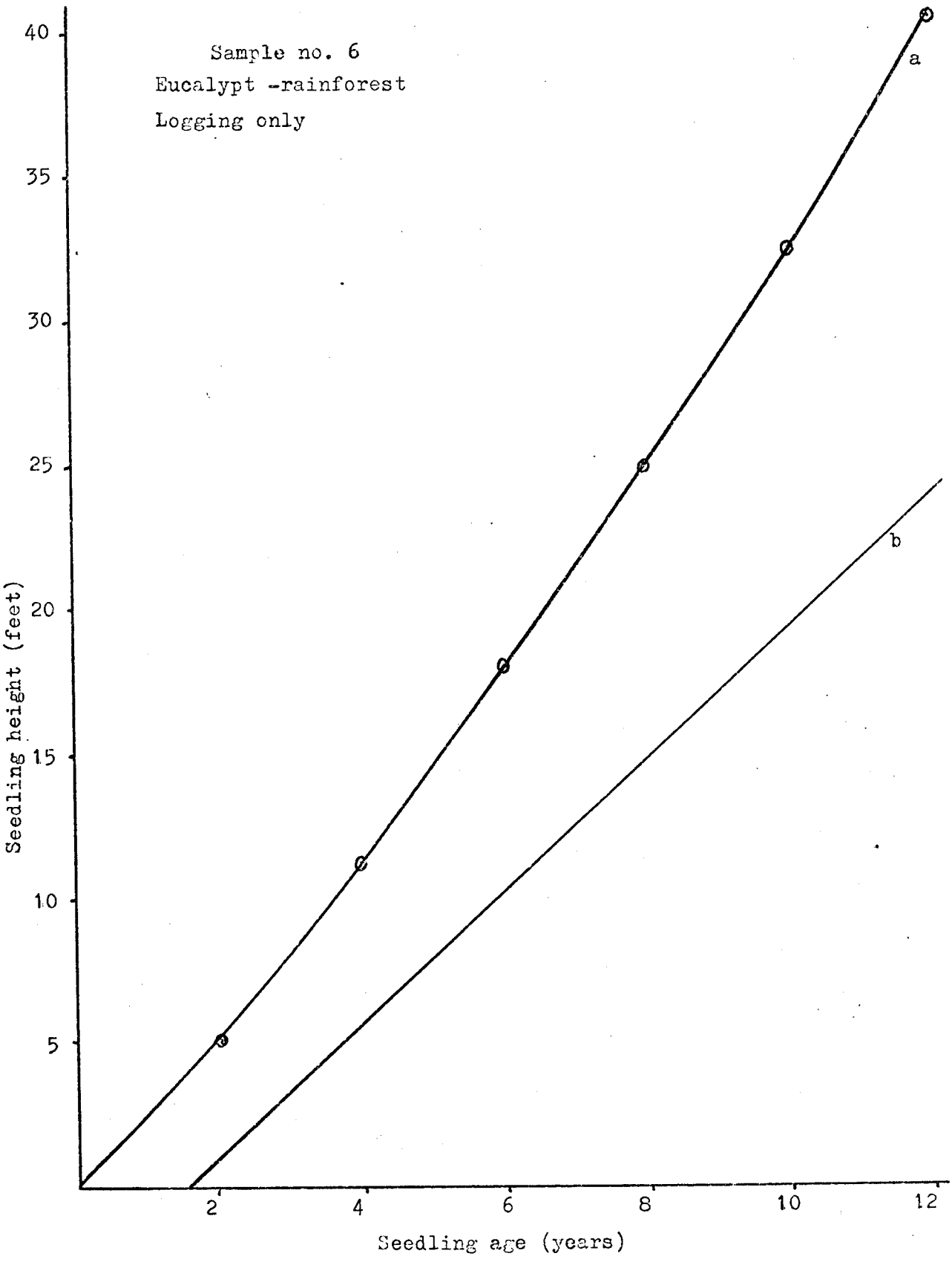
a) The height curves of the dominant seedlings
Data from stem analysis of ten stems for each sample area (dominant seedlings are the 12 tallest per acre)

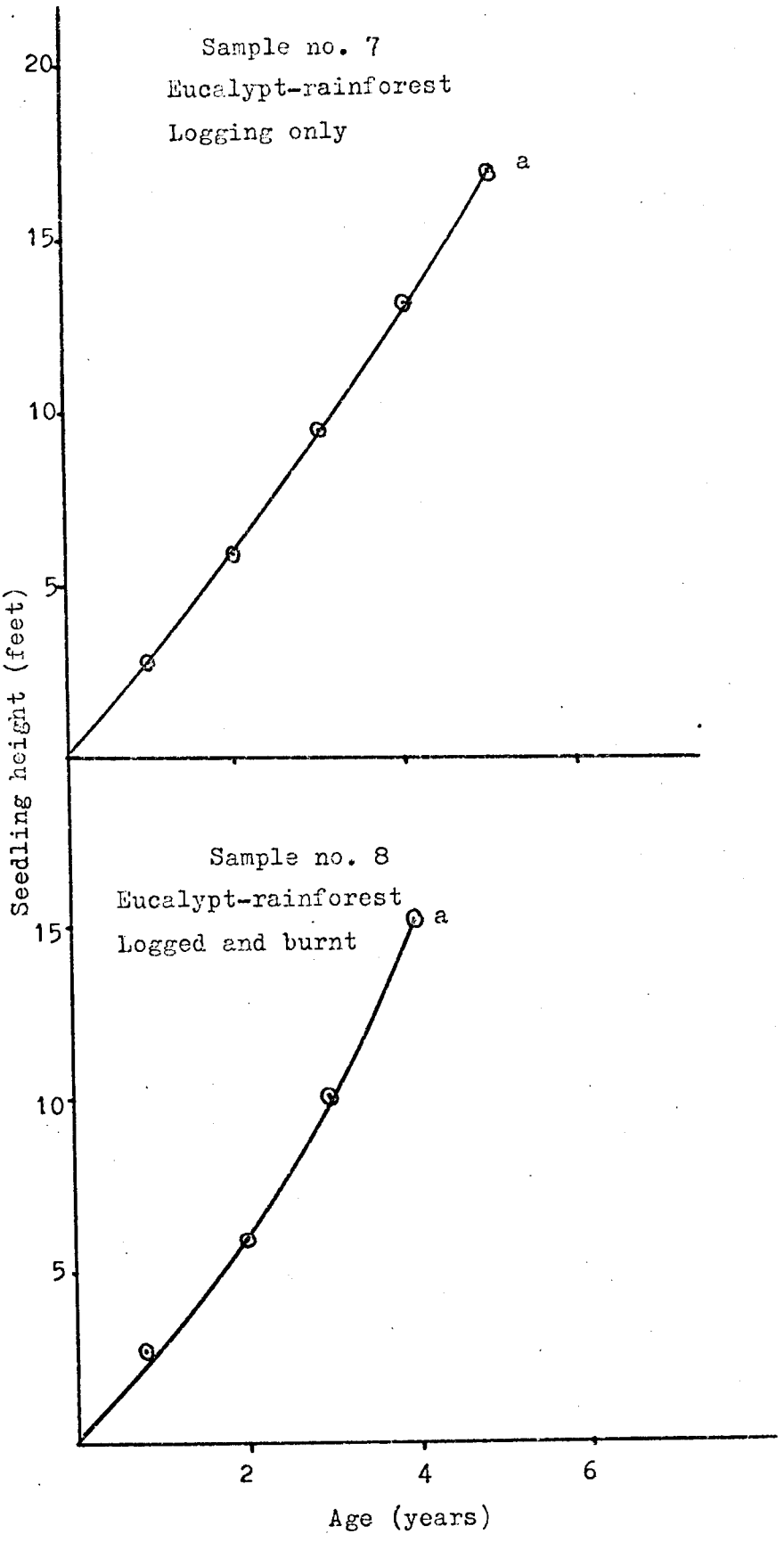
b) Plot of the regressions of height on age for the survey data, Data from each plot measured in the survey, (seedlings are the 500 tallest seedlings per acre)
The mean height of even-aged crops of regeneration is represented by a point.

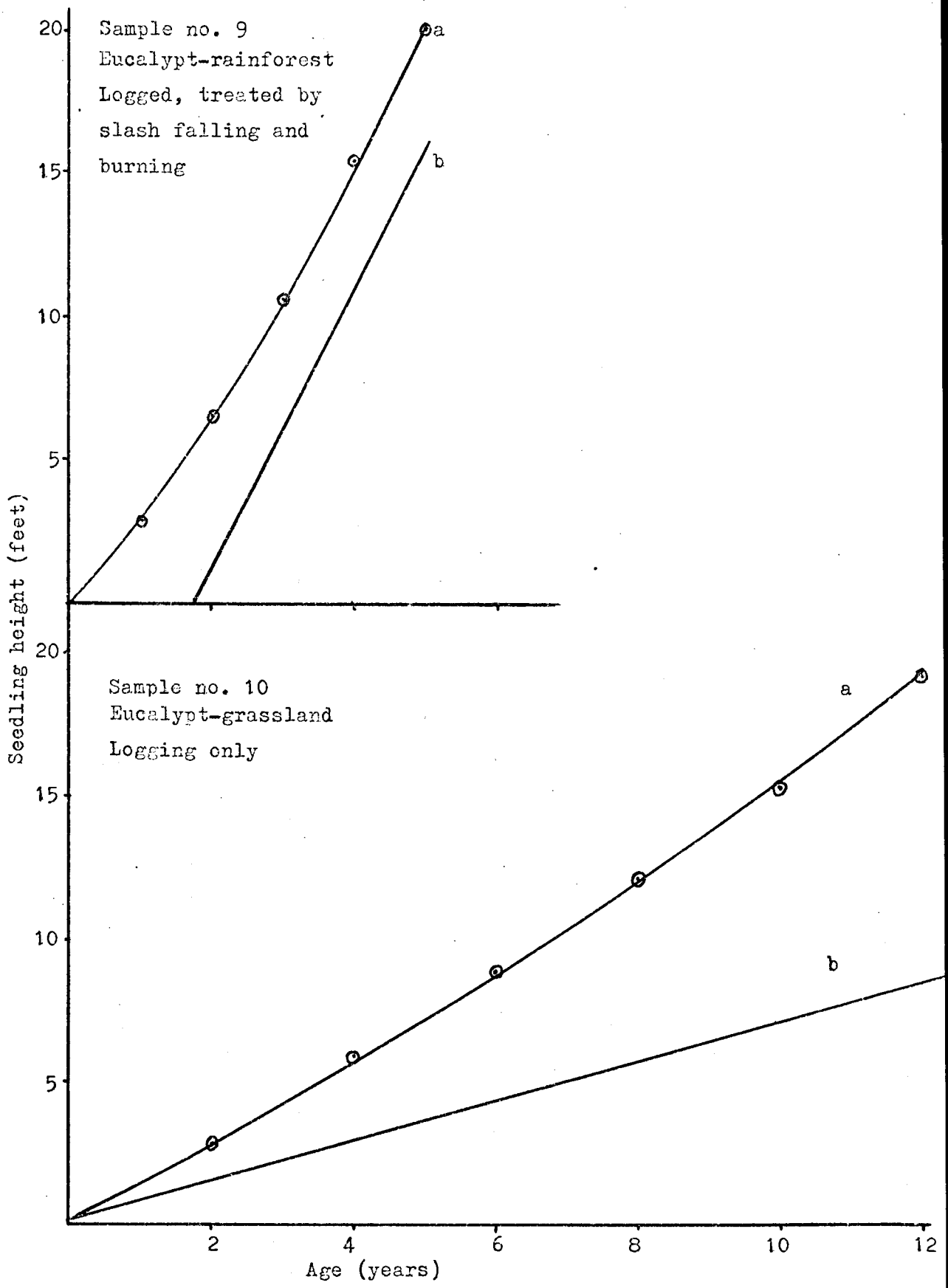
b represents the future regeneration crop since it is an average of 500 tallest seedlings per acre.

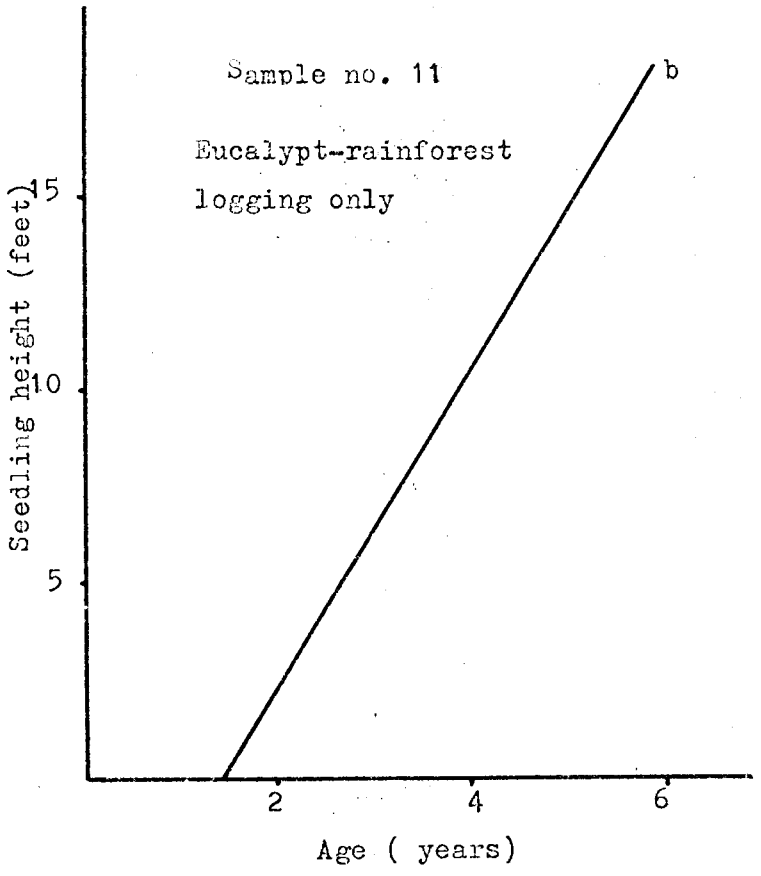

Sample no. 1
Eucalypt-sclerophyll scrub
Logging only
a
b
Sample no. 2
Eucalypt-sclerophyll scrub
Logged and burnt
a
b
Seedling height (feet)
Age (years)
20
15
10
5
2
4
6
8


Sample no. 3
Eucalypt - rainforest scrub
Soil disturbance by dozing
15
10
5
b
Sample no. 5
Eucalypt-rainforest scrub
Soil disturbance by dozing
Seedling height (feet)
25
20
15
10
5
a
b
2
4
6
8
10
Age (years)

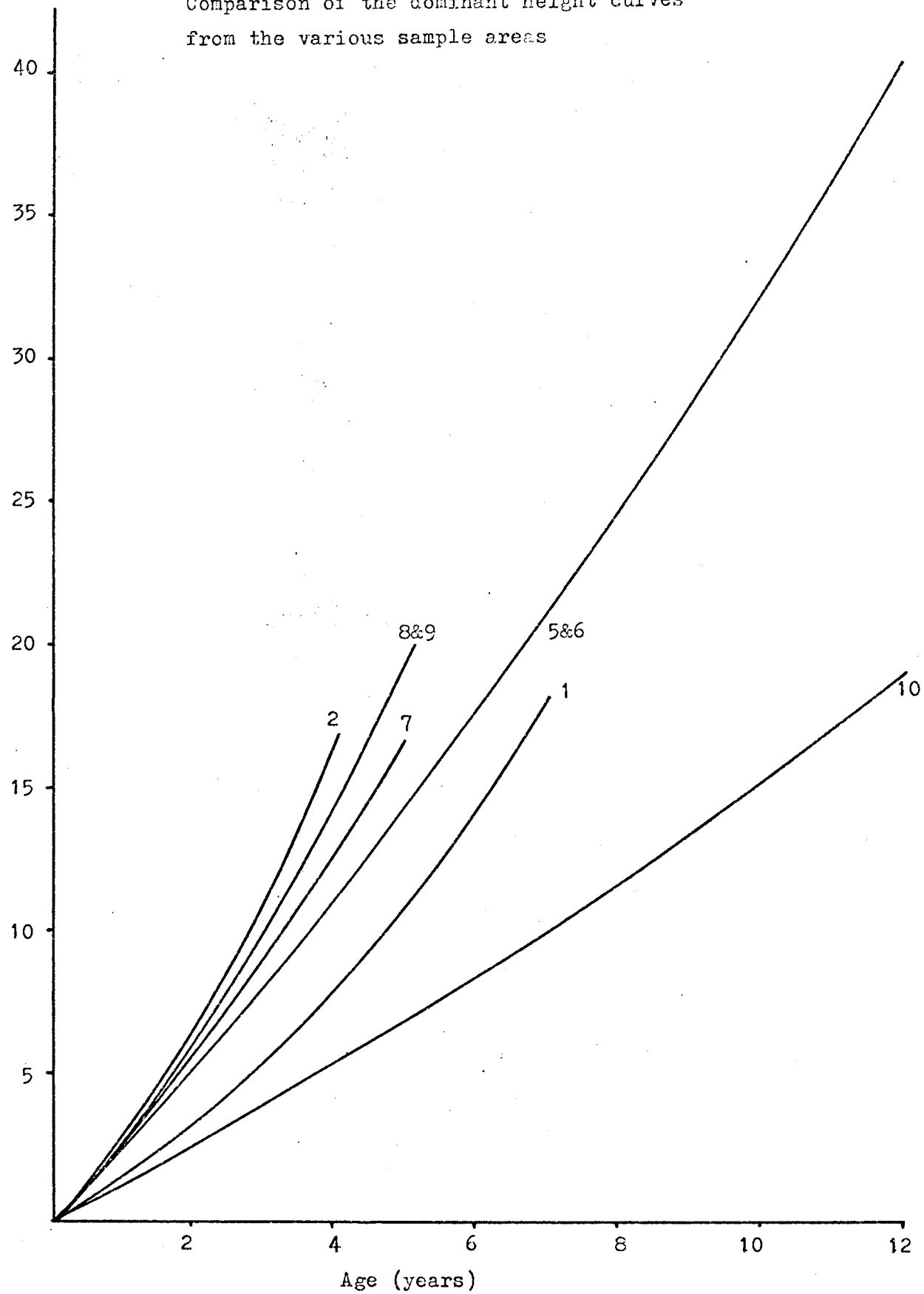

Sample no. 6
Eucalypt -rainforest
Logging only
a
b
Seedling height (feet)
40
35
30
25
20
15
10
5
2
4
6
8
10
12
Seedling age (years)


Sample no. 7
Eucalypt-rainforest
Logging only
a
Sample no. 8
Eucalypt-rainforest
Logged and burnt
a
Seedling height (feet)
20
15
10
5
15
10
5
2
4
6
Age (years)

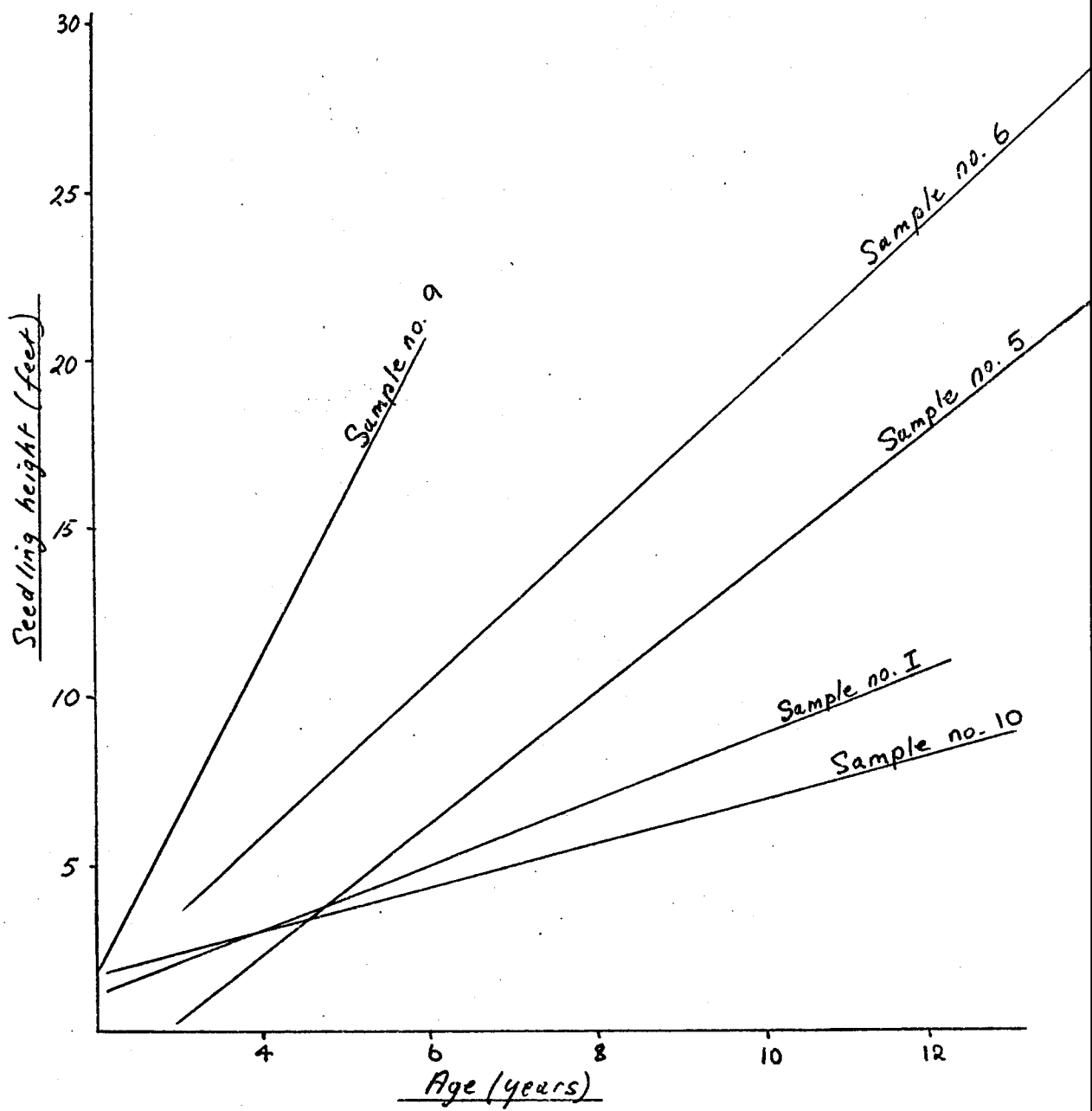

Sample no. 9
Eucalypt-rainforest
Logged, treated by
slash falling and
burning
a
b
Sample no. 10
Eucalypt-grassland
Logging only
a
b
Seedling height (feet)
Age (years)
20
15
10
5
2
4
6
8
10
12


Sample no. 11
Eucalypt-rainforest
logging only
b
Seedling height (feet)
15
10
5
2
4
6
Age (years)

Comparison of the dominant height curves from the various sample areas

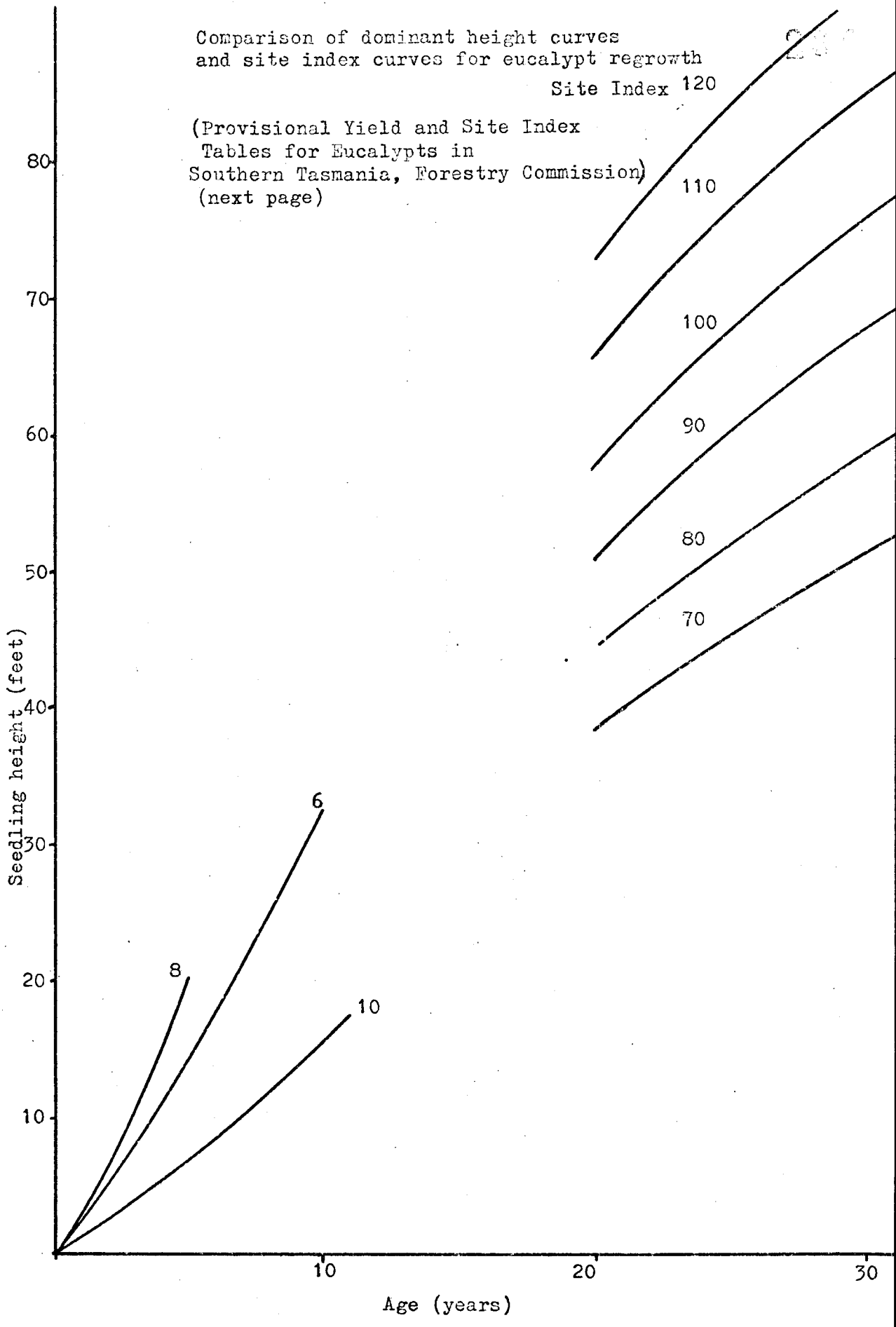


Comparison of the regressions for the various sample areas



Comparison of dominant height curves
and site index curves for eucalypt regrowth

(Provisional Yield and Site Index
Tables for Eucalypts in
Southern Tasmania, Forestry Commission)
(next page)



Merchantable Volumes of Fully Stocked Unthinned Stands (Hoppus super feet per acre)

(Provisional Yield and Site Index Tables for Eucalypts in Southern Tasmania. Forestry Commission 1964)

Age	30 Years	60 Years	90 Years
Site Index 190	68,000	154,000	172,000
Site Index 150	47,900	106,500	123,300
Site Index 110	29,500	66,100	77,000
Site Index 100	24,900	56,500	65,800
Site Index 90	20,500	47,200	54,700
Site Index 80	16,200	37,700	44,100
Site Index 70	11,900	28,400	33,400
Site Index 60	7,700	19,000	22,700
Site Index 50	3,500	9,900	12,300

(Merchantable volume is to four inch diameter top under bark)

* To convert these figures into tons divide by 300.

APPENDIX 4

4A Stocking

A more detailed breakdown of the data presented in tables 4.1,4.2 and 4.3 and relevant discussion is now given.

A1 Seedling number

The data is presented in table 4.1.

(a) Logging and burning

The sample mean for this treatment is 5348 seedlings per acre.

(i) Eucalypt - rainforest

The sample mean for this treatment is 3939 seedlings per acre in an area of pure rainforest that had been seeded by aircraft at Loyetea to 7250 seedlings per acre in areas of treated Eucalypt - rainforest also at Loyetea. Seedling numbers were estimated at 2961 per acre in the area of Eucalypt - rainforest at Leven Road burnt by wild fire in February 1966.

(ii) Eucalypt - rainforest scrub

There was only one area of this treatment available for sampling; this occurred at Mt. Cattley. The estimate of seedling numbers was 3925 per acre for this area.

(iii) Eucalypt - sclerophyll scrub

Estimates from two different areas of wild fire at Kara are 7899 and 9125 seedlings per acre, a very satisfactory

result.

(iv) Eucalypt - grassland

No areas of this treatment were available for sampling. It is very doubtful if this treatment would be successful, the results from the experimental plot at Campbells suggest not.

(b) Logging with additional disturbance by dozing

The sample mean for this treatment is 1656 seedlings per acre.

(i) Eucalypt - rainforest

The sample mean for this treatment is 1854 seedlings per acre. The estimates from two areas at Bunkers Road were 1729 and 2065 seedlings per acre. The amount of soil disturbance reflects the pattern of seedling numbers in this case (17% and 66% respectively).

(ii) Eucalypt - rainforest scrub

Quite large scale areas have received this treatment. The sample mean for the various areas is 2020 seedlings per acre. The estimates range from 750 to 4201 seedlings per acre. In some areas of this treatment stocking is low, and in some cases the treatment has failed, probably due to heavy browsing by native game on areas of marginal stocking.

(iii) Eucalypt - sclerophyll scrub

No areas of this treatment were available for sampling.

(iv) Eucalypt - grassland

No areas of this treatment were available for sampling.

It is very doubtful if this treatment would be successful, the evidence from Campbells suggests not.

(c) Logging without additional soil disturbance

This treatment has been widely practiced at Surrey Hilled. The Company has assumed that regeneration has been adequate. The sample mean for this treatment is 775 seedlings per acre.

(i) Eucalypt- rainforest

The sample mean for this treatment is 358 seedlings per acre. The estimates ranged from 111 to 520 seedlings per acre. There appears to be a marked correlation between seedling number and soil disturbance which is related to logging intensity.

(ii) Eucalypt - rainforest scrub

No areas of this treatment were available for sampling. One would expect that estimates of this treatment would be similar to those estimates from logged mixed forest (300-400 seedlings per acre).

(iii) Eucalypt - sclerophyll scrub

The sample mean for this treatment is 855 seedlings per acre. Estimates from the various sample areas ranged from 194 to 1308 seedlings per acre.

(iv) Eucalypt - grassland

The sample mean for this treatment is 1273 seedlings per acre. Estimates ranged from 196 to 1873 seedlings per acre. There is a distinct pattern of decreasing seedling

numbers with age, varying from 1873 per acre in five year old logging at Bunkers Road, to 196 per acre in areas logged twenty year ago near the Burnie Road, at Guilford.

A2 % Area Stocked

The estimate of area stocked derived by Mount's mapping rules is taken as a standard. The data is presented in table 4.2

(a) Logging and burning

The mean area stocking for all burning treatments is 96%. In most forest types burning by either wild fire, or coupe burning techniques has resulted in a well stocked vigorous crop of regeneration. In the grassland understorey burning as a treatment is of little use mainly because of lack of fuel to provide fire of sufficient intensity to kill the grass.

(i) Eucalypt - rainforest

Estimates for this treatment were taken from samples in 3 different areas slash-burnt at Loongana. All the estimates gave values of 100% area stocked. One area at Query Road was an area of pure rainforest that had been burnt and seeded by aircraft which has resulted in the successful conversion of pure rainforest into more productive eucalypt forest.

Sampling from an area of Surrey Hills burnt by wild fire (Leven Road) gave an estimate of 80% area stocked, the lowest value for this treatment. There are a number of swampy areas at Leven Road, and also eucalypt seed was broadcast

because of the low density of seed trees. Both these factors would have contributed to this low value.

(ii) Eucalypt - rainforest scrub

The estimate of 100% area stocked was obtained from samples in the Mt. Cattley fire area. This area had been partially logged and pepper-dozed prior to the fire of January 1968. Natural seed fall from residual trees has replaced the regeneration destroyed during the fire. Even though the area had been pepper-dozed prior to the fire, the organic matter was burnt ; this has resulted in an "ash-bed" effect.

(iii) Eucalypt - sclerophyll scrub

Sampling of two separate wild fire areas at Kara gave estimates of 100% area stocking. No artificial seeding has been done in these areas.

(iv) Eucalypt - grassland

Burning of grassland does not result in the removal of competition for the eucalypt seedling crop. Some of the areas sampled had been burnt within five years of sampling. These areas, however, could not be distinguised from unburnt areas.

(b) Logging with additional soil disturbance by dozing

I have classified in this category the extensive areas that have been "pepper-dozed" and areas such as Bunkers Road, where extensive logging has resulted in additional soil disturbance. The sample mean for this treatment is 72% area stocked.

(i) Eucaly t - rainforest

The mean of two samples at Bunkers Rd. was 68% area stocked. The estimates were 81% and 60% area stocking. The higher value in one sample can be atributed to greater logging intensity(10 versus 6 eucalypts/ acre logged), and in consequence more soil disturbance (66% and 17% respectively).

(ii) Eucalypt - rainforest scrub

The sample mean for area stocking in this type is 75%. Many areas in Mayday Road and Cattley Road were sampled. Within some of these large treated areas there are sub areas where stocking is marginal. The area west of Mayday Road, in the region of the 3 acre trial plot is such an example. The maximum stocking that can occur with this treatment is related to the percentage of soil disturbance effected. Estimates between 60 and 100% soil disturbance have been obtained.

(iii) Eucalypt - sclerophyll scrub

No areas were available where really intensive logging (clear felling), or additional soil disturbance had been done.

(iv) Eucalypt - grassland

No areas of this treatment were available for sampling. The evidence from the experiment at Campbells suggests that the treatment would be unsuccessful.

(c) Logging with little soil disturbance or burning

The sample mean of % area stocked for normal logging

treatments is 46%. The variance of results for this treatment is higher than for the other treatments. (i.e. burning and by soil disturbance treatments).

(i) Eucalypt - rainforest

The sample mean for this treatment is 34%. The results vary from 11% for a sample at Old Park Road to 48% in the vicinity of Gin Creek Road. It would appear that the results are a direct consequence of two factors, namely seed-bed disturbance and seed source. The estimates at Gin Creek Road and Parrawe are slightly higher than the estimates for other areas.

(ii) Eucalypt - rainforest scrub

No large areas of this type and treatment were available for sampling. From observations of a few small areas of this type that had not been treated by dozing, it would appear that the result would be similar to mixed forest (34%).

(iii) Eucalypt - sclerophyll scrub

Estimates from areas of this type at Kara ranged from 46% to 68% area stocked with a mean of 51%. The density of eucalypts in this type is much higher than for mixed forest (25 and 8 trees per acre respectively). Consequently, logging of this type has removed more trees per acre resulting in more soil disturbance and regeneration than for mixed forest.

(iv) Eucalypt - grassland

Sampling in areas of this type gave estimates of area

stocked varying from 32% to 75% with a mean of 48%.

The ages of regeneration could usually be traced to some logging activity. However, the eucalypts appear to be able to slowly colonize grass areas without logging disturbance. In this case it would appear that the small percentage of seedlings which germinate on accidental burns on the grassland would stagnate for many years. Ultimately, such seedlings are either killed by the next fire, or reach sufficient height and vigor to overcome competition from the ground cover. Eventually the trees reach sufficient height to escape the effects of grass fires. This process is estimated to take at least fifteen years.

A3 % Milacre Stocking

Percentage milacre stocking or the frequency of stocked milacre quadrats is the parameter most commonly used by foresters to assess regeneration. As mentioned previously 30 - 40% milacre stocking is generally accepted as a minimum value for burnt seed-beds. It's applicability to unburnt seed-beds as a minimum standard is dubious because of the over-dispersion of seedlings and larger variation in height increments of seedlings to those found on similar sites which have been burnt. The results of % milacre stockings are presented in table 4.3

(a) Logging and burning

The sample mean for this treatment is 86% milacre stocking. The samples in areas of this treatment are fairly

homogeneous, the estimates ranging from 75% to 93% of stocked milacres.

(i) Eucalypt - rainforest

The sample mean for this type is 75% milacre stocking. Estimates from samples in three different slash burns at Loyetea ranged from 57% to 90%. Sampling in regeneration at Mt. Tor would give similar estimates. The estimate of the wild fire area at Leven Road was 61% milacre stocking. The stocking in the same area where aerial seedling was used would perhaps give a higher value due to better seed dispersion than in areas where natural seeding has been augmented by hand broadcasting of seed. However, no samples were located in this particular area. In the area of pure rainforest at Query Road that was seeded by aircraft, the dispersion of seedlings is quite uniform. The complete area is stocked (100% area stocked) and yet the % milacre stocking is only 57% ! In areas of regeneration resulting from natural seeding 80% milacre stocking is equivalent to 100% area stocking.

(i) Eucalypt - rainforest scrub

The only available area of this treatment for sampling was at Mt. Cattley (Fire Jan. 1968). The sample estimate was 89% milacre stocking. The dense regeneration resulting from this fire is due to seed trees. The boundaries of pure rainforest areas are also well stocked with eucalypt regeneration, but only within a chain or two of seed trees.

The fire intensity in pure rainforest areas was not as severe as in the surrounding logged areas of mixed forest. The fire spotted from logged areas across pure rainforest into the next logged area.

(iii) Eucalypt - sclerophyll scrub

Two separate areas of wild fire at Kara were sampled. The mean of these two estimates is 93% milacre stocking. The regeneration in both these areas would be classed as "wheatfield" regeneration providing sufficient numbers of seedlings to give adequate selection of good genotypes for the final crop.

(iv) Eucalypt - grassland

Burning of grass understories does not result in the removal of competition for eucalypt seedling establishment. Some of the grass areas sampled had been burnt within five years of sampling, but little difference between these and the unburnt sites could be detected.

(c) Logging with additional soil disturbance by dozing

This treatment includes areas that have been "pepper-dozed" and areas where intensive logging, hence additional soil disturbance has occurred, for example at Bunkers Road. The sample mean for this treatment is 43% milacre stocking.

(i) Eucalypt - rainforest

The estimates for the two samples at Bunkers Road are 34% and 52% milacre stocking, with a mean of 40%. The estimates of soil disturbance in these areas are 17% and 66% respectively.

(ii) Eucalypt - rainforest scrub

The sample mean for this type is 45% milacre stocking, the estimates ranged from 37% to 70%. The variance of these figures is quite large which is indicative of the variation in soil disturbance with treatment. The estimates of soil disturbance were averaged over the whole area and not for a set of strips; these vary from 55% to 80% of soil disturbance. There are, however, areas within this treatment that have been missed and these are not available for seedling regeneration. However carefully applied, the pepper-dozing technique will not allow, at a reasonable cost, the same extent of soil disturbance that can be effected by slash burning techniques.

(iii) Eucalypt sclerophyll scrub

There were no large areas of this type where this treatment has been applied.

(iv) Eucalypt - grassland

No areas of this treatment were available for sampling. It is very doubtful, based on the results of the experimental plot at Campbells, if this treatment would be successful.

(c) Logging with little soil disturbance or burning

This treatment has been practiced widely at Surrey Hills and it has been assumed that the natural regeneration has been adequate. The results of the survey show that regeneration arising from logging alone is far less than for any other treatment.

(i) Eucalypt - rainforest

Estimates from various sample areas give a sample

mean of 18% milacre stocking, the lowest estimate of the survey. The estimates ranged from 11% at Old Park Road, to 20% at Parrawe. The variance of the sample data is small. As discussed previously, the results are proportionate to the amount of soil disturbance and seed tree availability.

The estimate of % milacre stocking at Parrawe (20%) is really no different to that on the average site at Surrey Hills (17%), although different soil types and species are present in these two localities.

(ii) Eucalypt-rainforest scrub

No areas of sufficient size for sampling this treatment were found. One would expect, based on the data in table 4.3, that the mean value for this treatment would be between the estimates of mixed and sclerophyll forest, or about 25% milacre stocking.

(iii) Eucalypt-sclerophyll scrub

The sample mean is 30% milacre stocking. Estimates range from 13% to 37% exhibiting considerable variance, more so than for the mixed forest type.

The sample mean is 37% milacre stocking, the estimates ranging from 15% to 63%. The results show a decrease of stocking with age. For example, the estimate from an area logged twenty years ago, near Guildford, was 15% milacre stocking and an area

logged five years ago, in Bunkers Road, near the E.B.R. line, was 63% milacre stocking.

B1 Height growth of seedlings

A more detailed break down of data presented in table 14.4 and relevant discussion is now given.

a) Logging and burning

The sample mean height of four year old seedlings in areas of this treatment is 147 inches.

(i) Eucalypt - rainforest

The mean seedling height in samples at 4 years for this treatment is 133 inches. The samples were taken from several areas of forest of the same height potential (and productivity) as the commercial forests at Surrey Hills.

(ii) Eucalypt - rainforest scrub

The area at Mt. Cattley is the only area available to provide figures for this treatment. The seedlings in July 1971 are less than three years old; their mean height is 75 inches. The height growth in this area has been severely curtailed by severe browsing of native game. I would estimate the mean height at age 4 being very similar to that of the mixed forest type (133 inches)

(iii) Eucalypt - sclerophyll scrub

The mean height of four year old seedlings on this type is 162 inches. There was some variation between the height growth on sub-areas of this treatment. In one area of high site quality (E1 forest), the mean height of seedlings was over 200 inches.

(iv) Eucalypt - grass

(iv) Eucalypt - grass (continued)

As stated previously, burning in this grass understorey does not really result in any improvement in seedling regeneration because of the effect of severe grass competition. Some of the areas sampled have been burnt, but such areas cannot really distinguished from unburnt areas.

(b) Logging with additional soil disturbance by dozing.

The sample mean height of 4 year old seedlings for this treatment is 77 inches.

(i) Eucalypt - rainforest

The sample mean of 116 inches for 4 year old seedlings has come from 2 samples areas at Bunkers Road. The site quality in this area is higher than for the average mixed forest site at Surrey Hills. I have measured several trees in this area in excess of 200 feet.

(ii) Eucalypt - rainforest scrub

The sample mean height of 4 year old seedlings is only 38 inches. Areas were sampled adjacent to the Main Road and also at Mayday Rd. In this latter area browsing by native game has severely curtailed the initial height growth of seedling regeneration. Recovery from browsing damage only occurs when the seedlings reach a height of about 3 feet.

(iii) Eucalypt - sclerophyll scrub

No areas of this treatment were available for sampling.

(iv) Eucalypt - grass

No areas of treatment were available for sampling. It is

very doubtful if this treatment would succeed, the results from the experimental plot at Campbells suggest not.

(c) Logging with little soil disturbance or burning

This treatment has been widely practiced at Surrey Hills and it has been assumed that voluntary regeneration has been adequate. The sample mean height of four year old seedlings is 55 inches.

(i) Eucalypt - rainforest

The sample mean height of four year old seedlings is 69 inches. A large number of areas were sampled scattered throughout the mixed forest areas. The variation in mature height of the forest areas sampled ranged from 130 feet at Leven Road to 190 feet at Old Park Road.

(ii) Eucalypt - rainforest scrub

No areas of this treatment were available for sampling. I would suspect that there would be little difference between seedling heights in this type and mixed forest. Certainly, the browsing problem would not be as severe as for the "pepper-dozed" areas because of less herbage and more logging slash.

(iii) Eucalypt - sclerophyll scrub

The mean height of 4 year old seedlings is 61 inches. The areas sampled at Kara included sites of fairly low site index with an E. simmondsii/E. delegatensis admixture (low E3 forest), as well as areas of hgih site quality with mixtures of E. obliqua and E. delegatensis (E2 forest).

Variation in seedling height broadly reflects the site qualities of the areas sampled.

(iv) Eucalypt - grassland

The mean height of 4 year old seedlings was 35 inches There was little variation in growth rates of seedlings between sample areas.

APPENDIX 5

Detailed discussion of the various components of productivity index on a block by block basis is included below. This has been forwarded from Chapter 5.

1. Eucalypt-rainforest

a. Logging with little Soil Disturbance

This treatment has been practiced widely and it has been assumed that voluntary regeneration has been adequate. The mean productivity index is 124 units. The mean % area stocked is low (34%), as well as the % milacre stocking (53% on stocked areas) and also the seedling height (69 inches). All these contributing factors of productivity are low and the combined total is only 12% of the result obtained for the slash burning treatment.

b. Logging with Additional Disturbance by Dozing

Only a small area has been treated by this method which is in the 29 Mile Road, Bunkers Road area. Both of the stocking indices are higher than for the usual logging treatment. The mean seedling height at 4 years is also higher (116 inches), but the general site index is only slightly higher than for the average Surrey Hill's site. The mean productivity index is 464 units, or only 47% of the result from the burning treatment on a lower quality site.

To increase the productivity of the site one must increase the two stocking parameters; this appears to be fairly impractical. Even so, the height increment could not be increased unless slash burning is adopted.

c. Logging and Burning

The mean productivity value for this site was 977 units or 6 times the mean value of the normal logging treatment. Data for this treatment had to be obtained from areas of slash burning treatments at Loyetea and Loongana because no areas treated by slash burning were available on Surrey Hills. There is little doubt that the same, or even better, results could be obtained at Surrey Hills if such methods were adopted. Each factor contributing to the productivity value is much higher than for the other treatments. Over small areas of this treatment the two stocking values could be somewhat higher, but in practice values of between 80% and 90% are obtained for the % area stocked after successful slash burning.

2. Eucalypt-rainfall scrub

a. Logging without any Additional Soil Disturbance

There were no significant areas of this treatment in which samples could be located. I would suspect that the stocking values in this type would be slightly

higher than those in the Eucalypt-rainforest type, but even so the productivity estimate could not possibly be more than 200 units. It is of interest to note that the company has considered it necessary to treat all areas of this type by dozing although it has not recognized the need to provide any treatment for Eucalypt-rainforest types.

b. Logging with Additional Soil Disturbance by Dozing

As previously stated, the company has completed over the past 15 years or so substantial areas of this treatment. The mean productivity value for this treatment is 172 units. The stocking estimates are higher than for untreated forest, however, the seedling height growth is quite low (38 inches). Browsing by native game has reduced the height growth of this regeneration and at four years the effect is significant. To increase the productivity of this treated forest it would be necessary to increase height increment. The use of slash burning techniques along with initial protective measures from game would appear to be the best way to do this. It is doubtful if any increase in stocking would be effected economically by additional soil disturbance.

c. Logging and Burning

The area sampled at Mt. Cattley was accidentaly

burnt in January, 1968. The stocking values are higher than for the previous treatment not involving burning. The seedling height estimate in this case is low (100 inches), however, this is a very conservative interpolation of three year old seedlings (75 inches at 3 years). If a height figure of 133 inches is used then the productivity index would be 1003 units. Increase in productivity could only be achieved by an increase in height increment because the stocking is for practical purposes maximal.

3. Eucalypt-sclerophyll scrub

a. Logging without Additional Soil Disturbance

The estimate of productivity for this treatment is 162 units. The stocking estimates are slightly higher than in the case of the logged Eucalypt-rainforest type, but they are still well below maximum values. The mean seedling height at age 4 is 61 inches which is quite low. To increase the productivity index it would be necessary to increase all three indices.

b. Logging with Additional Soil Distrubance by Dozing

No area of this treatment was available for sampling. I would anticipate stocking values for this treatment being higher (about 60% than) for the previous treatment. Seedling height increment would perhaps be

a little higher due to more soil disturbance and less competition than for the previous treatment.

c. Logging and Burning

The mean estimate of the productivity for this treatment is 1507 units, the most productive site and treatment sampled. Stocking estimates are close to the maximum values, and the average seedling height at age 4 is 162 inches. It is doubtful if any improvement in productivity index could be achieved.

4. Eucalypt-grassland

a. Logging

The estimate of productivity for this site is 112 units. This estimate is low by comparison to other treatments and types. With the grass understorey type, unlike other types, there si no treatment available at the present that can result in the successful regeneration of these areas. The stocking estimtes are slightly higher than for othe forest types with the same treatment, and the seedling height growth (35 inches) is the lowest estimate obtained. Severe grass competition is strongly suspected as the reason for this very minimal height increment.

b and c

It is very doubtful if these treatments would be

successful, the evidence from the experimental plot at Campbells suggests not.

APPENDIX 7

CHAPTER I

Introduction

(I) Aim

The purpose for the establishment of this plot if four-fold. Firstly, to test the potential of a variety of species of Eucalyptus and other species in the general locality. Secondly, to test the Macrantherous species which possibly could be used as alternatives to E. delegatensis for commercial production if the prevalence of E. delegatensis Dieback continues. Thirdly, to provide some ideas of the growth rates that could be expected from various species if they were grown under intensive forest management at this altitude. Fourthly, to grow in the field various provenances of E. viminalis and E. dalrympleana, including altitudinal range of these two species, to detect differences between provenances when grown under field conditions as well as review a good range of seed source of perhaps the most promising species of Eucalyptus with potential resistance to E. delegatensis Dieback.

(II) Description of Area and Species

The area selected is at Mayday Road approximately half a mile south of the Cobbers Road junction in the south eastern corner of the Surrey Hills' block. It was an area that was covered with good quality E. delegatensis forest

with an understorey of Drimys lanceolata, Telopea truncata Phyllocladus asplenifolius and some small Nothofagus cunninghamii. Scattered through the original forest were a few specimens of E. gunnii. The presence of E. delegatensis Dieback was quite detectable. Something in the order of one to two dead trees per acre plus two or three mature trees visibly effected is an estimate of its original intensity.

The area was logged during the winters of 1962 and 1963. Prior to logging the area was "pepper-dozed" and sixty percent of the mineral soil exposed. The area did not regenerate successfully, the stocking of the strips in the immediate vicinity being only 13% milacre stocking.

The species used in the trial fall into a number of categories. These are:-

1. Section Renantherae

   E. delegatensis, E. regnans and E. fastigata

   These are planted as controls. E. regnans will probably be severely damaged by frost during the winter and may have to be discarded or replanted in the spring depending on its performance. E. fastigata, a closely related species to E. regnans, it occurs naturally on the southern tablelands of N.S.W. Its wood properties are

very similar to those of E. regnans. Possibly it is more resistant to frost and snow than E. regnans and for this reason it is included in the trial. It is planted commercially in South Africa (Hall 1970).

2. Section Macrantherae

a. Commercial species -

(i) E. globulus, E. nitens, E. dalrympleana

All these species are found in commercial sizes, but they have not been cut extensively for sawlogs in Tasmania. E. nitens is used in Victoria for sawmilling purposes. Their pulping properties are equal to those of the "ash" species and are well worthy of investigation. The climate of the locality could be a limiting factor to their use as they have been located in a climate, similar to, or more severe than found at the extremities of their natural distributions.

(ii) E. cypellocarpa, E. st. johnii (bicostata), E. maideni

These mainland species belong to the southern blue gum group together with nitens and globulus. They have been included in the trial because as a group they grow to commercial

sizes, show moderate resistance to frost and exhibit moderate growth rate.

b. Non-commercial species -

E. subcrenulata, E. johnstonii, E. gunnii, E. urnigera, E. perriniana

This group includes species mainly endemic to Tasmania. These occur naturally in areas which are subjected to more severe climatic conditions than are generally experienced at Mayday Road. They are also usually located on quite poor sites and it will be very interesting to see how they perform when grown on good forest soils. E. gunnii and E. johnstonii are found in commercial sizes in some localities, but are only logged occasionally.

3. Coniferous species -

Pinus radiata, Pseudotsuga menziesii, Larix europea, Picea excelsa, Pinus attenuata

Pinus radiata grows with only moderate success in the general locality; it is included in the trial as a control species. P. menziesii and the P. attenuata provenances are expected to be more successful at this altitude than P. radiata. The European larch (Larix europea), based on its good initial growth rate at the coast, would appear to offer some prospects of success. The Norwegian spruce (Picea excelsa) will probably not be very successful, but it is included because of its current availability.

4. Other Species -

Acacia dealbata

This species has excellent pulping characteristics, fast growth and is a possiblity for intensive forest management in the general area. Its performance as a plantation grown species is yet to be determined, particularly in view of possible insect predation.

5. E. viminalis - E. dalrympleana provenances

One acre of the trial will be planted with seedlings from various provenances of these species in Spring, 1971, as part of a programme of studies concerned with the determination of the actual identity of the Tasmanian "White gums". These provenances include a continuous series of collections from sea level to 3,000 feet in the Mersey Valley. Also, there is material from collections made at strategic points from the total distribution of the "White gums" from Tasmania, King Island and the Australian continent. Results of this work will be published in several years time after recording progress.

CHAPTER II

Methods

The area was cleared by dozer in March, 1971. Stumps were left, and the area ploughed with an agricultural tractor using a disc plough. Soil to depth of eight inches was disturbed in this operation. The area was fenced in April 1971. Figure 2.1 is a photograph of the site before any preparation had occurred.

Some planting was done over two days in May 1971, the balance of planting to be completed in late November 1971. This was necessary because of the supply situation of planting stock. It was planned to commence planting in early summer, 1971, but this was impossible because the area had not been cleared in time. Planting was then delayed until May because of unusually dry conditions.

As a result, little growth could be expected on the planted stock before the winter and their resistance to frost damage was considerably less than if they had been planted in late spring. At this stage (August 1971) it appears that re-filling with new plants will be essential to complete the trial. Snow has caused damage to some large plants mainly by bending the stems and covering the foliage.

The details of planting stock are given in Table 2.1 . Possibly it will be necessary to delay the planting of *P. attenuata* provenances until the stock is large enough,

The planting stock has been well fertilized during preparation. The application of fertilizer has varied depending on the location of seedlings. The eucalypts grown at Ridgely have been fertilized with "Magamp" ($Mg\ NH_4\ OH$). The E. viminalis and E. dalrympleana provenances grown at the University in Hobart have been fertilized with "Aquasol". The conifers which were grown in nursery beds have been fertilized with "Hygold" 400. All trees in the trial plot will receive a standard application of two ounces of "Hygold" 400 several weeks after the next planting operation in Nov. - Dec. 1971.

The basic layout of the plot is illustrated in Figure 2.2. The blocks, with the exception of the smaller edge blocks, contain 6 rows of six trees at a 3 x 3m. spacing. Replication of blocks has been done with hopefully the more promising species, however, being limited in area this has not been possible in all cases.

The E. viminalis - E. dalrympleana provenances will be planted in smaller replicated blocks, possibly four by five rows with 2 x 2m. spacing.

Maintenance

The initial measurement of frost damage and replacement of severely damaged trees will be done by the author.

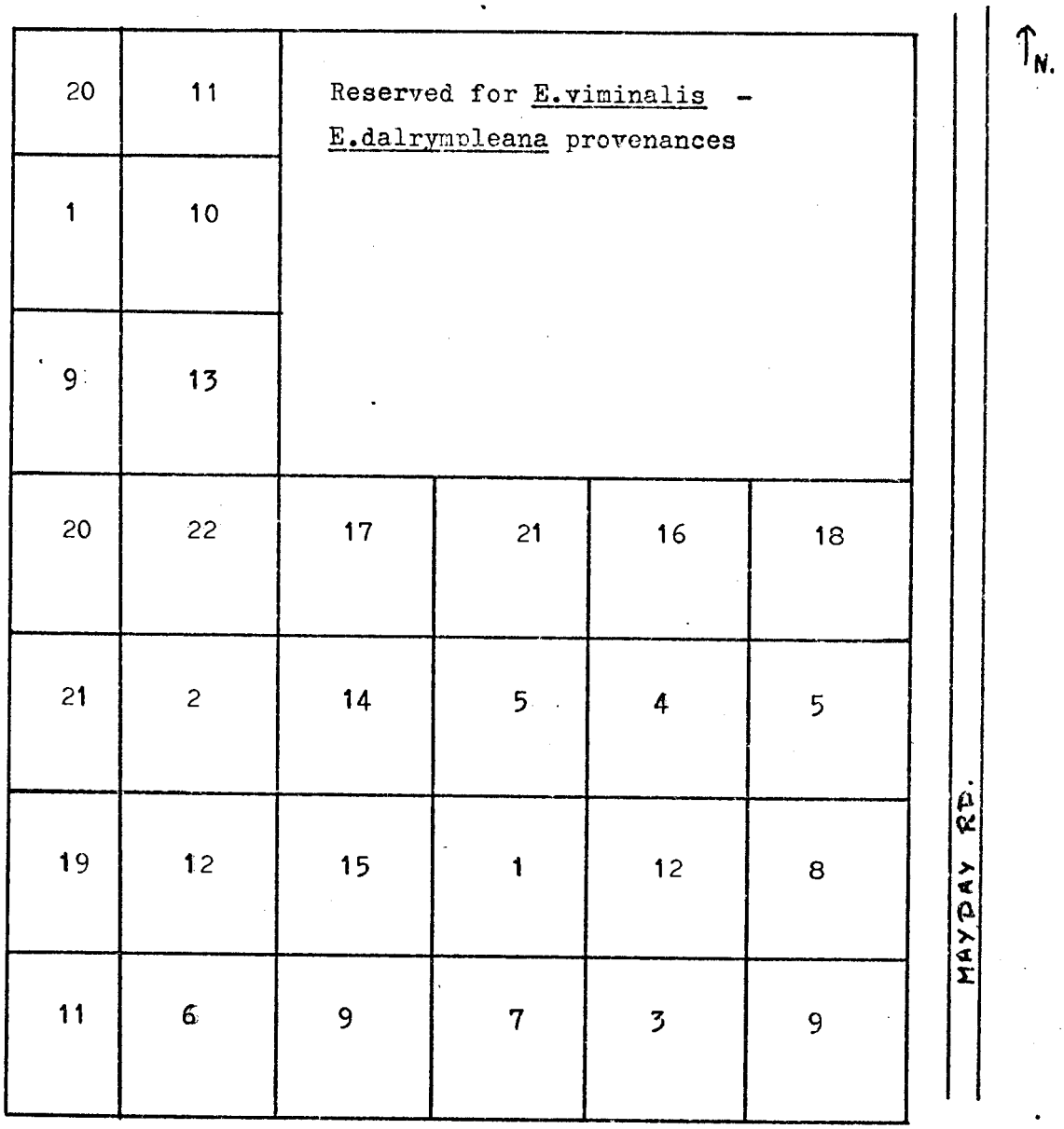
A complete measurement of all trees should be undertaken during the winter 1972.

The requirements for future measurement could be decided at this time, possibly a complete measurement each year could be scheduled.

Reference

Hall Norman, et al., 1970 Forest Trees of Australia Forestry and Timber Bureau , Canberra.

Figure 2.2 Layout, and species planted in the Mayday Rd., Trial Plot. Establishment 1971 Area 3 acres Scale 1chn.=1in.



1 delegatensis, 2 regnans, 3 fastigata, 4 gunnii, 5 urnigera, 6 johnstonii, 7 subcrenulata, 8 perriniana, 9 globulus, 10 maidenii, 11 cypellocarpa, 12 nitens, 13 stjohnii, 14 dalrympleana, 15 P.radiata, 16 P.attenuata S9823, 17 P.attenuata S9822, 18 P.attenuradiata S9821, 19 Picea excelsa, 20 Larix europea, 21 P.menziesii, 22 Acacia dealbata,

Table 2.1 List of Details Concerning Trees at Mayday Road Trial Plot

Species	Provenance	Supplier	Planting Stock	Date Planted	Comments
E. delegatensis	Surrey Hills	A.F.H.	1/0 tubed	May, '71	
E. regnans	Moogara	Walduck	1/0 tubed	May, '71	
E. nitens	Victoria	ex Vic. For. Commission	½/0 tubed	May, '71	
E. globulus	Mt. Wellington	Walduck	½/0 tubed	May, '71	
E. johnstonii	Moogara	Walduck	½/0 tubed	May, '71	
E. subcrenulata	Moorey Rd.	Orme	½/0 tubed	Dec, '71	
E. urnigera	Mt. Dromedary	For. Com.	½/0 tubed	May, '71	
E. dalrympleana	Arm River	Orme	½/0 tubed	May, '71	
E. gunnii	29 Mile Road	Orme	½/0 tubed	May, '71	
P. radiata	New Zealand	Kingsland	1½/0 open	May, '71	
P. attenuata	Lake Country, Calif.	F. & T.B.	½/0 tubed	Dec, '71	Ref. Seed Lot No. 9822
P. attenuata	Colasa, California	F. & T.B.	½/0 tubed	Dec, '71	" " " " 9823
P. attenuradiata	Eldorado Country Calif.	F. & T.B.	½/0 tubed	Dec, '71	" " " " 9821
Larix europea	Bukk Mts. (North)Hungary	Versepuy	2/0 open	May, '71	
P. menziesii	Stoodley	For. Comm.	3/0 open	May, '71	
Picea excelsa	Monts du Velay, France	Versepuy	3/0 open	May, '71	
Acacia dealbata	Inglis	Orme	1/0 tubed	Dec, '71	Plants are tubed wildings
E. viminalis E. dalrympleana provenances	Various	Orme	1/0 tubed	Dec, '71	
E. cypellocarpa	Bemboka N.S.W.	F. & T.B.	½/0 tubed	Dec, '71	Ref. Seed Lot No. 9572
E. fastigata	Tallanganda N.S.W.	F. & T.B.	½/0 tubed	Dec, '71	Ref. Seed Lot No. 8588
E. maidenii	Nr. Narooma N.S.W.	F. & T.B.	½/0 tubed	Dec, '71	" " " " 9442
E. st. johnii	Wee Jasper N.S.W.	F. & T.B.	½/0 tubed	Dec, '71	" " " " 9027

Figure 2.1
Area of trial plot prior to clearing

Appendix 8

This paper "Les Eucalyptus de Tasmanie" has been accepted for publication by the Revue Forestiere Francaise (February 1971). Only a draft of the paper is included, however, the actual paper has been altered slightly to improve the quality of French grammar.

Resume

Les eucalyptus qui croissent naturellement en Tasmanie sont mentionés, ainsi que leurs habitats, distributions, et relations entre les différentes espèces. Des espèces moins connues sont aussi mentionees car elles peuvent offrir certaines attraits pour etre implantées dans d'autres pays. Information quant au climat et à l'environement, est donnée.

General

Seulement deux sections, parmi les huit de ce genre, reconnues par Blakely (1934) se trouvent en Tasmanie, ce sont les Macrantherae, et les Renantherae qui contiennent neuf et cinq espèces autochones respectivement. Des espèces naturelles de la Tasmanie, telles que E. gunnii sont bien connues pour leur resistance au froid (Lacaze 1962), mais d'autres espèces moins connues telles que E. subcrenulata ou E. urnigera pourraient aussi être considérées pour être implantées à l'etranger.

Les hybrides naturels sont nombreux, en général dans les lieux où les deux parents sont abondants. Des espèces telles que E. ovata dû a leur ample distribution ont produit une grande variété d'hybrides. Les hybrides sont restrients aux croisements entre especes de chaque section (Pryor 1957). Hybrides entre les espèces Macrantherae et Renantherae n'ont pas été verifées.

Les Especes

Fig No. 1 et le liste des especes.

Nomenclature

La nomenclature de genre Eucalyptus est complexe. Blakely (1934) est encore le texte accepté. L'amalgamation d'especes telles que E. gunnii avec E. archeri et E. johnstonii inclus la E. subcrenulata n'a pas aide notre connaissance de ces especes. Les vieilles appellations sont utiles car elles décrivent convenablement différents types qui sont maintenant groupés en une seule espèce. Il existe une variation considerable entre les exemplaires d'une meme zone, et a plus de raison lorsqu'ils sont de différentes régions. J'ai suivi la nomenclature de Jackson (1965) dans cet article.

En general, il existe des différences entre les caracteristiques des exemplaires Tasmaniens et continentaux des mêmes espèces.

L'E. aggregata par example, montre des differences telles, qu'elles ont été considerées suffisantes pour justifier une classification speciale, a savoir:- E. rodwayi. Dans d'autres cas, tels que E. delegatensis (= E. gigantea), E. dalrympleana et beaucoup d'autres, les différences existent mais n'ont pas donne lieu a d'autres nomenclatures.

La forme, le developpement et caracteristiques des espèces Tasmaniennes sont en général superieures aux espèces continentales.

L'Association des especes

Dans la plupart des fôrets les espèces Renantherae dominent généralement les espèces Macantherae. D'importantes forets, composées exclusivement de Renantherae, sont communes. Il existe egalement des forets exclusivement d'E. regnans, d'E. obliqua d'E.delegatensis, d'E. coccifera et d'E. simmondsii mais les forêts composées exclusivement de Macrantherae n'existent pas. Il existe des forets composees de jusqu' a cinq différentes espèces, mais généralement dans des regions de sols et de topographie variables. En général on ne trouve que deux ou trois espèces dans la même region.
Les combinations assez communes d'espèces différent sont les suivantes:

a) Fôrets des montagnes et du Plateau Central
E. coccifera-E. subcrenulata; E. coccifera-E. gunnii; E. coccifera-E. delegatensis-E. gunnii; E. delegatensis-E. gunnii; E. delegatensis-E. dalrympleana;
E. pauciflora-E. delegatensis-E. dalrympleana ou E. gunnii.

b) Fôrets de la côte et des plaines
E. obliqua-E. amygdalina-E. viminalis; E. amygdalina-E. viminalis; E. linearis-E. viminalis; E. tasmanica-A. viminalis; E. pauciflora-E. rubida; E. amygdalina-E. rubida.

Ecologie

La relation écologique entre la fôret d'Eucalyptus, la fôret humide, plaines, laiches, et marecages est extremement complexe. La vegetation des différentes regions est sujéte a une grand nombre de facteurs tels que fréquence des incendies, fertilité du sol, altitude, precipitation, et orientation (Jackson 1965).

Les fôrets commerciales d'E. regnans, E. delegatensis et E. obliqua sont essentiellement des fôrets provenant de la destruction de la fôret originaire par des incendies naturels. La régénération d'enormes extensions d'Eucalyptus a été produite par de grands incendies tels que ceux de 1898, de 1934 et de 1967. Généralement le sous-bois de nos forêts d'Eucalyptus est tellement dense compose d'arbustes, de fougères, d'arbrisseaux et des espèces de la "foret-humide", qu'il empêche la régénération naturelle des Eucalyptus. Si la foret d'Eucalyptus n'est pas brûlée de temps à autre, elle se couvertira petit a petit en "forêt humide", simplement due a ce que les espèces qui composent la "fôret humide" se régénérent spontanement dans une telle ambience, alors que les Eucalyptus n'y prosperent pas (Gilbert 1958). Lorsqu'une forêt d'Eucalyptus est brûlée par un incendie severe, toutes les autres espèces presentes sont detruites, ainsi d'ailleurs que beaucoup d'Eucalyptus, mais les graines de ces derniers qui tombent au sol après l'incendie, y trouvent des des conditions idéales pour y germer et s'y developper.

Amenagement

La technique de contrôle d'une forêt d'Eucalyptus suit de près la methods naturelle de régénération. La parcelle dûe à être régénérée est totalement coupée, de façon a ce que les branches, l'encorce et les troncs soient secs en Automne, lorsqu'ils sont incendies. On a, bien entendu, prèserve quelques arbres destines a produire les graines qui ensemenceront la nouvelle fôret. Actuellement on re-seme en général par avion, après avoir brûlé la foret. L'incendie de régénération doit être soigneusement preparé, car de grandes quantités de materiaux combustibles peuvent être presents, qui pourraient produire une chaleur extrememen intense et detrimentaire même dans des conditions meteorologiques favorables. D'autre part, si le brûlage n'est pas suffisamment severe, le resultat quant a la régénération des Eucalyptus peut être relativement inefficace et peut memo être un fiasco total. Si le brûlage est trop intense le risque d' en perdre le contrôle est augmente, mais la régénération sera excellente. Des progres remarquables ont faits pendant ces 10 dernieres années quant aux techniques de brûlage. La pousse des sauvageons d'Eucalyptus est bien superieure dans des terrains bien brûlés au prealable que des terrains non preparés.

Les figures 4 et 5 démontrent la production et hauteurs atteintes par des peuplements naturels provenant de regeneration d'E. regnans et d'E. obliqua dans le sud de la Tasmanie. (Forestry Commission 1964) La classe moyenne est 120 et une classe de 180 est excellente et n'est produite que pas des peuplements d'E. regnans Des cubage jusqu'a 900 m^3 par hectare de bois d'ouvre ou bois pour pâte à papier ont ete produits par des fôrets vierges d'E. regnans dans la vallée Florentine, bien que la production moyenne de ces fôrets soit de l'ordre de 450 m^3 par hectare. Ces fôrets sont entre 250 et 400 ans.

Fig 4 Table de production pour E. regnans et E. obliqua (D'apres Forestry Commission 1964).

Age (annees)	20	40	60	80	100	120
Classe 49	7	42	66	81	86	88
Classe 75	47	168	246	277	293	306
Classe 115	112	383	528	591	632	660
Classe 147	168	563	768	858	914	961
Classe 180	230	755	1036	1149	1231	1287

6

Utilisation

L'exploitation des forets a commencé en Tasmanie vers 1850.c.a.d. envirion cinquante ans après colonisation. Les fôrets alors etaient abondantes et aucunes restrictions ne furent imposées aux scieries jusqu'en 1885, mais ce n'est qu'en 1920 apres la creation du "Forestry Dept." que l'exploitation des fôrets a été controlé.

Aujourd'hui, seulement les fôrets inaccessables ont echappé a l'exploitation des scieries, le nombre de ces derniers actuellement diminue, dûe au manque de matière première (c.a.d. d'arbres de grosseur et d'espèces convenables pour elles.) Les scieries produisent surtout des planches de bonne qualite pour export, où bois d'ouvre pour la construction locale.

Il y a actuellement trois frabriques de pâte à papier établies en Tasmanie, et une quatrieme entera prochainment en production.

NOM	ETABLI	PRODUIT	PROCEDE	PRODUCTION ANNUELLE.
Associated Pulp & Paper Mills	1938	Papiers de bonne qualite	Soude	117,811 tonnes
Australian Newsprint Mills	1941	Papier a journaux	Mecanique	170,575 tonnes
Australian Paper Manufacturers	1969	Pulpe	Sulphite	60,853 tonnes
A.P.P.M.	1971	Papiers a glace	"	-

, l'utilisation des forets Tasmaniennes sera plus etendu et plus instensif, du a la vent récemment realisée au Japon de 1,2000,000 tonnes approximatifs de copeaux par an. Ces copeaux seront produits avec des arbres coupés dans les regions preablement exploitées par des scieries, où des regions jusqu'a moment considerées non-economiques du a leur faible rendment où a leur pauvrete forestiere. On espère que l'exploitation organisée de ces fôrets permettra un programme de regénération mieux étudie et plus intense qu'actuellment.

Les forêts industrielles de Tasmanie sont basées sur les E. obliqua, E. regnans et E. delegatensis. Les autres espèces ne servent que pour la production de pâte à papier et, bois de chauffage. E. globulus sert pour la production de bois pour la construction de ponts, de pilotis, et de bateaux, où un bois dense et durable est necessaire. Les trois especes les plus exploitees produisent d'excellents bois d'ouvre et pate a papier.

Ces autres espèces pour les copeaux au Japon seront E. viminalis, dalrympleana, amygdalina, tasmanica, linearis, simmondsii, ovata et rodwayi.

TABLEAU DE PRODUCTION

Categorie	1966 - 1967	1967-1968
Grumes pour pate a papier, bois d'ouvre etc.		
a) Eucalyptus	1,468,936	1,610,811
b) Nothofagus	163,215	187,983
Coniferes (indignes)	9,219	10,638
Coniferes (Pinus radiata)	55,791	52,482
Bois de chauffage (Eucalyptus)	314,894	267,376
	2,012,005m^3	2,129,290m^3

Climat

La Tasmanie jouit d'un climat maritime tempere. Ses hivers sont benins, surtout si l'on considere sa latitude et ses etes sont ensoleillés mais frais. Toutefois, l'ile de la Tasmanie est suffisement etendue pour avoir en certains lieus des caracteristiques continentales. Le climat et les precipitations en particuller sont affectés par la topographie des montagnes et le fait que les vents predominants soufflent de l'Ouest.

La courbe des precipitations moyennes annuelles souligne la concentration des pluies sur la côte et les hauteurs de l'Ouest et, en moindre dégré, sure les monts du Nord et de l'Ouest. Le plateau Central et les zones Est et Sud, protegées des vents ouest, ont un regime de pluies plus reduit.

L'evapouration moyenne est d'environ 760 mm. dans la partie Est de l'ile, et de 560 mm. dans le secteur Ouest.

La neige peut apparaitre sur les hauteurs en toutes saisons, toutefois les fortes sont limitées aux mois d'hiver, bien que de grandes chutes aient été enregistrées en Juin et Juillet (c.a.d. au debut de l'hiver). Les accumulations de neige au dessus de 1000m. de miveau, ne commencer que vers Juin et tendent a disparaître vers Octobre. Les neiges eternelles n'existent pas en Tasmanie. Les gelées sont frequentes dans tout le territoire Tasmanien. Dans l'interieur de l'île et sure les plateau elles se produisent presque chaque nuit, mais en général la tempèrature monte au dessus de 0°C.

Temperatures et precipitations mensuelles
moyennes pour les diverses regions de la Tasmanie.

Station	Altitude		J	F	M	A	M	J	J	A	S	O	N	D
HOBART (Sud-Est)	50m	°C	17	16	15	13	11	8	8	9	11	12	12	15
		mm	43	48	51	63	51	66	48	53	53	71	58	63
ZEEHAN (Ouest)	200m	°C	14	14	13	11	9	7	7	8	9	10	8	13
		mm	132	127	142	214	246	252	270	280	222	222	186	158
OATLANDS (Central)	480m	°C	14	14	13	10	8	6	5	6	8	9	12	13
		mm	36	48	38	58	51	51	43	48	41	61	56	62

ESPECE	FORME	HAUTEUR	ELEVATION
RENANTHERAE			
"Ash Group"			
E.delegatensis R.T.Baker	a,b,	20-60m.	300-1100m.
E.sieberi L.Johnson	a,b,	15-30m.	0-600m.
E.obliqua L'Herit.	a	15-80m.	0-600m.
E.regnans F.Muell.	a	30-90m.	0-800m.
"Peppermint Group"			
E.tasmanica Blakely	b,c,	9-15m.	0-500m.
E.risdonii Hook.f.	c	5-15m.	0-200m.
E.linearis Dehn.	b	6-15m.	250-800m.
E.amygdalina Labill.	b	10-20m.	0-500m.
E.coccifera Hook.f.	a,b,c,	5-40m.	600-1400m.

OBSERVATION

Forme des forets de cette espèce, qui ont une grande importance commerciale. On les trouve généralement aux sols fertiles derivés de granite, de dolerite ou de basalte.
Trouve généralement dans des endroits secs sur les crêtes des montagnes de la côte de l'Est.
Espèce très repandue, qui prospère dans des terrains humides, mais non marecageux, qu'elle ne tolere pas. C'est un des Eucalyptus de grande importance commerciale.
Espece restreinte aux vallees humides et, aux terrains fertiles. Elle est remplacée par E.delegatensis dans les regions plus elevées et par E.obliqua dans les endroits plus secs.
C'est une espèce de grande importance commerciale.

Est très sembable au E.risdonii mais est plus repandu que cette espèce. Apparait souvent dans les terrains derivés de roches sedimentaires, surtout sur la cote de L'Est de la Tasmanie.
De distribution restriente, se trouve seulement dans des terrains pauvres. C'est un arbre très decoratif, aux feuilles argentées.

Très sembable a l'E.amygdalina, mais il a le tronc blanc et les feuilles très étroites.
Se trouve en general dans des endroits secs derivés de roches doleritiques.
Restreint aux terrains secs et pauvres.En general, pousse en compagnie des E.obliqua et des E.viminalis
Très repandue dans les regions montagneuses. C'est une des espèces , avec E.delegatensis, qui prospère dans les sols rocheux de dolerite. Il existe quelque poches reliques, sur la côte Est où les arbres atteignent une grande hauteur et ou developpent des caracteristiques speciales

ESPECE	FORME	HAUTEUR	ELEVATION
E.pauciflora Sieb.	b,c,	6-20m.	0-1100m.
E.robertsonii Blakely	a	20-40m.	300-600m.
E.simmondsii Maiden	a,b,	12-30m.	0-500m.
MACRANTHERAE			
"Lowland White gum Group"			
E.viminalis Labill.	a,b,c,	10-50m.	0-500m.
E. dalrympleana Maiden	a	20-50m.	300-1000m.
E. rubida Deane & Maiden	b	10-30m.	150-600m.
'Alpine white gum group"			
E. gunnii Hook f.	b	10-30m.	600-1200m.
E. archeri Maiden & Blakely	b,c	5-15m.	600-1200m.
E. perriniana(F. Muell.) Rodw.	c	4-6m.	300-600m.
E. morrisbyi R.G. Brett	b	5-15m.	Sea level
E. urnigera Hook f.	b	5-15m.	600-1200m.

Une espece qui se trouve dans les savvannes et dans les vallées généralement sujettes aux gelées.
De distribution restreinte aux vallées des rivières Forth et Mersey. Se trouve souvent en compagnie des E.dalrympleana.
Très repandu dans l'Ouest de la Tasmanie.
Est très tolerant de sols acides et pauvres.

Cet eucalyptus prospère dans la plupart des sols, depuis les sablonneux de la côte jusqu'aux basaltiques. Il pousse souvent en rase campagne, mais developpe en un arbre magnifique dans les vallées du Nord-Est, de sol fertile.
On le trouve dans les regions plus humides et plus froides. L'espece Tasmanienne est legerement differente de l'espece continentale Australienne.
Cette espece remplace E. viminalis sur les sites de terrains plus pauvres et dans les régions seches et plus exposées.

Il pousse naturellement dans les régions marecageuses exposées et froides du haut-Plateau Tasmanien. Il atteint un plus grand developpement du cote ouest du plateau.
Cette espèce est quelquefois incluse avec l'espèce E. gunnii. On la trouve aux limites nord des forêts d'E. gunnii; elle pousse dans les sols plus pauvres et plus faibles que cette dernière.
Cette espece, peu connue est une relique qui se trouve seulement dans des sites restreints, très marecageux.
C'est un bel arbre très decoratif.
Ne se trouve que dans deux petites localites pres d'Hobart.
Il pousse naturellement dans les regions rocheuses exposées et froides des montagnes du sud Ouest de la Tasmanie. Il remplace E. gunnii dans les fôrets de la Tasmanie du Sud.

ESPECE	FORME	HAUTER	ELEVATION
"Yellow gum group"			
E. vernicosa Hook f.	d	0.5-4m.	800-1500m.
E. subcrenulata Maiden & Blakely	a,b,c	5-40m.	600-1200m.
E. johnstonii Maiden	a	20-60m.	500-1000m.
"Swamp gum group"			
E. ovata Labill	a,b,c	10-50m.	0-1000m.
E. rodwayi Baker & Smith	b	10-20m.	0-1000m.
"Blue gum group"			
E. globulus Labill.	a,b	10-60m.	0-600m.
E. bicostata Maiden & Blakeley	a,b	10-30m.	0-200m.
E. cordata Labill	a,b,	3-25m.	200-800m.

C'est un arbuste très robuste et decoratif. C'est le plus resistant au froid des Eucalyptus (Martin 1948). On le trouve sur les crêtes des montagnes du Sud Ouest de la Tasmanie.
On rencontre cette espèce dans les terrains marecageux. Elle produit de grands arbres dans les meilleurs terrains.
Se trouve generalement dans des terrains de grès.
Jackson (1960) a démontre qu'une variation clinale existe, entre les especes E. johnstonii-E.subcrenulata-E. vernicosa.
Cette espèce est très répandue, mais on la trouve surtout dans des endroits marecageux où au contraire, très secs. A l'ouest de la Tasmanie il se developpe en un arbre de grande dimension et il est alors utilise comme bois de construction. Il s'hybride facilement avec la plupart du section Macantherae. (Autrefois E. aggregata de Tasmanie) On le trouve principlement dans les endroits marecageux du Haut Plateau Central et dans les vallées de rivières.
Cette espèce se trouve principalement dans la region Est de la Tasmanie. Dans des terrains fertilies, il atteint un grand developpement entremêlé avec E. regnans et E. obliqua.
C'est un arbre très semblable a l'E. globulus, restreint a l'ile Flinders et au Continent Australien.

Il est restreint aux sites marecageux, généralement derives de roches gréseuses. Il s'hybride facilement avec E. globulus. Il a un feuillage argenté et très decoratif.

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I have not included any diagrams with this draft because I do not have copies of the originals. However, included with the text are the following diagrams:-

Temperature patterns of Tasmania(Langford 1965)

Map of the annual precipitation (" ")

Distribution maps of eucalypt species (modified after Jackson 1965)

APPENDIX 9

Mt. Cattley Plots

Measurements of trees and stumps, July, 1971.

Plot A

Slope - nil; little rock; kraznozem

Stumps - delegatensis - (g.b.h.o.b. at 3'6" height) 10'8", 13'10", 20'10", 16'8", 10'10"

Dead Trees - delegatensis - 4'4"; gunnii - 5'4", 3'0"

Live Trees - delegatensis - 14'7", 7'8", 10'8"; gunnii 4'3"

Plot B

Slope - 5% elevation from east to west; some surface rock present; kraznozem

Stumps - delegatensis - 11'5", 12'10", 8'9", 14'9", 11'2"

Dead Trees - delegatensis - 2'9", 3'11", 2'6", 2'4"; gunnii 3'3", 2'2", 4'8"

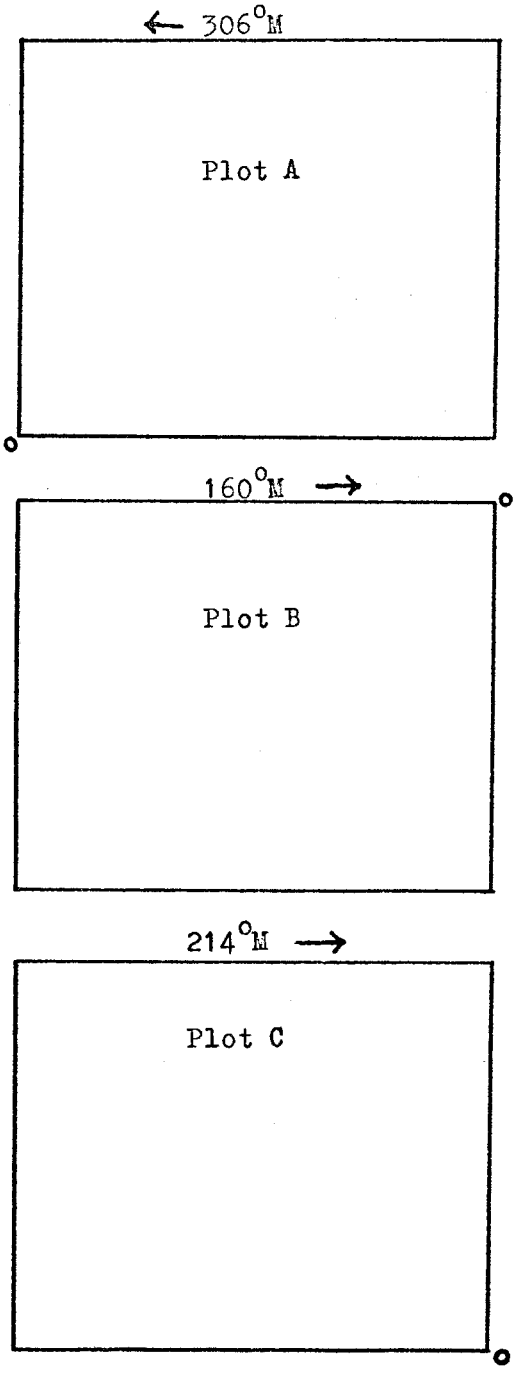
Plot C

Slope - nil; little rock; kraznozem

Stumps - delegatensis - 16'2", 15'9", 23'5"

Dead Trees - delegatensis - 2'11", 3'2"

Live Trees - delegatensis - 6'1"



Scale one chain = one inch

permanent peg