

THE BRYOPHYTES OF THE MT WELLINGTON RANGE, TASMANIA

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(with five tables)

ABSTRACT

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A census of the bryophyte flora of the Mt Wellington Range, Tasmania, is reported, the field work having been carried out between 1 May 1977 and 31 October 1980. The survey area was similar in extent to that used by the authors in an earlier survey of the vascular plants. A total of 164 mosses and 130 liverworts was found in the survey area, representing more than 60% of the known Tasmanian bryophyte flora, including several species not previously known to occur in Tasmania. The number of moss species was greatest at middle and lower altitudes whereas the number of liverwort species was greatest at middle and higher altitudes. Reports of liverwort species in this census are accompanied by references to works containing descriptions and drawings, wherever possible, of these species. Only a few species known from past information or collections to have occurred on Mt Wellington were missing in the current survey despite the devastating bushfire of 7 February 1967.

INTRODUCTION

Serious efforts were made to study the bryophyte flora of Tasmania before that of most other parts of Australia. Bastow (1886-87) published a four-part paper (with an illustrated fold-out key) on the Tasmanian mosses and within thirty years Rodway (1913-14) brought out an extensive revision. Similarly, Bastow (1888) published an illustrated account of the Tasmanian liverworts, and Rodway (1917) provided an extensive revision. Although Rodway recognized that many of his "species" were really different forms of the same species and therefore not fully deserving of specific rank, it was only relatively recently that bryologists have brought into synonymy many of these forms previously considered to be distinct. Indeed, the plasticity of many species both in their vegetative and reproductive organs is probably at least as great as in the flowering plants, and perhaps bryologists of the future will increase the list of synonyms still further. Since Rodway's time many genuine new species have been added to the bryophyte flora of Australasia (including Tasmania) due to the efforts of such workers as H.N. Dixon, G.O.K. Sainsbury, J.H. Willis, E.A. Hodgson, K.W. Allison, R. Grolle and R.M. Schuster.

SURVEY AREA AND VEGETATION ZONES

The field work for the present survey was carried out between 1 May 1977 and 31 October 1980, the survey area used being the same as that employed for a census of the vascular plants of the Mt Wellington Range (Ratkowsky & Ratkowsky 1976). Details of the vegetation zones occurring within the survey area are given in that paper and will not be repeated here, although Table 1 summarizes the main features and approximate elevations of each zone. Unlike the earlier survey where a minimum elevation of 240 m was employed in order to make a comparison with a previously published survey, no lower elevation limit was used in the present survey, except that bryophytes growing in the vicinity of habitation were not included.

CENSUS OF THE MOSSES

An important publication subsequent to the revision of the moss flora by Rodway (1913-14) was the eight-part commentary of Sainsbury (1953-56) on the moss species in

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TABLE 1

SUMMARY OF THE VEGETATION ZONES OF THE MT WELLINGTON RANGE

Zone	Description	Approximate elevation
1	Treeless upper regions.	1220-1270 m
2	Woodlands containing pure stands of <i>Eucalyptus coccifera</i> , and treeless marshlands and grasslands at the same elevations.	1100-1220 m
3a	Woodlands with mixed eucalypt stands, dominant eucalypt <i>E. urnigera</i> , and treeless marshlands and grasslands at the same elevations.	800-1100 m
3b	Wet sclerophyll forests, dominant eucalypt <i>E. delegatensis</i> .	600- 800 m
4	Wet sclerophyll forests, dominant eucalypt <i>E. obliqua</i> .	Below 670 m
5	Sandstone outcrops such as Snake Plains, The Springs, Sphinx Rock, etc., dominant eucalypt <i>E. johnstonii</i> .	600- 750 m
6	Gully communities, permanently wet, with thick undergrowth of <i>Bedfordia salicina</i> and <i>Olearia argophylla</i> .	Below 600 m
7	Dry sclerophyll open forests, dominant eucalypts <i>E. pulchella</i> and <i>E. viminalis</i> (on dolerite) or <i>E. tenuiramis</i> (on mudstone).	Below 500 m

what was then Rodway's herbarium (now incorporated into the Tasmanian Herbarium). These papers, together with the works of J.H. Willis, and others, helped form the basis for the moss flora of southern Australia of Scott and Stone (1976). Their treatment must now be the starting point for any serious revision of the moss flora of this region. The ordering of the families and genera in the present census (Table 2) follows Scott and Stone (1976), and the names of species, arranged alphabetically, adhere to those given in that work, except where more recent knowledge requires modification. Footnotes, which are listed at the end of table 2, are used for clarification, to impart extra information, or to indicate unsolved problems of taxonomic interest.

Mosses are notoriously difficult to identify with certainty in the field, as the identity of many species can usually only be determined with confidence after microscopic examination. This fact makes it difficult to accurately assess the abundance of a species in a vegetation zone. Thus, unlike the census of vascular plants (Ratkowsky & Ratkowsky 1976), no assessment of the frequency of occurrence of a species is indicated in table 2, presence in any zone being indicated by a "x". However, where a species was found only once during the survey, its occurrence is indicated by a "r" to signify that it is rare.

CENSUS OF THE LIVERWORTS

Discussion of a census of Tasmanian liverworts is complicated by the absence of a modern treatment of the hepatic flora of this region, as there is as yet no comprehensive work on liverworts equivalent to that of Scott and Stone (1976) on the mosses. There are a number of large families, notably those of Lophocolaceae and Lepidoziaceae, that are badly in need of revision. The lack of an equivalent to Scott and Stone (1976) has prompted a different approach to the presentation of the census of the liverworts of Mt Wellington in table 3. Each species listed is followed by a number indicating a footnote. The footnotes appear at the end of the table and provide references to literature either citing nomenclature or providing descriptions and illustrations, wherever possible,

TABLE 2
THE MOSSES OF THE MT WELLINGTON RANGE

	Zone							
	1	2	3a	3b	4	5	6	7
Sphagnaceae								
<i>Sphagnum australe</i> Mitt.			x			x		
<i>S. cristatum</i> Hampe	x	x	x			x		
<i>S. falcatulum</i> Besch.	x	x						
<i>S. subsecundum</i> (1) Nees	x	x	x			x		
Andreaeaceae								
<i>Andreaea rupestris</i> (2) Hedw.	x	x	x	x				x
<i>A. subulata</i> Harv. ex Hook.				r				
Polytrichaceae								
<i>Polytrichum alpinum</i> Hedw.	x	x						
<i>P. commune</i> Hedw.	x	x	x	x		x	x	
<i>P. juniperinum</i> Hedw.	x	x	x	x	x	x	x	x
<i>Atrichum androgynum</i> (C. Muell.) Jaeg.					x		x	
<i>Pogonatum subulatum</i> (Brid.) Brid.				x	x		x	
<i>Polytrichadelphus magellanicus</i> (Hedw.) Mitt.				x	x	x	x	
<i>Psilopilum australe</i> (Hook.f. & Wils.) Mitt.	x	x	x					
<i>P. crispulum</i> (Hook.f. & Wils.) Mitt.		x	x					
Fissidentaceae								
<i>Fissidens asplenioides</i> Hedw.								x
<i>F. dealbatus</i> Hook.f. & Wils.							r	
<i>F. leptocladus</i> C. Muell. & Rodw.					x	x	x	x
<i>F. pallidus</i> Hook.f. & Wils.					x			
<i>F. pungens</i> C. Muell. & Hampe			x	x	x	x	x	x
<i>F. rigidulus</i> Hook.f. & Wils.				x	x	x	x	x
<i>F. taylorii</i> C. Muell.				x	x		x	x
<i>F. tenellus</i> Hook.f. & Wils.					x	x	x	x
<i>F. vittatus</i> Hook.f. & Wils.							x	x
Grimmiaceae								
<i>Grimmia apocarpa</i> (Hedw.) B.S.G.				x	x	x		x
<i>G. laevigata</i> (Brid.) Brid.								r
<i>G. pulvinata</i> (Hedw.) Sm.								x
<i>G. trichophylla</i> Grev.	x	x	x	x	x	x	x	
<i>Rhacomitrium crispulum</i> (Hook.f. & Wils.) Dix.	x	x	x	x	x	x	x	x
<i>R. lanuginosum</i> (Hedw.) Brid. var. <i>pruinosum</i> Wils.	x	x	x	x				
Ditrichaceae								
<i>Ditrichum cylindricarpum</i> (C. Muell.) F. Muell.					x		x	
<i>D. difficile</i> (Dub.) Fleisch.				x	x	x	x	x
<i>D. punctulatum</i> Mitt.	x	x	x	x	x	x	x	
<i>Ceratodon purpureus</i> (Hedw.) Brid.	x	x	x	x	x	x	x	x
<i>Eccremidium pulchellum</i> (Hook.f. & Wils.) C. Muell.								x
<i>Cheilothela chilensis</i> (3) (Mont.) Broth.	x	x	x					
Seligeriaceae								
<i>Blindia magellanica</i> Schimp.				x	x		x	
<i>B. robusta</i> Hampe	x	x						
<i>B. tasmanica</i> Sainsb.						r		
Dicranaceae								
<i>Campylopus clavatus</i> (R.Br.) Wils.	x	x	x	x	x	x		x
<i>C. introflexus</i> (Hedw.) Brid.	x	x	x	x	x	x	x	x
<i>C. pallidus</i> Hook.f. & Wils.			x	x	x	x	x	
<i>Dicranella cardotii</i> (R.Br. ter.) Dix.				x	x			
<i>D. dietrichiae</i> (4) (C. Muell.) Jaeg.						r		
<i>Dicranoloma billardieri</i> (Brid.) Par.	x	x	x	x	x	x	x	x
<i>D. dicarpum</i> (Nees) Par.					x		x	
<i>D. menziesii</i> (Tayl.) Par.					x		x	

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TABLE 2 (CONT.)

THE MOSSES OF THE MT WELLINGTON RANGE

	Zone								
	1	2	3a	3b	4	5	6	7	
<i>Dicranoweisia microcarpa</i> (Hook.f. & Wils.) Par.	x	x	x	x	x				x
<i>Leucobryum candidum</i> (P. Beauv.) Wils.								x	
Pottiaceae									
<i>Acaulon integrifolium</i> C. Muell.					x				
<i>Calyptopogon mnioides</i> (Schwaegr.) Broth.					x		x		
<i>Tortula muralis</i> Hedw.	x	x	x	x	x	x	x	x	x
<i>T. papillosa</i> Wils.					x				x
<i>T. princeps</i> De Not.		x	x		x				x
<i>T. rubra</i> (5) Mitt.		r							
<i>Gymnostomum calcareum</i> Nees & Hornsch.						x	x	x	
<i>Tortella calycina</i> (Schwaegr.) Dix.		x	x	x	x		x	x	
<i>T. knightii</i> (Mitt.) Broth.		x	x	x	x				
<i>Tridontium tasmanicum</i> Hook.f.									x
<i>Weissia controversa</i> Hedw.			x	x	x	x			
<i>Barbula australasiae</i> (Hook. & Grev.) Brid.					x		x	x	
<i>B. crinita</i> (6) Schultz					x	x		x	
<i>B. torquata</i> Tayl.					x	x		x	
<i>B. unguiculata</i> Hedw.									x
<i>Bryoerythrophyllum jamesonii</i> (7) (Tayl.) Crum				x	x		x	x	
<i>Triquetrella papillata</i> (Hook.f. & Wils.) Broth.					x			x	
<i>Anomodon tasmanicus</i> (8) Broth.									x
Encalyptaceae									
<i>Encalypta vulgaris</i> Hedw.							x		x
Orthotrichaceae									
<i>Orthotrichum tasmanicum</i> Hook.f. & Wils.					x			x	
<i>Macromitrium archeri</i> Mitt.					x			x	x
<i>M. weymouthii</i> Broth.								r	
<i>Ulota lutea</i> (9) (Hook.f. & Wils.) Mitt.				r					
<i>Zygodon hookeri</i> Hampe								r	
<i>Z. intermedius</i> B.S.G.	x	x	x	x	x	x	x	x	x
<i>Z. menziesii</i> (Schwaegr.) Arnott					x			x	x
Funariaceae									
<i>Funaria apophysata</i> (Tayl.) Broth.			r						
<i>F. glabra</i> Tayl.					x			x	x
<i>F. gracilis</i> (Hook.f. & Wils.) Broth.					x			x	x
<i>F. hygrometrica</i> Hedw.		x	x	x	x			x	x
<i>F. producta</i> (Mitt.) Broth.									r
Splachnaceae									
<i>Tayloria octoblepharis</i> (Hook.) Mitt.	x	x	x	x	x				x
Bryaceae									
<i>Bryum argenteum</i> Hedw.	x	x	x	x	x	x			x
<i>B. billardieri</i> Schwaegr.		x	x	x	x	x	x	x	x
<i>B. blandum</i> Hook.f. & Wils.				x	x			x	
<i>B. capillare</i> Hedw.	x	x	x	x	x	x	x	x	x
<i>B. crassum</i> Hook.f. & Wils.			r						
<i>B. dichotomum</i> Hedw.	x	x	x	x	x	x			x
<i>B. erythrocarpoides</i> C. Muell. & Hampe				x				x	x
<i>B. laevigatum</i> Hook.f. & Wils.		x	x	x	x	x		x	
<i>B. micro-erythrocarpum</i> C. Muell. & Kindb.									r
<i>B. pachythea</i> C. Muell.							x		x
<i>B. pseudotriquetrum</i> (Hedw.) Gaertn., Meyer & Scherb.			x		x				
<i>Leptostomum inclinans</i> R.Br.			x	x	x			x	x
<i>Mielichhoferia bryoides</i> (Harv.) Wijk & Marg.				x	x	x			

TABLE 2 (CONT.)

THE MOSSES OF THE MT WELLINGTON RANGE

	Zone							
	1	2	3a	3b	4	5	6	7
<i>Orthodontium lineare</i> Schwaegr.				x	x	x	x	x
<i>Pohlia cruda</i> (Hedw.) Lindb.	x	x	x	x				
<i>P. nutans</i> (Hedw.) Lindb.		x	x	x	x	x	x	x
Aulacomniaceae								
<i>Leptotheca gaudichaudii</i> Schwaegr.	x	x	x	x	x	x	x	
Mitteniaceae								
<i>Mittenia plumula</i> (Mitt.) Lindb.	x	x	x	x	x		x	
Rhizogoniaceae								
<i>Rhizogonium bifarium</i> (Hook.) Schimp.								x
<i>R. distichum</i> (Sw.) Brid.					x		x	
<i>R. mnioides</i> (Hook.) Wils.		x	x	x	x	x	x	
<i>R. novae-hollandiae</i> (Brid.) Brid.		x		x			x	
<i>Goniobryum subbasilare</i> (Hook.) Lindb.					x		x	
<i>Hymenodon pilifer</i> Hook.f. & Wils.								x
Bartramiaceae								
<i>Bartramia hallerana</i> Hedw.				x	x		x	x
<i>B. cf. hampeana</i> C. Muell.								x
<i>B. papillata</i> Hook.f. & Wils.	x	x	x	x	x	x		x
<i>Bartramidula pusilla</i> (Hook.f. & Wils.) Par.								x
<i>Breutelia affinus</i> (Hook.) Mitt.	x	x	x	x	x	x	x	x
<i>B. elongata</i> (Hook.f. & Wils.) Mitt.	x	x	x	x	x	x	x	x
<i>B. pendula</i> (Sm.) Mitt.	x		x	x	x	x	x	x
<i>Conostomum pentastichum</i> (Brid.) Lindb.	x	x	x					
<i>C. pusillum</i> Hook.f. & Wils.	x	x	x			x		x
<i>Philonotis scabrifolia</i> (Hook.f. & Wils.) Braithw.	x	x	x	x	x		x	
<i>P. tenuis</i> (Tayl.) Reichdt.		x	x	x	x	x	x	x
Hypnodendraceae								
<i>Hypnodendron comosum</i> (Labill.) Mitt.								x
<i>H. spininervium</i> (Hook.) Jaeg.					x		x	
<i>H. vitlense</i> Mitt.					x		x	
Rhacopilaceae								
<i>Rhacopilum convolutaceum</i> (C. Muell.) Reichdt.				x	x		x	x
Hedwigiaceae								
<i>Hedwigia ciliata</i> (Hedw.) Ehrh.		x	x	x	x	x		x
<i>H. integrifolia</i> P. Beauv.				x	x	x		x
<i>Rhacocarpus purpurascens</i> (Brid.) Par.	x	x	x					
Ptychomniaceae								
<i>Ptychomnion aciculare</i> (Brid.) Mitt.				x	x	x	x	x
<i>Glyphothecium sciuroides</i> (Hook.) Hampe								r
Lepyrodontaceae								
<i>Lepyrodon lagurus</i> (Hook.) Mitt.	x	x	x					
Meteoriaceae								
<i>Weymouthia cochlearifolia</i> (Schwaegr.) Dix.					x			x
<i>W. mollis</i> (Hedw.) Broth.								r
Neckeraceae								
<i>Thamnobryum pumilum</i> (Hook.f. & Wils.) Nieuwl.					x			x
Echinodiaceae								
<i>Echinodium hispidum</i> (Hook.f. & Wils.) Reichdt.					x			x
Lembophyllaceae								
<i>Lembophyllum divulgum</i> (Hook.f. & Wils.) Par.		x	x	x	x		x	x
<i>Camptochaete arbuscula</i> (Sm.) Reichdt.					x		x	x
<i>C. gracilis</i> (Hook.f. & Wils.) Par.		x	x	x	x			x

Bryophytes of the Mt Wellington Range, Tasmania

TABLE 2 (CONT.)

THE MOSSES OF THE MT WELLINGTON RANGE

	1	2	3a	Zone				7
				3b	4	5	6	
Hookeriaceae								
<i>Distichophyllum microcarpum</i> (Hedw.) Mitt.				x	x		x	
<i>D. pulchellum</i> (Hampe) Mitt.		x	x	x			x	
<i>Eriopus apiculatus</i> (Hook.f. & Wils.) Mitt.							x	
<i>Acrophyllum dentatum</i>	x	x	x	x	x		x	x
(10) (Hook.f. & Wils.) Vitt & Crosby								
<i>Sauloma tenella</i> (Hook.f. & Wils.) Mitt.					x		x	
Hypopterygiaceae								
<i>Hypopterygium rotulatum</i> (Hedw.) Brid.		x	x	x	x		x	x
<i>Cyathophorum bulbosum</i> (Hedw.) C. Muell.					x		x	
<i>Lopidium concinnum</i> (Hook.) Wils.							x	
Thuidiaceae								
<i>Thuidium furfurosus</i> (11) (Hook.f. & Wils.) Reichdt.			x	x	x	x	x	x
Amblystegiaceae								
<i>Acrocladium chlamydophyllum</i>				x	x	x	x	x
(Hook.f. & Wils.) C. Muell. & Broth.								
<i>A. cuspidatum</i> (Hedw.) Lindb.				x	x	x	x	x
<i>Cratoneuropsis relaxa</i> (Hook.f. & Wils.) Fleisch.							r	
Brachytheciaceae								
<i>Brachythecium albicans</i> (Hedw.) B.S.G.					x	x		x
<i>B. paradoxum</i> (Hook.f. & Wils.) Jaeg.	x	x				x		
<i>B. rutabulum</i> (Hedw.) B.S.G.				x	x	x	x	x
<i>B. salebrosum</i> (Web. & Mohr) B.S.G.				x	x	x		
<i>Eurhynchium asperipes</i> (Mitt.) Dix.							r	
<i>E. austrinum</i> (Hook.f. & Wils.) Jaeg.					x		x	x
<i>E. muriculatum</i> (Hook.f. & Wils.) Jaeg.				x	x		x	
<i>E. praelongum</i> (Hedw.) B.S.G.					x	x	x	x
<i>Pseudoscleropodium purum</i> (12) (Hedw.) Fleisch.					x			
<i>Rhynchostegium</i> sp. (13)					x		x	x
Fabroniaceae								
<i>Fabronia australis</i> Hook.						r		
Plagiotheciaceae								
<i>Plagiothecium denticulatum</i> (Hedw.) B.S.G.	x	x	x		x		x	
<i>Catagonium politum</i> (Hook.f. & Wils.) Dus.	x	x	x	x	x		x	
<i>Isopterygium limatum</i> (Hook.f. & Wils.) Broth.	x	x	x	x	x	x	x	x
Sematophyllaceae								
<i>Sematophyllum amoenum</i> (Hedw.) Mitt.				x	x	x	x	x
<i>S. homomallum</i> (Hampe) Broth.							x	
<i>S. leucocytus</i> (C. Muell.) Sainsb.				x	x		x	x
<i>S. uncinatum</i> Stone & Scott				x	x		x	
<i>Wijkia extenuata</i> (Brid.) Crum				x	x		x	x
Hypnaceae								
<i>Hypnum chrysogaster</i> (14) C. Muell.			x		x	x	x	
<i>H. cupressiforme</i> Hedw.	x	x	x	x	x	x	x	x

Footnotes (all references to Scott & Stone 1976, are abbreviated S&S).

- (1) This may really be *S. cymbifolioides* C. Muell. (see S&S p.453).
- (2) Vitt (1980) showed that *A. rupestris* does not occur in the Southern Hemisphere and that material previously referred to by this name is mostly *A. mutabilis*.
- (3) This species is not given as occurring in Tasmania by S&S p.454.
- (4) This species is not given as occurring in Tasmania by S&S p.148, but we have also found it in Hartz Mtn National Park.

TABLE 2 (CONT.)

THE MOSSES OF THE MT WELLINGTON RANGE

- (5) *Tortula rubra*, found at Trestle Mtn, is a new Tasmanian record; we have also found it in Ben Lomond and Cradle Mountain National Parks.
- (6) This name, as noted by S&S p.454, replaces *Barbula pseudopilifera* C. Muell. & Hampe.
- (7) This species is listed in S&S P.215 as *B. binnsii* (R.Br.ter.) Wijk & Marg. (see Ratkowsky 1980b, p.367).
- (8) This species was found at Knocklofty, Tolmans Hill, Browns River, Ridgeway Reservoir, etc. but sporophytes were not seen and its taxonomic position remains uncertain (see S&S p.218).
- (9) According to Malta (1933), several species of *Ulota* occur on Mt Wellington, which are supposedly easy to distinguish using vegetative characters.
- (10) This name now replaces *Pterygophyllum dentatum* (Hook.f. & Wils.) Dix. (see S&S p.454).
- (11) Forms both with single and multiple cell papillae have been found. We believe the drawings in S&S on p.403 and p.405, the latter purporting to be of *T. laeviusculum* (Mitt.) Jaeg., are of different forms of a single species.
- (12) This species, found near a creek behind the Cascade Brewery and also near Strickland Avenue, is a new record for Tasmania.
- (13) The Mt Wellington material appears to be *Rhynchostegium laxatum* (Mitt.) Par. rather than *R. tenuifolium* (Hedw.) Reichtd., but as noted by S&S p.431, a thorough revision of these two species is needed.
- (14) The orange-to-yellow inflated alar cells seem to distinguish this species from *Hypnum cupressiforme* Hedw.

of the species. For example, Allison and Child (1975), wherever it is cited, contains a brief description and a drawing of the relevant species.

The ordering of the families and of the five hepatic orders follows the proposal of Grolle (1972) with slight alterations, the taxonomic arrangement of the families within orders being alphabetic. Similarly, genera within families, and species within genera, are listed alphabetically. As with the mosses in table 2, presence of a species in a zone is indicated in table 3 by a "x" or a "r" (if it was found only once in the survey).

DISCUSSION

Rodway (1913-14, 17) listed a very high proportion of Tasmanian bryophytes as occurring on Mt Wellington, indicating the prominent place that this mountain has held in Tasmanian bryology. In our earlier survey of the vascular plants (Ratkowsky & Ratkowsky 1976) it was found that more than one-third of the known flowering plants of Tasmania occurred on Mt Wellington. In the present census, 164 moss species and 130 liverwort species are reported, representing more than 60% of the approximately 270 known Tasmanian moss species and the approximately 210 known Tasmanian liverwort species. This reaffirms the importance of this mountain range as a significant natural reserve of representative Tasmanian vegetation.

This census has revealed several species that were previously unknown in Tasmania. Two moss species, *Tortula rubra* and *Pseudoscleropodium purum*, are new records for Tasmania, at least in the sense that they are not given by Scott and Stone (1976) as occurring in Tasmania. *Cheilothea chilensis* is also omitted from Scott and Stone (1976), but we have also found it at Mt Field National Park. This distinctive plant, also known from South America, New Zealand, Victoria and New South Wales, but not common in any of those places, is now rather widespread as a colonizer of open ground at the higher elevations of Mt Wellington. No sporophytes have been found in Tasmanian material.

D.A. and A.V. Ratkowsky

TABLE 3 (CONT.)

THE LIVERWORTS OF THE MT WELLINGTON RANGE

	Zone							
	1	2	3a	3b	4	5	6	7
Order E: Jungermanniales								
Acrobolbaceae								
<i>Acrobolbus cinerascens</i> (Lehm. & Lindenb.) Bast. (33)		x	x					x
<i>Goebelobryum unguiculatum</i> (Hook.f. & Tayl.) Grolle (34)		x	x		x	x		
<i>Lethocolea squamata</i> (Tayl.) Hodgs. (35)		x	x	x	x			
<i>Tylimanthus pseudosaccatus</i> Grolle (36)					x			x
<i>T. tenellus</i> (Tayl. ex Lehm.) Mitt. (37)		x	x	x	x			x
Adelanthaceae								
<i>Adelanthus falcatus</i> (Hook.) Mitt. (38)	x	x	x	x				
Balantiopsaceae								
<i>Balantiopsis diplophylla</i> (Hook.f. & Tayl.) Mitt. (39)	x	x	x	x	x			x
<i>B. tumida</i> Berggr. (40)	x	x	x					
<i>Isotachis intortifolia</i> (Hook.f. & Tayl.) Gott. (41)	x	x	x	x	x	x	x	
<i>Neesioscyphus phoenicorhizus</i> Grolle (42)		x	x					
Cephaloziellaceae								
<i>Cephaloziella exiliflora</i> (Tayl.) Steph. (43)	x	x	x	x	x	x	x	x
<i>C. hirta</i> (?) (Steph.) Schust. (44)			x		x	x		
Chaetophyllopsiaceae								
<i>Chaetophyllopsis whiteleggei</i> (Carringt. & Pears.) Schust. (45)								r
Gymnomitriaceae								
<i>Gymnomitrium incompletum</i> (Gott.) Schust. (46)	x	x						
<i>Herzogobryum aterrimum</i> (Steph.) Grolle (47)		x						
<i>H. erosum</i> (Carringt. & Pears.) Grolle (48)		x	x					
<i>H. teres</i> (Carringt. & Pears.) Grolle (49)		x	x	x				
Herbertaceae								
<i>Herbertus oldfieldianus</i> (Steph.) Rodway (50)		x	x	x				
<i>Triandrophyllum subtrifidum</i> (Hook.f. & Tayl.) Fulf. & Hatch. (51)		x	x	x				
Jubulaceae								
<i>Frullania clavata</i> (Hook.f. & Tayl.) Tayl. (52)					x			x
<i>F. falciloba</i> (Hook.f. & Tayl.) Lehm. (53)			x	x	x		x	x
<i>F. monocera</i> (Hook.f. & Tayl.) Tayl. (54)					x		x	
<i>F. probosciphora</i> Tayl. (55)					x		x	x
<i>F. rostrata</i> (Hook.f. & Tayl.) Hook.f. & Tayl. (56)				x	x			x
<i>F. scandens</i> Mont. (57)					x		x	
Jungermanniaceae								
<i>Anastrophyllum schismoides</i> (Mont.) Steph. (58)	x	x						
<i>Andrewsianthus perigonialis</i> (Hook.f. & Tayl.) Schust. (59)	x	x	x					
<i>Cryptochila grandiflora</i> (Lindenb. & Gott.) Grolle (60)	x	x	x					
<i>Cuspidatula monodon</i> (Hook.f. & Tayl.) Steph. (61)					x	x	x	
<i>Jamesoniella colorata</i> (Lehm.) Schiffn. (62)		x	x	x				x
<i>J. tasmanica</i> (Hook.f. & Tayl.) Steph. (63)					x		x	x
<i>Jungermannia inundata</i> Hook.f. & Tayl. (64)	x	x	x	x	x	x		
<i>J. orbiculata</i> (Col.) Grolle (65)	x	x	x			x		
<i>Lophozia tasmanica</i> Schust. (66)	x	x	x			x		

Bryophytes of the Mt Wellington Range, Tasmania

TABLE 3 (CONT.)

THE LIVERWORTS OF THE MT WELLINGTON RANGE

	Zone							
	1	2	3a	3b	4	5	6	7
Lejeuneaceae								
<i>Cheilo-lejeunea albo-virens</i> (Hook.f. & Tayl.) Hodgs. (67)		r						
<i>C. mimosa</i> (Hook.f. & Tayl.) Schust. (68)					x		x	
<i>Diplasiolejeunea plicatiloba</i> (Hook.f. & Tayl.) Grolle (69)					r			
<i>Harpalejeunea latitans</i> (Hook.f. & Tayl.) Grolle (70)					x		x	
<i>Lejeunea drummondii</i> Tayl. (71)					x		x	
Lepicoleaceae								
<i>Lepicolea scolopendra</i> (Hook.) Dum. ex Trev. (72)		x	x	x				
Lepidolaenaceae								
<i>Gackstroemia weindorferi</i> (Herz.) Grolle (73)		x	x		x		x	x
<i>Lepidolaena brachyclada</i> (Tayl. ex Lehm.) Trev. (74)		x	x					
<i>L. reticulata</i> (Hook.f. & Tayl.) Trev. (75)		r						
Lepidoziaceae								
<i>Acromastigum colensoanum</i> (Mitt.) Evans (76)								x
<i>Bazzania adnata</i> (Lehm. & Lindenb.) Trev. (77)				x	x		x	
<i>B. monilinervis</i> (Lehm. & Lindenb.) Trev. (78)						r		
<i>Hygrolembidium acrocladum</i> (Berggr.) Schust. (79)	x	x	x					
<i>H. australe</i> (Steph.) Grolle (80)	r							
<i>Kurzia hippuroides</i> (Hook.f. & Tayl.) Grolle (81)	x	x	x	x	x	x	x	x
<i>K. tenax</i> (Grev.) Grolle (82)								x
<i>Lepidozia glaucophylla</i> (Hook.f. & Tayl.) Tayl. (83)					x		x	
<i>L. laevifolia</i> (Hook.f. & Tayl.) Tayl. (84)		x		x	x		x	
<i>L. pendulina</i> (Hook.) Lindenb. (85)	x	x	x		x		x	x
<i>L. ulothrix</i> (Schwaegr.) Lindenb. (86)				x	x	x	x	x
<i>Telaranea centipes</i> (Tayl.) Schust. (87)					x	x		
<i>T. gottscheana</i> (Lindenb.) Hodgs. (88)				x	x	x	x	x
<i>Zoopsis argentea</i> (Hook.f. & Tayl.) Hook.f. (89)					x		x	
<i>Z. leitgebiana</i> (Carringt. & Pears.) Bast. (90)	x	x	x	x	x	x	x	
Lophocoleaceae								
<i>Chiloscyphus allodontus</i> (Hook.f. & Tayl.) Hodgs. (91)						r		
<i>C. billardieri</i> (Schwaegr.) Nees (92)		r						
<i>C. coalitus</i> (Hook.) Nees (93)		x	x	x	x		x	x
<i>C. echinellus</i> (Lindenb. & Gott.) Mitt. (94)							x	
<i>C. fissistipus</i> (Hook.f. & Tayl.) Tayl. (95)		x			x		x	x
<i>C. kirkii</i> Steph. (96)		x						
<i>C. limosus</i> Carringt. & Pears. (97)			x	x	x		x	
<i>C. triacanthus</i> (Hook.f. & Tayl.) Steph. (98)				x				
<i>C. tridentatus</i> Mitt. (99)		x	x	x	x			
<i>Clasmatocolea marginata</i> (Steph.) Grolle (100)		r						
<i>C. strongylophylla</i> (Hook.f. & Tayl.) Grolle (101)		x	x	x				
<i>Hepatostolonophora paucistipula</i> (Rodw.) Engel (102)		x	x					
<i>H. rotata</i> (Hook.f. & Tayl.) Engel (103)				r				
<i>Leptophyllopsis laxus</i> (Mitt.) Schust. (104)		x	x	x	x		x	
<i>Leptoscyphus</i> sp. (105)		x	x	x	x			
<i>Lophocolea bidentata</i> (L.) Dum. (106)		x	x	x	x			
<i>L. excipulata</i> Steph. (107)	r							
<i>L. gunniana</i> Nees (108)	x	x					x	

TABLE 3 (CONT.)

THE LIVERWORTS OF THE MT WELLINGTON RANGE

	Zone							
	1	2	3a	3b	4	5	6	7
<i>L. lenta</i> (Hook.f. & Tayl.) Tayl. (109)	x	x	x	x	x	x	x	x
<i>L. leucophylla</i> (Hook.f. & Tayl.) Tayl. (110)		x	x				x	
<i>L. muricata</i> (Lehm.) Nees (111)				x	x		x	
<i>L. semiteres</i> (Lehm.) Mitt. (112)			x	x	x	x	x	x
Plagiochilaceae								
<i>Plagiochila baileyana</i> Steph. (113)			x					x
<i>P. circinalis</i> (Lehm. & Lindenb.) Lehm. & Lindenb. (114)		x	x					
<i>P. fasciculata</i> Lindenb. (115)	x	x			x			x
<i>P. incurvicolla</i> (Hook.f. & Tayl.) Hook.f. & Tayl. (116)		x	x	x	x			
<i>P. pleurata</i> (Hook.f. & Tayl.) Hook.f. & Tayl. (117)		x	x					
<i>P. radiculosa</i> Mitt. (118)			r					
<i>P. ratkowskiana</i> H. Inoue (119)	x	x	x					
<i>P. retrospectans</i> (Nees) Nees (120)		x	x	x	x		x	x
<i>P. strombifolia</i> (Tayl.) Hook.f. & Tayl. (121)			x		x		x	x
Pseudolepicoleaceae								
<i>Isophyllaria attenuata</i> (Rodw.) Hodgs. (122)	x	x						
<i>Temnoma townrowii</i> Schust. (123)		x	x	x	x	x	x	x
Radulaceae								
<i>Radula buccinifera</i> (Hook.f. & Tayl.) Tayl. (124)	x	x	x	x	x		x	x
<i>Radula</i> sp. (125)	x	x			x		x	
Scapaniaceae								
<i>Diplophyllum domesticum</i> (Gott.) Steph. (126)	x	x	x					
Schistochilaceae								
<i>Schistochila ciliata</i> (Mitt.) Steph. (127)			r					
<i>S. lehmanniana</i> (Lindenb.) Carringt. & Pears. (128)			x	x	x		x	
Trichocoleaceae								
<i>Trichocolea mollissima</i> (Hook.f. & Tayl.) Gott. (129)								r
<i>T. rigida</i> Schust. (130)				x	x		x	

Footnotes

- (1) Carrington & Pearson 1888, pp.11-12; Bastow 1888, p.283, plates XXXV and XLIII, both as *Anthoceros longispirus*. Spores greenish, minutely verruculose; elators with a single, spiral band.
- (2) Bastow 1888, p.283, plate XXXV as *Anthoceros laevis*; Allison & Child 1975, pp.283-284. Spores yellowish, papillose; elators rudimentary, lacking spiral bands.
- (3) Bastow 1883, p.282; Rodway 1917, pp.57-58, both as *Fimbriaria drummondii*.
- (4) Campbell 1965a, pp.31-42, figs.1-21; Allison & Child 1975, pp.271-273.
- (5) Campbell 1965b, pp.122-126, figs.1-10; Allison & Child 1975, pp.272-277.
- (6) Campbell 1965b, pp.126-130, figs.11-24; Allison & Child 1975, pp.274-278.
- (7) The Australian species of the genus *Riccia* have recently been revised by Na-Thalang 1980. Tasmanian material was not studied, however.
- (8) Hewson 1970a, pp.186-188, figs.1,3-4.
- (9) Hewson 1970a, pp.188-189, figs.1,4; Allison & Child 1975, pp.252-253.
- (10) Hewson 1970b, pp.79-80, fig.6.
- (11) Hewson 1970b, p.77, fig.6.
- (12) Hewson 1970b, pp.89-91, fig.8; Allison & Child 1975, pp.254-255.

Bryophytes of the Mt Wellington Range, Tasmania

TABLE 3 (CONT.)

THE LIVERWORTS OF THE MT WELLINGTON RANGE

- (13) Hewson 1970b, pp.103-104, fig.11.
 (14) Hewson 1970b, pp.104-106, fig.11.
 (15) Hewson 1970b, pp.88-89, fig.8.
 (16) Hewson 1970b, p.84, fig.7.
 (17) Hewson 1970b, pp.99-100, fig.10.
 (18) Hewson 1970b, pp.91-92, fig.9.
 (19) Allison & Child 1975, pp.233-234. The genus is a very difficult one and is badly in need of revision; some of the Mt Wellington material may be other species of *Fossombronia*.
 (20) Campbell *et al.* 1975, pp.593-600, fig.3; Allison & Child 1975, pp.245-246.
 (21) Hodgson 1961, pp.720-721, figs.13-18; Kuwahara 1966, pp.235-236, figs.12f and 22a.
 (22) Hodgson 1961, pp.723-724, figs.23-24; Kuwahara 1966, p.224, fig.19a; Allison & Child 1975, pp.263-264.
 (23) Kuwahara 1960, p.22, fig.8; Kuwahara 1966, p.236.
 (24) Hodgson 1961, pp.714-717, figs.1-5; Kuwahara 1966, pp.236-237, fig.11b; Allison & Child 1975, pp.262-263.
 (25) Hodgson 1961, pp.717-718, figs.6-9; Kuwahara 1966, pp.223-224, fig.12b; Allison & Child 1975, pp.261-262, all as *M. hamata* Lindb., an illegitimate name according to Engel (1976).
 (26) Hodgson 1961, pp.721-723, figs.19-22; Kuwahara 1966, pp.215-216, fig.16, as *Austrometzgeria saccata*.
 (27) Hässel de Menendez 1961a, pp.268-270, figs.3-4; Allison & Child 1975, p.237.
 (28) Bastow 1888, p.269, plate XXXI; Allison & Child 1975, pp.246-247.
 (29) Hässel de Menendez 1961b, pp.255-259, figs.9-10; Campbell *et al.* 1975, pp.593-600, fig.2; Allison & Child 1975, pp.238-241, all as *S. hymenophyllum*.
 (30) Schuster & Scott 1969, pp.233-238, figs.1-2, 4-7; Allison & Child 1975, pp.232-233.
 (31) Schuster & Scott 1969, pp.248-250, figs.1-2, 4-5.
 (32) Campbell 1959, pp.245-254, figs.1-33, as *Calobryum gibbsiae*; Schuster 1967, pp.21-28, figs.IX-X; Hässel de Menendez 1970, pp.235-238, fig.1.
 (33) Bastow 1888, p.242, plate XVI; Hodgson 1958, pp.581-582, fig.7.
 (34) Grolle 1962, pp.135-144, figs.1-4.
 (35) Bastow 1888, p.243, plate XVII, as *L. drummondii*; Hodgson 1958, p.582; Allison & Child 1975, pp.191-192.
 (36) Bastow 1888, p.241, plate XVI; Grolle 1963a, pp.391-394, fig.121.
 (37) Bastow 1888, p.241, plate XVI; Hodgson 1958, pp.573-575, fig.2; Allison & Child 1975, pp.185-187.
 (38) Bastow 1888, p.235, plate XII; Allison & Child 1975, pp.193-194.
 (39) Bastow 1888, p.243, plate XVII; Engel 1968, pp.109-112, figs.326-464.
 (40) Engel 1968, pp.106-108, figs.276-325.
 (41) Hodgson 1949a, pp.29-30; Hatcher 1960, pp.602-604, figs.483-558. We are herein treating *Isotachis grandis* Carringt. & Pears. as a likely synonym.
 (42) Grolle 1964a, pp.27-29, fig.4. Previously known only from the type in New Zealand.
 (43) Schuster 1972, pp.190-193; Allison & Child 1975, pp.195-196.
 (44) Schuster 1972, pp.190-212. Differs from *C. exiliflora* in that the cells are armed with spinous teeth; plants green, not becoming reddish. A thorough revision of this genus is needed.
 (45) Hodgson & Allison 1962, pp.152-154, figs.35-39, as *Anoplostomum whiteleggei*; Schuster 1974, pp.172-174, fig.1.
 (46) Schuster 1966a, pp.279-280.
 (47) Grolle 1980b, pp.326-327; Grolle 1975a, pp.71-74, fig.1, as *H. filarium*.
 (48) Carrington & Pearson 1888, pp.8-9, plate XLI, as *Cesia erosa*; Grolle 1966a, pp.231-234, fig.4.
 (49) Carrington & Pearson 1888, pp.9-10, plate XLII, as *Jungermannia teres*; Grolle 1966a, pp.222-226, fig.2.

TABLE 3 (CONT.)

THE LIVERWORTS OF THE MT WELLINGTON RANGE

- (50) Bastow 1888, pp.248-249, plate XXI, as *Sendtnera juniperina*. Similar to, but generally considered to be specifically distinct from *H. alpinus* (Steph.) Hodgs., illustrated in Allison & Child 1975, pp.37-38.
- (51) Fulford & Hatcher 1961, pp.348-351; Allison & Child 1975, pp.38-40.
- (52) Hattori 1979a, pp.328-329, fig.4.
- (53) Hattori 1979a, pp.336-337, fig.10; also pp.340-342, fig.13, and pp.361-362, fig.27 as *F. forsythiana* and *F. wattsiana* respectively.
- (54) Hattori 1979a, pp.347-349, fig.18; also Hattori 1979b, pp.132-134, fig.36 as *F. hampeana*.
- (55) Hattori 1979b, p.139; also pp.131-132, fig.35, as *F. falsa*.
- (56) Bastow 1888, pp.265-266, plates XXIX and XXXVI, as *Frullania diplota*; Hattori 1979a, pp.352-353, fig.21.
- (57) *F. deplanata* Mitt. and *F. subdeplanata* Steph. are probably conspecific as both have flattened perianths lacking ventral keels; Hodgson 1949b, pp.380-381, figs.19-20 as *F. subdeplanata* and *F. deplanata*; Allison & Child 1975, pp.217-218, as *F. deplanata*.
- (58) Allison & Child 1975, pp.93-94.
- (59) Schuster 1966a, pp.280-281.
- (60) Grolle 1971, pp.19-22, fig.4; Allison & Child 1975, pp.98-101.
- (61) Allison & Child 1975, pp.94-95.
- (62) Grolle 1971, pp.81-85, fig.22; Allison & Child 1975, pp.102-103.
- (63) Grolle 1971, pp.55-59, fig.15; Allison & Child 1975, pp.101-102.
- (64) Vána 1975, pp.299-303, figs.17-19; Allison & Child 1975, pp.97-98.
- (65) Vána 1975, pp.303-306, figs.19-21; Possibly just an aquatic form of *Jungermannia inundata*.
- (66) Schuster 1968, pp.484-485; Schuster & Engel 1975, p.469.
- (67) Schuster 1963, p.245.
- (68) Schuster 1963, p.245.
- (69) Grolle 1975b, pp.75-79, fig.1; Allison & Child 1975, pp.228-229, both as *Diplasiolejeunea lyratifolia*.
- (70) Grolle 1980a, pp.239-243, fig.2.
- (71) Bastow 1888, pp.258-259, plate XXVII, as *Lejeunea gumniana*.
- (72) Scott 1960, pp.152-154, figs.60-95.
- (73) Grolle 1967, pp.20-24, figs.5-6; Allison & Child 1975, pp.54-55.
- (74) Grolle 1967, pp.43-46, figs.13-14.
- (75) Grolle 1967, pp.46-47, fig.13.
- (76) Hodgson 1954, pp.21-22, fig.14.
- (77) Hodgson 1954, pp.13-14, figs.2 and 7; Allison & Child 1975, pp.82-85. *B. involuta* (Mont.) Trev. is possibly another form of this highly variable species.
- (78) Hodgson 1954, pp.10-11, fig.5.
- (79) Herzog 1951, pp.488-491, figs.6-7, as *Lembidium isodictyon*; Grolle 1966b, p.229.
- (80) Herzog 1951, pp.491-494, figs.8-9, as *Lembidium stereophyllum*; Grolle 1966b, pp.229-230.
- (81) Hodgson 1956, p.615, as *Lepidozia hippuroides*; Carrington & Pearson 1888, pp.2-3, plate XXXVII, as *Lepidozia capillaris* var. *geniculata*; *Kurszia compacta* (Steph.) Grolle is treated herein as probably conspecific; cf. Hodgson 1956, p.616, fig.27, as *Lepidozia compacta*.
- (82) Grolle 1963b, p.174; Grolle 1964b, p.80.
- (83) Hodgson 1956, pp.594-596, fig.3; Allison & Child 1975, pp.64-65.
- (84) Hodgson 1956, p.597, fig.5; Allison & Child 1975, p.66.
- (85) Hodgson 1956, pp.601-602, fig.10; Allison & Child 1975, pp.71-72.
- (86) Hodgson 1956, pp.593-594, fig.2; Allison & Child 1975, pp.63-64.
- (87) Hodgson 1956, pp.605-606, fig.16, as *Lepidozia centipes*; Allison & Child 1975, pp.76-77.
- (88) Hodgson 1956, pp.609-611, fig.20, as *Lepidozia gottscheana*; Allison & Child 1975, pp.77-78.

Bryophytes of the Mt Wellington Range, Tasmania

TABLE 3 (CONT.)

THE LIVERWORTS OF THE MT WELLINGTON RANGE

- (89) Scott 1969, pp.165-168, figs.2-3; Allison & Child 1975, pp.90-91.
 (90) Scott 1969, p.169, figs.1, 6-7; Allison & Child 1975, pp.90-91.
 (91) Hodgson 1943, p.42, fig.12.
 (92) Hodgson 1943, pp.36-37, fig.25; Allison & Child 1975, pp.144-145.
 (93) Hodgson 1943, pp.41-42, fig.8; Allison & Child 1975, pp.146-149.
 (94) Hodgson 1943, pp.45-46, fig.10.
 (95) Hodgson 1943, pp.48-49, fig.13; Allison & Child 1975, pp.150-151.
 (96) Rodway 1917, p.102.
 (97) Bastow 1888, p.239, plates XV & XXXIX.
 (98) Hodgson 1943, pp.47-48, fig.20; Allison & Child 1975, pp.147, 149-150.
 (99) Bastow 1888, p.239, plate XIV; Hodgson 1943, pp.46-47, fig.14.
 (100) Bastow 1888, p.233, plate XII, as *Jungermannia marginata*.
 (101) Hodgson 1953, pp.338-339, fig.10, as *Lophocolea strongylophylla*.
 (102) Engel 1979, pp.103-107, fig.7.
 (103) Engel 1979, pp.98-103, fig.5.
 (104) Schuster 1963, pp.269-270; Hodgson 1943, p.45, fig.7, as *Chiloscyphus laxus*.
 (105) Bastow 1888, p.225, plate VI, as *Leioscyphus chiloscyphioides*. The relationship of this species to *Leptoscyphus expansus* (Lehm.) Grolle and *Leptoscyphus australis* (Hook.f. & Tayl.) Schust. needs study.
 (106) Hodgson 1953, pp.354-355, fig.32; Allison & Child 1975, pp.140-141; see footnote 109.
 (107) Rodway 1917, p.91.
 (108) Hodgson 1953, pp.337-338, fig.11, as *L. notophylla*.
 (109) Hodgson 1953, pp.350-351, fig.27; Allison & Child 1975, pp.136-137. Extraordinarily variable vegetatively; possibly *L. subporosa* Mitt., *L. decurrens* Herz., and even *L. bidentata* (L.) Dum., together with this, are all forms of a single species.
 (110) Hodgson 1953, pp.343-344, fig.19; Allison & Child 1975, pp.132-133.
 (111) Hodgson 1953, pp.342-343, fig.18; Allison & Child 1975, pp.131-132.
 (112) Hodgson 1953, pp.334-335, fig.8, as *L. heterophylloides*; Allison & Child 1975, pp.130-131.
 (113) Inoue & Schuster 1971, pp.173-180, figs.61-63.
 (114) Inoue & Schuster 1971, pp.123-130, figs.44-45.
 (115) Inoue & Schuster 1971, pp.180-187, figs.64-66.
 (116) Inoue & Schuster 1971, pp.77-82, figs.26-27.
 (117) Inoue & Schuster 1971, pp.110-115, figs.40-41.
 (118) Inoue & Schuster 1971, pp.117-121, figs.42-43.
 (119) Inoue 1980, pp.141-144, figs.1-10. This new species, described from a collection on Mt Wedge, is widespread on many Tasmanian mountains.
 (120) Inoue & Schuster 1971, pp.203-213, figs.72-74.
 (121) Inoue & Schuster 1971, pp.131-138, figs.46-48.
 (122) Hodgson 1972, p.111; Hodgson 1967, fig.5; Schuster 1966b, pp.69-73, fig.1, the latter two as *I. murrayana*.
 (123) Schuster 1966c, pp.351-355, figs.48-50.
 (124) Castle 1967, pp.70-74, fig.34; Allison & Child 1975, pp.201-202.
 (125) This is probably a group of species characterized by an inflated lobule and by cells that tend to be somewhat mamilllose, including *R. compacta* Castle 1963, pp.43-45, fig.20, *R. tasmanica* Steph. (Castle 1963, pp.36-38, fig.17), *R. tabularis* Steph. (Castle 1963, pp.38-41, fig.18), *R. aneurysmalis* (Hook.f. & Tayl.) Gott. (Castle 1963, pp.28-30, fig.12) and *R. wattiana* Steph. (Castle 1963, pp.45-47, fig.21).
 (126) Allison & Child 1975, pp.104-105.
 (127) Hodgson 1941, p.188, fig.31; Schuster 1971, fig.8; Allison & Child 1975, pp.116, 121-122.
 (128) Hodgson 1941, pp.184-185, figs.10-11.
 (129) Schuster 1968, pp.445-447, plate 50, figs.8-11; Ratkowsky 1980a, pp.79-80.
 (130) Schuster 1968, pp.447-449, plate 50, figs.1-7; Ratkowsky 1980a, p.80.

Amongst the liverworts, several new Tasmanian records have been found in the survey area. Perhaps the most remarkable is *Neesioscyphus phoenicorhizus*, a very distinctive plant, of which we have material from at least six locations in the survey area. The species was previously known only from the type collection near Arthurs Pass in New Zealand (Grolle 1964a), and as all other known species of this genus grow in tropical localities, the taxonomic affinities of this species have not been established with certainty. *Chaetophyllopsis whiteleggei*, *Haplomitrium gibbsiae* and *Hygrolembidium australe* are also new to Tasmania, these records having been obtained in this survey. In addition, two other species, also obtained in this survey but not listed in table 3, were identified tentatively by Dr. R. Grolle (pers.comm.) as belonging to the genera *Cephalozia* (Dum.) Dum. and *Paracromastigum* Fulf. & J. Tayl. respectively. These could, upon further study and subsequent specific identification, also prove to be new Tasmanian records.

TABLE 4
NUMBER OF SPECIES IN EACH VEGETATION ZONE

	Zone							
	1	2	3a	3b	4	5	6	7
Mosses	43	62	62	78	108	61	102	82
Liverworts	34	70	63	50	69	25	67	29
Total bryophyte count	77	132	125	128	177	86	169	111

Table 4 lists the number of species in each vegetation zone, obtained by counting the entries in the columns of table 2 and table 3. Mosses have their maximum occurrence in the zones of middle and lower elevation, the greatest numbers being in Zones 4, 6, 7 and 3b. Liverworts occur most frequently in Zone 2, followed by Zones 4, 6 and 3a, with comparatively low numbers in the low elevation dry sclerophyll environments of Zone 7. Ogden and Powell (1979), from a study of woody plants at Mt Field National Park, Tasmania, concluded that species richness increases with altitude to reach a maximum in the subalpine zone. This conclusion does not hold for Mt Wellington, as a tally of woody species from the survey by Ratkowsky and Ratkowsky (1976) shows that the greatest abundance occurs in Zone 4 and Zone 7, the numbers declining distinctly in the higher elevation zones. The numbers in table 4 enable one to examine the effect of elevation on bryophyte richness. The greatest moss richness is seen to occur in the middle and lower zones, whereas liverworts are spread out over a wide range of altitudes, although they are relatively scarce in Zones 5 and 7.

One may examine the question further by grouping closely related zones and counting the number of species that occur exclusively in one zone group. The basis for grouping the zones was taken from Ratkowsky and Ratkowsky (1977), where several methods of hierarchical cluster analysis were used. It was found that Zones 3b, 4 and 6 clustered to form a gully/wet sclerophyll forest group; Zones 1, 2 and 3 formed a high elevation group of treeless or woodland habitats; Zone 7 formed a dry sclerophyll forest group of its own; and Zone 5 had no close neighbour and could not be grouped with other zones. Table 5 lists the number of species restricted to one of the following three zone groups, with Zone 5 omitted: any or all of Zones 1, 2 and 3a; any or all of Zones 3b, 4 and 6; exclusive to Zone 7.

The results in table 5 show that the mosses occur predominantly in the gully/wet sclerophyll forest group, with much smaller numbers of species occurring either in the high elevation group or dry sclerophyll. The liverworts, however, exhibit a different pattern, with half the species in table 5 occurring in the high elevation zone group. An almost equally large number of liverwort species occurs in the gully/wet sclerophyll zone group, with only three species being exclusive to dry sclerophyll forest. The

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TABLE 5

NUMBER OF SPECIES RESTRICTED TO CERTAIN ZONE GROUPINGS
(omitting Zone 5 from consideration)

	Species occurring only in Zones 1, 2 and/or 3a	Species occurring only in Zones 3b, 4 and/or 6	Species occurring only in Zone 7
Mosses	16	42	13
Liverworts	35	32	3

results in table 4 and table 5 indicate that mosses predominate in the middle zones (gullies and wet sclerophyll communities) but are also relatively abundant in the lower elevations (dry sclerophyll), whereas liverworts are abundant both at middle and higher elevations but are relatively infrequent in the dry sclerophyll forests.

Only a few species previously known to have occurred on Mt Wellington, from citations in Rodway (1913-14, 17) or from specimens preserved in the Tasmanian Herbarium, have not been found in the present survey. The largest and most striking of these is *Neckera pennata* Hedw., a pendent species previously known from a few east-facing gullies. The current absence of this species from Mt Wellington may be traced to alienation of environment as a result of land clearance and house building, or may be due to the devastating bushfire of 7 February 1967. Although there has clearly been a strong recovery of the bryophyte flora since the fire, as evidenced by the large number of species found in this survey, epiphytic species are slow to recover, and it may be expected that, barring further fires, various epiphytic moss and liverwort species presently missing may be found on Mt Wellington in the future.

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