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Locating the Vegetation of Early Coastal Otago: A Map  
and Its Sources

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*Abstract*

A distribution map of bush and swamp of coastal Otago during early European times is presented. The depository of one inch to one mile maps on to which the detailed vegetation boundaries have been plotted is recorded, and the basic sources are given.

THIS paper has the same aims as a previous one locating the vegetation of early Canterbury (Johnston, 1961). The first is to present a map showing the general distribution of bush and swamp of coastal Otago during early European times. The second is to indicate the depository of cadastral maps at a uniform scale of one inch to one mile on which the detailed boundaries of the vegetation shown in the generalised map have been plotted. The third purpose is to provide a record of the basic sources from which the one inch to one mile maps have been constructed. Because of the similarity of purpose, and to facilitate reference, both the style and format of the previous paper on Canterbury are more or less closely followed here.

Enquiries from both overseas and local research workers seem to indicate the need for an accurate distribution map of early vegetation, not only of coastal Otago and Canterbury, but throughout New Zealand. Such maps as attempt to show the distribution of "pre-European" vegetation for New Zealand as a whole are at a small scale, and give, therefore, only a general, and rather inaccurate for coastal Otago, idea of the distribution (Cumberland, 1941, 1961; McLintock, 1959). Moreover, it is apparent that they are based, at least as to distribution, primarily upon soil indicators, and inadequately upon early map sources. However, the files of the Dunedin office of the New Zealand Lands and Survey Department, like the files at Christchurch, contain a wealth of early manuscript maps, produced by the early surveyors who were engaged in laying out the sections, and who, at the same time, mapped the distribution of bush and swamp. Many of these maps are now over a hundred years old. Some are still being used in the normal course of the department's work. Consequently, although some of the originals have been redrawn, many are in a dilapidated state, and in danger of losing some of their detail. To that extent, the availability of an alternative source appears necessary.



Another reason is that the presence of these records is not generally known, even among research workers (e.g., Wardle and Mark, 1956, p. 34). The cyclo-styled booklet, *The Mapping of Otago*, (Otago Branch, New Zealand Geographical Society, 1947), makes no mention of these early survey plans and topographical sketches, so that a record of the basic sources may be of value. For reasons mainly connected with the nature of the manuscript map sources, the dates of the earliest surveys and the distinctive regional character of coastal Otago, no attempt has been made to extend the scope of the present paper to the rest of Otago.

#### A GENERAL VEGETATION MAP

The general distribution of vegetation in early European times is shown in Figs. 1 and 2. Both these maps were prepared by photographic reduction and redrawing from the data plotted from the original surveys. The outline of the coasts, lakes and rivers is thus the position as it was about 1847. However, apart from the reclamations at the head of Otago Harbour, the shifting of the mouth of the Clutha River after the flood of 1878, and several adjustments along the course of the Taieri River, there is not a great deal of difference from the modern situation. Since then, also, about half the area of Lakes Tuakitoto and Kaitangata has become swamp.

Comparison with Holloway's "pre-European Vegetation" map in *A Descriptive Atlas of New Zealand* (McLintock, 1959), dated "immediately prior to European settlement", and with Cumberland's map of indigenous forest cover in 1840 (1961), indicates considerable disagreement, even allowing for the generalization and small scale employed. South of Dunedin, along the coastal hills, there was but a small part of the bush indicated by Holloway and Cumberland, and that, far from being in a solid belt, consisted of comparatively small, and widely scattered patches. There was practically no bush round the northern and north-western margins of the Taieri Plain. To the north of Dunedin, in the Waikouaiti-Palmerston-Hampden districts, there was rather more bush than to the south, but again it occurred not as a wide, continuous belt, but in patches, some small, others large, and in aggregate considerably less than the total indicated by Holloway and Cumberland.

The greater part of the evidence for this distribution is based on manuscript survey maps compiled about 1860, and the possibility cannot be overlooked that a large amount of bush had been burnt off in the preceding twelve years of settlement. However, comparison of these later maps with the original survey plans of the Otago Block compiled under the direction of C. H. Kettle as chief surveyor for the New Zealand Company, in 1846-47, indicates sufficient agreement in detail to allow this possibility to be set aside. If any extent of bush had been cleared by 1860, it would surely have been in these earliest settled areas. In fact, it was not until after 1860 that Otago really began to expand as a province, and there is every indication that the bush lines about 1860 were very similar to those immediately prior to the arrival of the first settlers.

At the same time, it does seem likely, from the very nature of the pattern of distribution of bush on Fig. 1, from soil indicators and other evidence, that a much larger area of bush had existed in coastal Otago at some previous time (Buchanan, 1868; Holloway, 1954; Wardle and Mark, 1956). One early report, for example, comments on a native tradition that a great fire at the close of an exceedingly hot and dry season had at once denuded the country, especially round the northern margins of the Taieri district, where sun and drought had told with greatest effect (*Otago Journal*, 1851, p. 98).

#### THE ONE INCH TO ONE MILE VEGETATION MAPS

The one inch to one mile scale was chosen for coastal Otago, as for Canterbury, because the published New Zealand Cadastral Map—Survey District series (N.Z. Mapping Service No. 13) and County series (N.Z.M.S. No. 15) show the boundaries



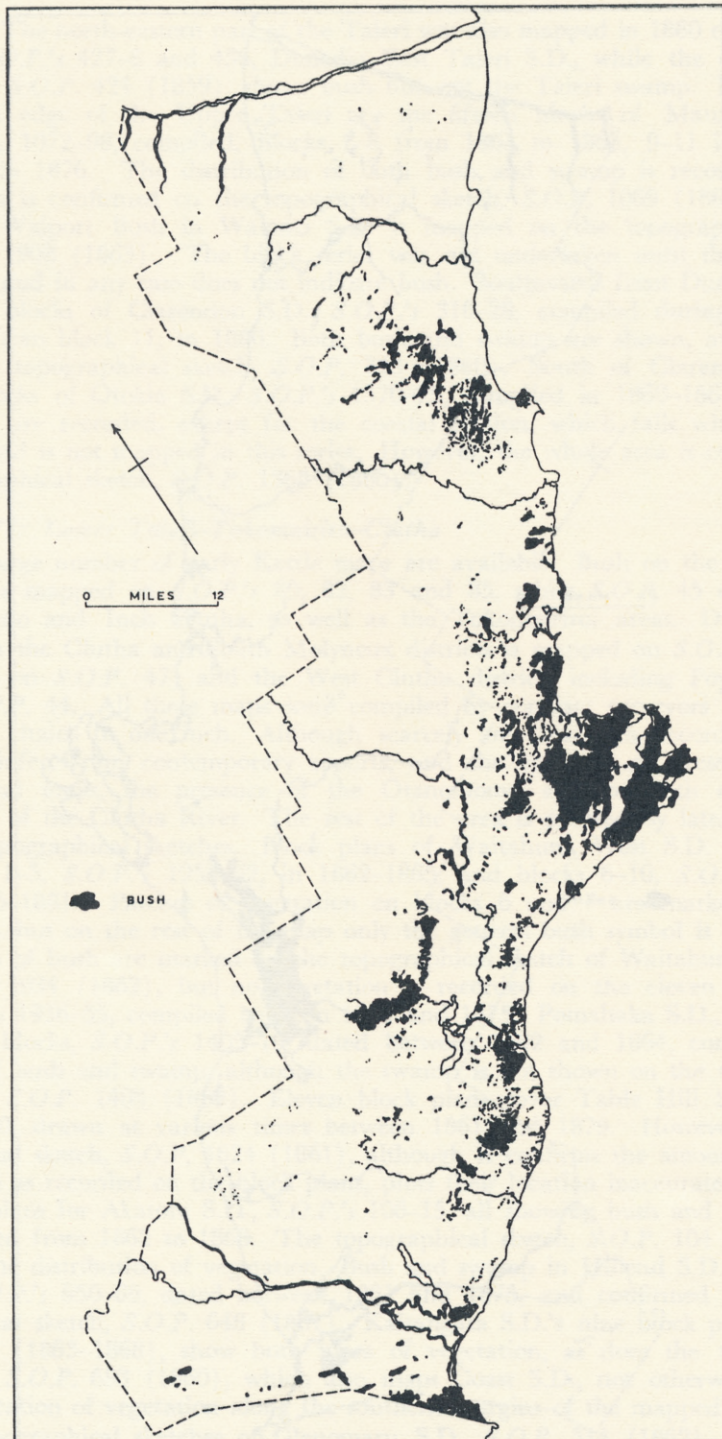


FIG. 1.—Distribution of bush on Coastal Otago during early European times: based upon contemporary map sources. The dashed line marks the inland boundary of the area studied.



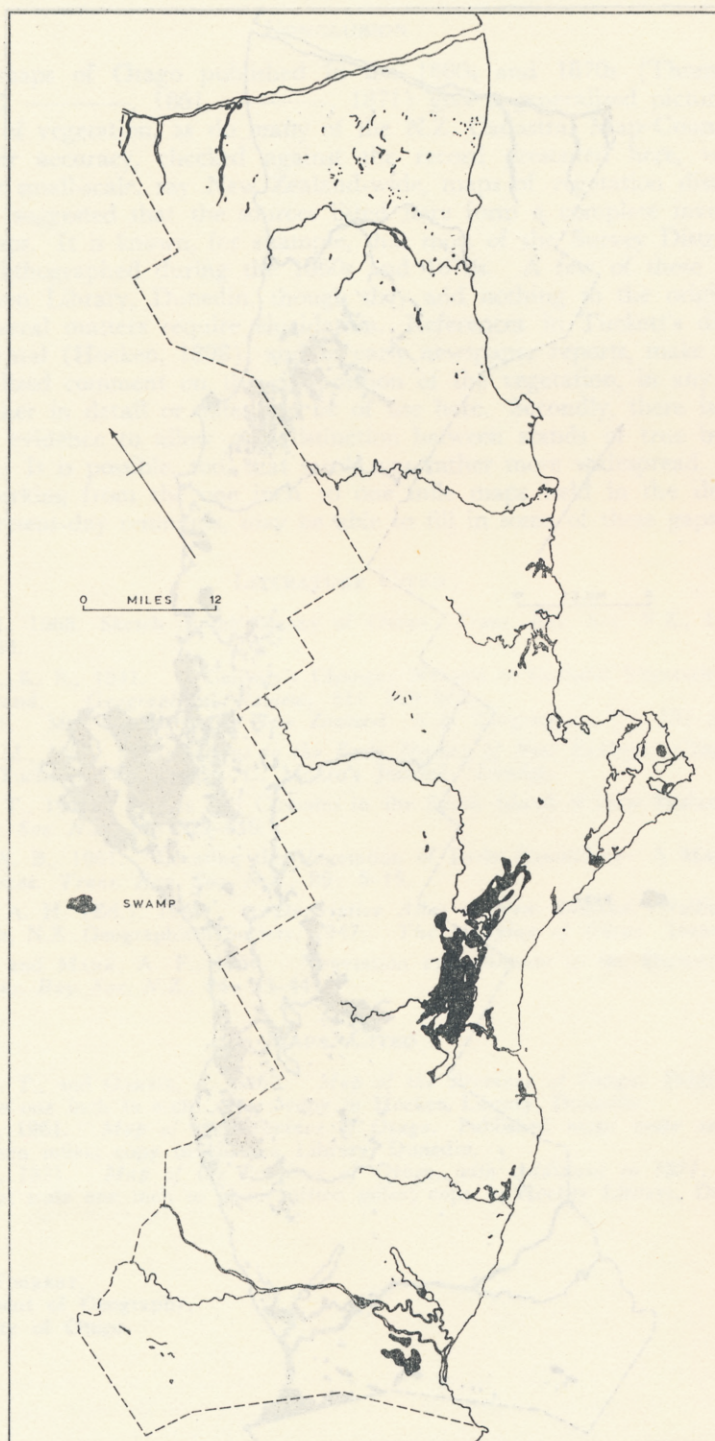


FIG. 2.—Distribution of swamp on Coastal Otago during early European times: based upon contemporary map sources. The dashed line marks the inland boundary of the area studied.



of surveyed sections, in addition to topographical features, and, in the case of the County series, often accurately show the boundaries of vegetation in early European times. Furthermore, in the absence of a complete coverage in the Topographical series (N.Z.M.S. No. 1), the Cadastral series provides the only adequate set of base maps. Apart from the topographical sketches, all the manuscript maps used in this project record the bush and swamp against a background of section boundaries at the time of the survey. The limiting lines of these sections thus provide the means by which the vegetation boundaries can be accurately transferred from the manuscript plans. The one inch to one mile maps of vegetation recorded on the Cadastral map series are not intended, however, to be a final depository. Both the County and Survey District series are being allowed to run out of stock, and it is not intended to reprint them. Instead, a new Cadastral map series (N.Z.M.S. No. 177) is being prepared, each sheet to coincide with the Topographical series (N.Z.M.S. No. 1). As this new series appears, the bush and swamp areas will be transferred to them, so that eventually a permanent depository will be available. In the meantime, the record of vegetation transferred to the Cadastral maps of the old County series is retained as an accurate record of the early vegetation in the Geography Department, University of Otago, Dunedin.

#### THE NATURE OF THE MAP SOURCES

Some 300 manuscript maps, filed by survey districts, are involved for coastal Otago. These fall into three types. The earliest maps are those compiled under the direction of C. H. Kettle as New Zealand Company surveyor during the years 1846–1847, and cover the greater part of the area within the original Otago Block: the Dunedin, Taieri, Tokomairiro and Clutha districts. Most of these are at a scale of twenty chains to one inch. The second group consists of topographical sketch maps or plans, one for almost every survey district, at a uniform scale of forty chains to one inch. Most of these were compiled between 1859 and 1861. The third group comprises the detailed survey plans for each block within each survey district, at a uniform scale of ten chains to one inch. Dates of compilation vary considerably from one district to another, and also within districts, but most were drawn during the decade 1860–1870.

With one or two exceptions among the ten chain to one inch series, the amount of vegetation data recorded on these manuscript maps is consistent throughout coastal Otago. In general, the recorded types are bush and swamp. There is reference to scrub in the Waitahuna Survey District, and in the Otokia S.D., but apart from this none of the maps gives any descriptive notes on the composition of the vegetation types. However, in order to validate the distribution of bush and swamp recorded on Figs. 1 and 2, it is necessary to comment at some length on the basic map sources, since each of the series mentioned above serves, in effect, as a check on the accuracy of the other.

In order to comment on the sources, coastal Otago has been divided into convenient areas (Fig. 3). For each area, the basic maps are listed, so that anyone interested in a particular district or region may readily find reference to the appropriate maps. With only a few exceptions, all the manuscript maps have both a scale and date of compilation recorded on them, and where a date is not evident, an approximation may be made from the rest of the series.

##### *Area I: Waitaki*

The record of vegetation distribution in this area is available from the Survey District block plans, and from the topographical sketches. Blocks 1–14, *Survey Office Plans* 1039–43, 1046–51, 1055–56, 1059–60, and 1063, dated, blocks 1–8 1865–1868, blocks 9–13 1872–1880, and block 14 (1890), cover the Marewhenua S.D. Swamp is indicated on many of the block plans, but small patches of bush



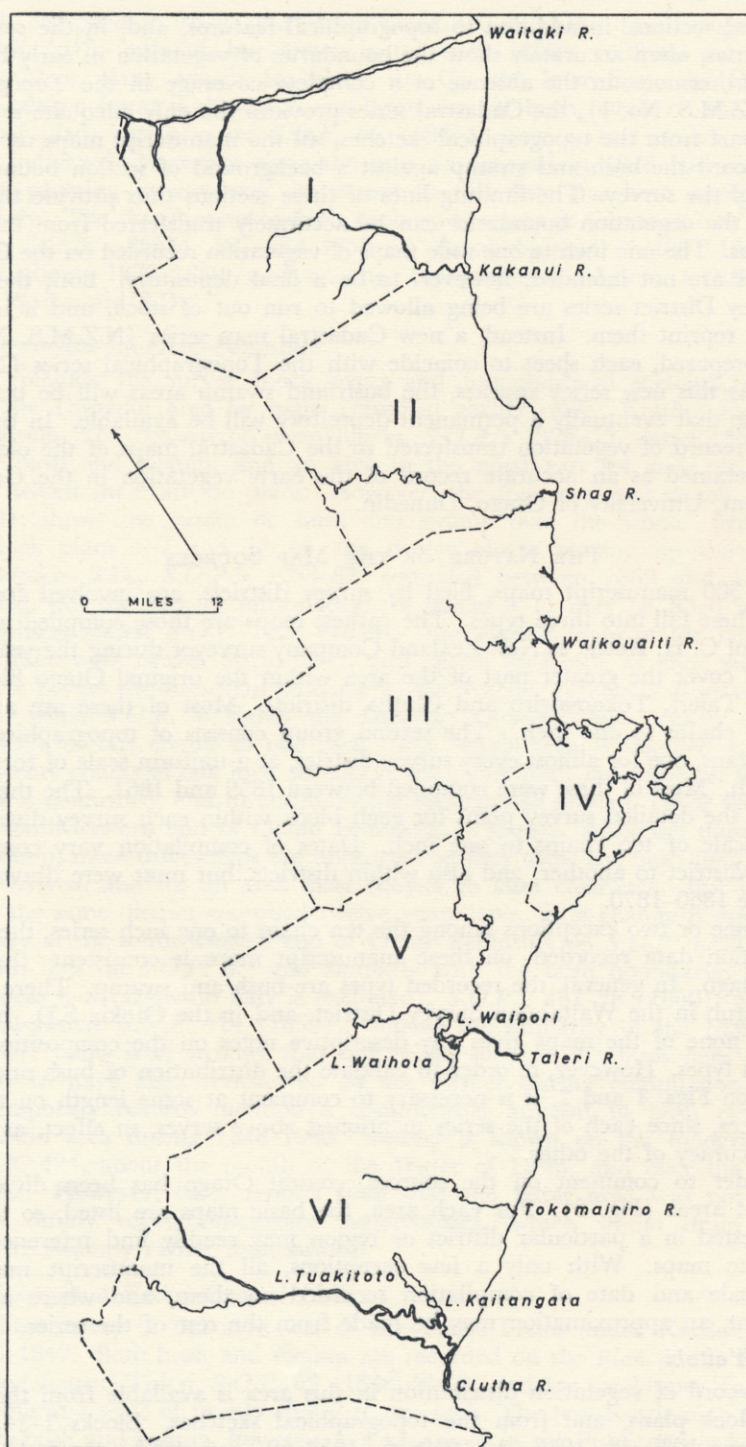


FIG. 3.—Map showing the division of Coastal Otago into convenient areas for the discussion of map sources.



are restricted to block 14. The topographical sketch of the district, *S.O.P.* 1037 (1865) shows only the areas in swamp. Although block plans have not been compiled for Kakanui S.D., the topographical sketch, *S.O.P.* 697 (1882) is available, but shows no sign of either bush or swamp. However, both forms of vegetation are recorded on the ten block plans of Awamoko S.D., *S.O.P.*'s 119–129 (1864–1865), supported by the topographical sketch, *S.O.P.* 117 (1864). The eight block plans for Papakaio S.D., *S.O.P.*'s 1392–1400, were compiled in 1863–1864. Apart from Papakaio Bush, vegetation is sparse, and on the plan for block 3, there is reference to a solitary "cabbage tree named Sally". Neither swamp nor bush is shown on the topographical sketch, *S.O.P.* 1390 (1863). Kauru S.D. is divided into nine blocks, *S.O.P.*'s 708–12, 715–17, compiled between 1864 and 1873, but plans for blocks 4 and 7 have not been made. The topographical sketch, *S.O.P.* 706 (1864), however, fills in the gaps and confirms the location of bush on the block plans, but does not show the small patches of swamp on blocks 1 and 5. Blocks 1–17 of Oamaru S.D., *S.O.P.*'s 1304–23, dated between 1862 and 1865, show small patches of bush and swamp (mainly old water courses), but the topographical sketch, *S.O.P.* 1302 (1861) records only the areas in swamp.

#### *Area II: Otepopo-Moeraki*

Survey block plans and topographical sketches also provide the available information on this area. Of the twenty blocks making up Otepopo S.D., plans are available only for blocks 1–10 and 15, *S.O.P.*'s 1350–65, compiled between 1861 and 1866. Both bush and swamp are indicated, but on the topographical sketch, *S.O.P.* 1349 (1861), and the only source for blocks 11–20, only bush is recorded. Moeraki S.D. comprises fifteen blocks, *S.O.P.*'s 1111–28, drawn up, blocks 1–12 and 15 during 1861–1867, and 13–14 in 1872–1873. The topographical sketch, *S.O.P.* 1109 (1860), confirms the location of the bush, but does not show any of the patches of swamp recorded on the block plans. Both the nine block plans, *S.O.P.*'s 412–23, compiled between 1868 and 1879, and the topographical plan, *S.O.P.* 409 (undated) of Dunback S.D. are devoid of vegetation, apart from very small patches of bush in blocks 4 and 7. The Waihemo S.D. topographical sketch, *S.O.P.* 1842 (1882) shows the location of both bush and swamp, but of the eight blocks in the district, only the plans for blocks 3–8, *S.O.P.*'s 1844–49, compiled during 1868–1877, are available, and none has any reference to either bush or swamp.

#### *Area III: Hawksbury-Silver Peak*

Vegetation distribution in the seven Survey Districts making up this area is also available from survey block and topographical sketch plans. The eleven block plans of Hawksbury S.D., *S.O.P.*'s 583–96, were compiled, blocks 1–7 in 1861, and the rest about 1867. In each case the distribution of bush and swamp confirms the pattern on the topographical sketch, *S.O.P.* 581 (1860). For Hummockside S.D., there are plans only for blocks 1, *S.O.P.* 679, and 4, *S.O.P.* 680, both dated about 1874. Both record small patches of bush, but no vegetation is indicated on the topographical sketch, *S.O.P.* 677 (1878). There is no block plan coverage for Hummock S.D., and no vegetation is recorded on the topographical sketch, *S.O.P.* 670 (1878). For Mount Hyde S.D., only the plans for blocks 2–4, *S.O.P.*'s 1137–39, compiled in 1879, are available, but bush and swamp is recorded on the topographical sketch, *S.O.P.* 1134 (1864). Similarly for Nenthorn S.D., only block 1, parts of blocks 2 and 3, *S.O.P.*'s 1241–44 (1883), and the University Reserve, *S.O.P.* 1252 (1894) have been compiled. However, a few small patches of bush, and some "peat moss" on blocks 4 and 8, are shown on the topographical sketch, *S.O.P.* 1239 (1866). Silver Peak S.D. is divided into ten blocks, *S.O.P.*'s



1521–30, all compiled in 1879 apart from block 10, in 1878. The topographical sketch, *S.O.P.* 1518, undated, but drawn in the early 1860's, confirms the pattern of the later block plans, except for block 10. On the later map, the Dunedin waterworks reserve forest is shown as one large area of bush, while on the earlier topographical plan, and also on *S.O.P.* 66 (1847), only several much smaller clumps are indicated. However, since the area as mapped in 1878 had not been extended by planting in any way, its extent at this date has been accepted as the most likely. The distribution of both bush and swamp is shown on the twelve block plans, *S.O.P.*'s 266M, 587 and 1852–68, dated, blocks 1–4 1861–1864, the rest mainly about 1878–1880, and on the topographical sketch, *S.O.P.* 1850 (1861), of Waikouaiti S.D.

#### *Area IV: Dunedin–Blueskin–Peninsula*

Records include the survey block plans and topographical sketches, supplemented in the Dunedin area by maps compiled earlier under Kettle's direction. Otago Peninsula S.D. consists of seven blocks, *S.O.P.*'s 1326–32, dated 1863, and all showing bush and swamp, and an area in the north-east set aside as Native Reserve for which there are no plans. However, the topographical sketch, *S.O.P.* 1324 (1859), shows the extent of bush and swamp over the whole peninsula. Only on block plans 1–7 and 12 of the twelve blocks making up the North Harbour–Blueskin S.D., *S.O.P.*'s 1263–82, compiled between 1860 and 1863, is bush recorded, but the lack of information for blocks 8–11 may be filled in from the topographical sketch, *S.O.P.* 1258 (1859). The earliest maps of the Dunedin–East Taieri S.D. were drawn up in 1847, and signed by Kettle as chief surveyor. *S.O.P.* part 2 covers the suburban sections in the Wakari (Halfway Bush)–Green Island area, while *S.O.P.* 6 shows the Dunedin City–Kaikorai Valley district, both at a scale of ten chains to one inch. The whole area is mapped again at a scale of twenty chains to one inch on *S.O.P.* 63. The bush indicated on the two earlier maps is confirmed, and in addition, the bush in the present Town Belt, and that at the south-western end of Otago Peninsula, is shown. Although there is no record of swamp, these three maps are important as they show the bush lines before the settlers arrived, and for an area most subject to later clearance. But in fact, on maps of the same district compiled twelve years later, little change is apparent. The boundary at the south-western end of Otago Peninsula on *S.O.P.* 1258 agrees in detail with that on *S.O.P.* 63, and similarly with the bush boundaries on the plans for blocks 4–8 (Dunedin City is excluded), *S.O.P.*'s 431–38 (1860), and the topographical sketch, *S.O.P.* 424 (1859). Indeed the similarity of the 1859–1860 and 1846–1847 plans is so striking that one might suppose the bush lines on the latter simply to have been transferred to the former during compilation. Certainly contemporary records mention a considerable amount of bush clearance in the Dunedin area during 1848–1860. Swamp is shown on the topographical sketch, *S.O.P.* 424, about the mouth of the Water of Leith, and over the South Dunedin Flat. However, early reports state that the latter area was not really swamp, but simply vegetation-clogged watercourses, which would drain easily when cleared: swampy rather than swamp.

#### *Area V: Maungatua–Taieri–Coastal Hills*

The earliest survey in this area was of the Taieri Plains under Kettle's direction in 1846–1847. Both bush and swamp are recorded on the *Plan of the District of [Upper and Lower] Taieri*, *S.O.P.* 62 (1846–1847), and for the Upper Taieri on *S.O.P.* 63, both at a scale of twenty chains to one inch. The best Kettle map for the Upper Taieri bush and swamp, however, is a plan held in the Public Record Office, London, reference C.O. 700/N.Z./11, two sheets, compiled in 1850 at a scale of 40 chains to 1 inch. A photo copy is held in the Geography Department, University of



Otago. The north-eastern part of the Taieri was also mapped in 1860 on block plans 1-3, *S.O.P.*'s 427-8 and 436, Dunedin-East Taieri S.D., while the topographical sketch, *S.O.P.* 424 (1859), shows bush but not the Taieri swamp. Bordering the western edge of the Upper Taieri are the fifteen blocks of Maungatua S.D., *S.O.P.*'s 1072-98, compiled, blocks 1-8 from 1861 to 1863, 9-11 in 1867, and 12-15 in 1876. The distribution of both bush and swamp is recorded, and its location is confirmed on the topographical sketch, *S.O.P.* 1069 (1860). Further south, Waipori Bush in Waipori S.D. is mapped on the topographical sketch, *S.O.P.* 1908 (1863). The block series was not undertaken until the 1880s and 1890's, and in any case does not indicate bush. Southwards from Dunedin are the eleven blocks of Clarendon S.D., *S.O.P.*'s 316-28, compiled during 1860-1868, apart from block 11, in 1880. Both bush and swamp are shown, and confirmed on the topographical sketch, *S.O.P.* 313 (1860). South of Clarendon are the five blocks of Otokia S.D., *S.O.P.*'s 1370-75, compiled in 1860-1861. Bush and swamp are recorded, except for the coastal section, which falls within Waiholā S.D., and is not mapped in this series. However, the whole area is covered in the topographical sketch, *S.O.P.* 1368 (1860).

#### *Area VI: Lower Taieri-Tokomairi-Clutha*

A large number of early Kettle maps are available. Bush on the Tokomairi Plain is mapped on *S.O.P.*'s 80, 82, 83 and 85, while *S.O.P.* 45 covers Coast, Tuakitoto and Inch Clutha, as well as the Tokomairi, areas. Distribution of bush in the Clutha and South Molyneux districts is mapped on *S.O.P.* 50; North Clutha on *S.O.P.* 47; and the West Clutha district, including Popotuna Bush, on *S.O.P.* 44. All these maps were compiled by contract surveyors at a scale of twenty chains to one inch. Although scarcely any swamp is recorded one may safely infer, from contemporary reports, and the evidence of present-day topographical maps, the presence of the Otanomomo swamp south of the Koau branch of the Clutha River. The rest of the area is covered by later block plans and topographical sketches. Block plans of Waitahuna West S.D. were drawn, blocks 1-5, *S.O.P.*'s 1958-62, in 1862-1865, and blocks 6-10, *S.O.P.*'s 1966-78 in 1875-1881. Patches of vegetation on blocks 6 and 7 are marked "manuka scrub", but on the rest of the map only the general bush symbol is given. Small patches of bush are marked on the topographical sketch of Waitahuna East S.D., *S.O.P.* 1934 (1862), but no vegetation is recorded on the eleven block plans, *S.O.P.*'s 1936-55, compiled between 1865 and 1875. Pomahaka S.D., divided into fifteen blocks, *S.O.P.*'s 1405-19, dated between 1862 and 1864, contains indications of bush and swamp, although the swamp is not shown on the topographical sketch, *S.O.P.* 1403 (1862). Eleven block plans cover Table Hill S.D., *S.O.P.*'s 1626-40, drawn at various times between 1861 and 1879. However, the topographical sketch, *S.O.P.* 1624 (1861), although it confirms the amount and shape of bush as recorded on the block plans, plots their location inaccurately. The nine block plans for Akatore S.D., *S.O.P.*'s 108-15, all showing bush and swamp, were compiled from 1862 to 1868. The topographical sketch, *S.O.P.* 104 (1860), confirms the distribution of vegetation. Bush and swamp in Hillend S.D. are mapped on *S.O.P.*'s 650-69, dated between 1861 and 1875, and confirmed on the topographical sketch, *S.O.P.* 648 (1861). Kaitangata S.D.'s nine block plans, *S.O.P.*'s 686-94 (1863-1868), show both types of vegetation, as does the topographical sketch, *S.O.P.* 683 (1860), which also maps Coast S.D., not otherwise available. The location of vegetation along the southern margins of the mapped area is from the topographical sketches of Glenomaru S.D., *S.O.P.* 514 (1862), and Warepa S.D., *S.O.P.* 1996 (1861), only the northern portions of which are of concern to this paper.



## CONCLUSION

Several maps of Otago published in the 1860s and 1870s (Thomson and Garvie, 1860, ———, 1861, ———, 1871) give a generalized picture of the distribution of vegetation, as do many of the N.Z. Cadastral Map-County Series sheets. Their accuracy, checked against the record presented here, would be sufficient for small-scale, say New Zealand-wide, maps of vegetation distribution.

It is not suggested that the sources listed here form a complete inventory of available maps. It is known, for example, that most of the Survey District block plans were lithographed during the 1860s and 1870s. A few of these are held in the Hocken Library, Dunedin, though they add nothing to the originals. In addition, several matters require elucidation. References in Tuckett's diary and Monro's journal (Hocken, 1898), and in early newspaper reports, make no more than generalized comment on the composition of the vegetation, in any case insufficient either in detail or extent to be of use here. Secondly, there is nothing in the map evidence to allow any distinction between stands of true bush, and tall manuka. It is possible, too, that scrub was rather more widespread. Perhaps botanists, working from the one inch to one mile maps held in the depository, and from present-day remnants, may be able to fill in some of these gaps.

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