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The Soils and General Ecology of the North-East Coastal Regions of Tasmania

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PLATE XIX

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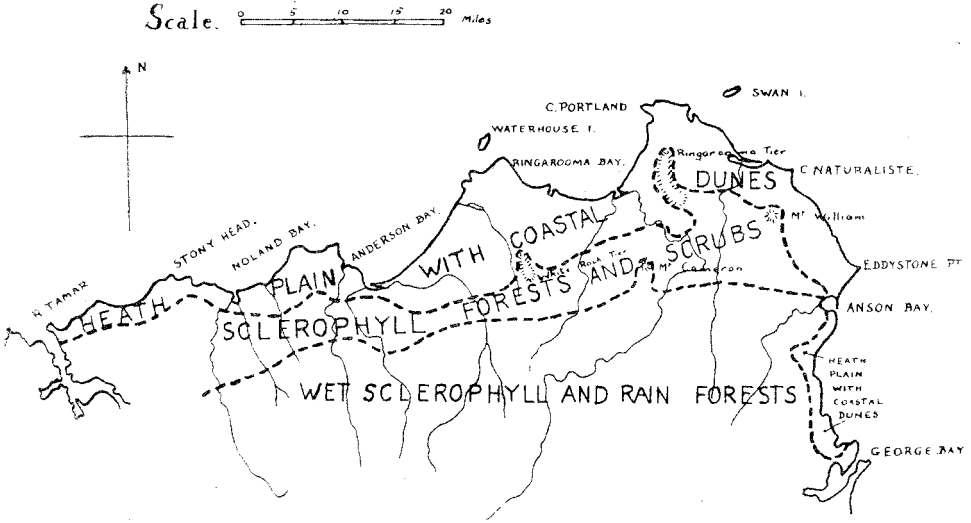
Recently an examination of the north-east coastal zone of Tasmania was made by means of some fourteen traverses across the area. These traverses were made following a detailed investigation of the soils and vegetation of approximately 7500 acres at Curries River and Stony Head some six to nine miles from Lefroy. This survey was undertaken at the request of the Department of Agriculture of Tasmania prior to a projected scheme of land development, and the extension of the investigation reported here was carried out for the purpose of determining the area and distribution of similar country in the north-east, to find to what extent the Curries River area is typical of the whole, and to assess generally the agricultural possibilities of the coastal strip.

Topographically the north-east coast, which embraces the coastal lands from the mouth of the River Tamar to George Bay on the east coast, presents a simple arrangement of features frequently associated with relatively low coastlines, namely, a belt of dunes fringing the sea shore, a well-marked trough behind the dunes, with the usual swamps and lagoons therein, and then more or less

gradually rising country intermediate between the coastal features and the more hilly and mountainous areas farther inland. Apart from Mt. Cameron, White Rock Tier, Ringarooma Tier and Mt. William, and certain rocky bluffs and capes on the coastline there are few prominent features of any great topographical significance in the coastal belt or adjoining rising country.

Superimposed upon the above simple topographical arrangement is an equally simple arrangement of soils and vegetation. This is shown on the accompanying sketch map where the dunes, the dune trough, and the gently rising country occupy the zone marked as *heath plain with coastal dunes*. Farther inland from this and occupying slightly hilly to hilly country is a zone of *sclerophyll forests and scrubs*, and still farther inland occupying the more hilly and mountainous areas a zone of *wet sclerophyll and rain forests*. It is with the first two zones that this investigation is concerned.



Vegetation Zones, North-East Coast of Tasmania.

In the first zone the dunes and adjacent lagoons and swamps are of recent origin whereas the intermediate rising plain country consists of pleistocene and pliocene sands with some swamps and heavy soil flats. Farther inland, occupying the second zone and with some outcrops in the coastal area, are cambro-ordivician slates and schists, granite, and dolerite and basalt as intrusives. The granite is more common in the eastern half of the area.

The sand dunes of the coastline vary, in their unbroken state, up to fifteen chains wide. Often they are considerably broken, the landward edge of the dunes being quite serrated, the direction of the

teeth being away from the prevailing westerly wind. Frequently the sand reaches much farther than a mile inland. Where the dune sand has been completely blown away there is often exposed old soil profiles and hardpans in various stages of destruction. These are apparently the remains of the soil type profile now characteristic of the heath plain country. The soil profile of the consolidated dunes consists of a very variable depth of sand with organic matter accumulation over deep yellow calcareous sand. Frequently old surface horizons are encountered in the profile. Plate XIX, fig. 1, shows partially broken dune with the trough beyond.

On the seaward side the dunes have a low cover of *Spinifex hirsutus, Juncus maritimus, Poa caespitosa, Acena sanguisorba, Heleocharis acuta,* with a little *Danthonia* and occasionally other grasses. There are isolated windswept specimens of *Leucopogon richei, Bursaria spinosa,* and *Cassineia aculeata.* On the sheltered side the vegetation is of much larger habit and denser growth, the chief species, apart from those listed above, being *Acacia sophorae, Banksia marginata,* and *Pteris aquilina,* with very occasional specimens of *Eucalyptus viminalis, E. amygdalina, Leptospermum* spp. and a number of species of the Restiaceae.

The soils of the coastal trough vary from true deep peaty swamps to deep wet sands with variable accumulation of organic matter. Elongated sheets of water are frequent and the vegetation varies considerably. It is, however, significantly the most naturally grassy area in the coastal zone, the two commonest species being *Themeda forskalii* and *Danthonia penicillata.* Other common species listed were *Xerotes* spp., *Lepidosperma elatior Diplarrhena Moraea,* and many species of the Restiaceae and Juncaceae. *Acaena sanguisorba, Hibbertia angustifolia* and *Pimelea glauca* were more restricted in their distribution, with a few localities in which the latter was dominant or nearly so.

The gently rising land intermediate between the above features and the inland soils occupies the greatest portion of the coastal zone, and it was primarily to estimate the possibilities of this area that this study was undertaken. The greater part of this gently sloping country is occupied by a humus podsol soil type which is distinguished by an acid reaction, and waterlogging in the wetter months of the year. The soil profile consists of about one foot of dark grey sand with accumulation of coarse organic matter over a depth of light grey sand, beneath which, and commencing at about 30 inches lies a black and brown organic hardpan frequently more than a foot thick. Beneath the pan lies a considerable depth of light grey sand. Analytical data for this soil type are included in the table given as an appendix to this paper.

This soil type represents one of the poorest phases of podsolic soil developed in Tasmania and is characterized by a dominant heath vege-

tation (Plate XIX, fig. 2) whose principal components are a large number of species of the Epacridaceae, the genera of most frequent occurrence being *Epacris* and *Leucopogon*.

There is also present a large number of smaller plants belonging to the order Leguminosae, the commonest being *Gompholobium huegelii* and *Kennedya prostrata*. The species of larger habit are represented by *Leptospermum scoparium*, *Melaleuca squarrosa*, *M. gibbosa*, *Acacia verticillata*, *Xanthorrhaea australis*, *Banksia marginata*, very stunted *Casuarina distyla*, and *Eucalyptus amygdalina*. Of occasional occurence is *Xerotes longifolia*. The presence and habit of the Eucalypt seemed to be determined by the degree of shelter from the wind. In clearly windswept localities it was totally absent, in slightly sheltered situations it was stunted and bent over at considerable angles, and in generally sheltered situations it attained its normal development. All three phases were noted on the humus podsol soil type.

Also in the zone of the humus podsol occur limited areas of three soil types related to the humus podsol and a limited acreage of heavy soil flats with variable profile. Analytical data on a profile from two of the sub-types typified by a marked dominance of *Xerotes longifolia* and by *Pimelea glauca* and on a profile from a heavy flat are contained in the table at the end.

In the sclerophyll forest and scrub zone the soils are more normally developed podsols residual on the rocks of their origin. There is some variation in the texture of the surface soil from sand to silty loam similar to that exhibited by such soils elsewhere in Tasmania. The subsoil consists of yellow and grey mottled clay. In the soils derived from granite there is a marked presence of grit throughout the profile. Other minor variations noted were the presence of a small quantity of ironstone gravel in the subsurface horizons and occasionally a slight induration of the same horizon.

The vegetation on these soils, illustrated in Plate XIX, fig. 3, consists principally of a sclerophyll forest of *Eucalyptus viminalis* and *E. amygdalina* with *E. sieberiana* on the gritty soils derived from granite. Other large species of common occurrence are *Acacia* spp., *Casuarina* spp., *Exocarpus cupressiformis*, *Banksia marginata*, *Leptospermum* spp. and *Melaleuca* spp., with an underscrub of numerous species which varied considerably with such conditions as soil drainage, topography and profile differences. The chief vegetation classes developed were the dominance of heath on very sandy soils, the dominance of *Xerotes* and grasses on the sandy loams and silty loams where the drainage was good, and the development of scrubs of *Leptospermum* and *Melaleuca* where the drainage was poor.

The zone occupied by the heath plain and coastal dunes is at present utilized for grazing sheep, the carrying capacity varying from 10 to 20 acres for one sheep. Owing to their ready destruction

and consequent blowing the dunes should be excluded from any plan of utilization. The swamps of the dune trough and the heavy flats are obvious sites for development but, though numerous, they aggregate only a small percentage of the total area. Similarly, the better phases of the heath plain characterized by a less heathy vegetation are possible of development with subterranean clover but they represent only a small percentage of the area occupied by the humus podsol. The normal and extensive phase of this soil, although carrying only a light and therefore easily cleared vegetation, is a very poor soil and except for the Naracoopa sand* of King Island no pastures of any value have been seen on similar soils elsewhere in the State. On the Naracoopa sand, which is a slightly better soil with a dominant braken vegetation, subterranean clover pastures take about six years to rise to full production. The sclerophyll forest and scrub area is characterized by soils which are growing good subterranean clover pastures in numerous localities elsewhere in the State.

* Stephens, C. G., and Hosking, J. S. A Soil Survey of King Island. *C.S.I.R. Bull.* No. 70.

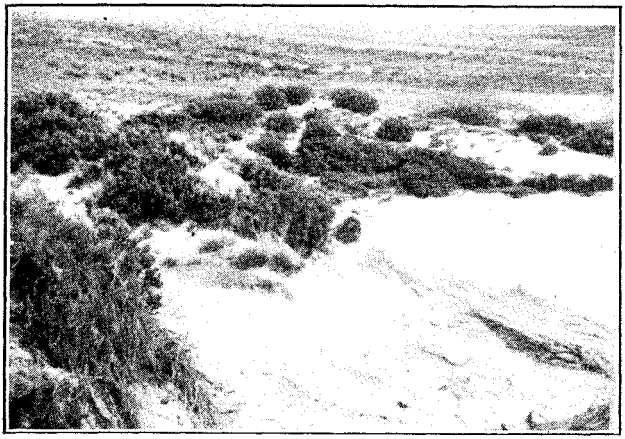


FIG. 1.

FIG. 2.

FIG. 3.