

ridge apart from its accumulation is its consolidation or stabilization. This is accomplished only by the development of vegetation, initially in the form of grass or low creeper. This vegetation will not develop naturally on a newly formed ridge of sand such as is postulated by Mr. Davies but must spread gradually from an area where it is already established. Since the vegetation, in addition to being a stabilizing medium, is also a source of accumulation, it is more likely that this will be the major factor in the development of consolidated sand ridges.

Recent Evidence

Recent changes along the N.S.W. coastline have provided evidence of the importance of vegetation in the progradation of beaches and the development of ridges. In the years 1950 to 1952 the beaches of this coastline suffered serious erosion and waves cut away portion of nearly all frontal dunes. This was caused more by a sequence of eroding storms without intermediate periods of building up than by particularly heavy storms. Since that time the beaches have been more stable, and although a normal amount of cutting and filling has taken place, the eroded fore-dunes have again become consolidated by vegetation, mainly by the grass "Sand Spinifex" (*Spinifex Hirsutus*). With continued mild conditions over the past few years this has spread seaward from the base of the frontal dunes on many of the beaches for distances of up to 30 and 40 yards. When growing near unconsolidated sand, Sand Spinifex not only stabilizes the sand in which it is growing but also accumulates sand from the unconsolidated area. The grass, which is now extending seaward from the base of the dunes, has built up terraces in most cases 2 to 3 feet and in some instances 5 or 6 feet above the beach level.

Initially these terraces develop as a slight bulge at the base of the fore-dune, dipping continuously seaward. As they build outward, they become almost flat-topped with a gentle slope from the front to the beach level and finally they are built up higher at the front, sloping back to the base of the original fore-dune. At The Entrance North, some 30 miles north of Sydney, a new fore-dune has arisen in this manner over the last 8 years; it is now approximately 40 yards wide and rises fairly symmetrically to a height of about six feet above the beach level.

There is little doubt that these new dunes developing along the whole length of many beaches of this coastline are growing sand ridges. Their growth has most probably been caused by the addition of sand to the near-shore circulation due to heavy rains and floods over recent years, while the rain has also materially assisted the propagation of the grass. Whether they will remain stabilized in their advanced position is a matter of conjecture but it is certainly reasonable to assume that the manner of their growth is the same as

that by which the known series of sand ridges were developed. With continued conditions of excess sand, each ridge should continue to grow both outward and upward until mild conditions and probably a good rainfall permit the grass to extend once again forward from the base of the ridge and commence the formation of a new ridge on the seaward side.

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Reference

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Suspected Sheep Killing by the Thylacine, *Thylacinus cynocephalus*

The Thylacine (Tasmanian Tiger or Marsupial Wolf), *Thylacinus cynocephalus* (Harris) is regarded as one of the world's rarest mammals and many people believe that the species is extinct. Several expeditions have searched for positive evidence of the survival of the species and accounts of these have appeared from time to time (Fleming, 1939; Sharland, 1939; Fleay, 1946). The last expedition (1945) brought back some plaster casts of footprints which it was claimed were made by *Thylacinus*. These casts are on display in the Tasmanian Museum and while some of them probably are footprints of *Thylacinus*, one is certainly the footprint of the forefoot of a wombat. Since 1943 there have been various unsubstantiated sightings of the Thylacine but no scientific effort has been expended on the confirmation or otherwise of those reports.

On 9 October 1957 it was reported to one of us (G.K.M.) that three sheep had been killed on a property on the Derwent Valley near Hobart. As the method of killing was apparently unusual we visited the property the next day and found that the three sheep had had their throats and lower jaws, as well as most of the face and turbinate bones eaten away. Very significantly, the remainder of the animal in each case was untouched, and there were no signs of the remains of the bones eaten off the carcasses or of struggle. Further enquiries showed that a sheep had been killed in the same way on a neighbouring property; and a lamb was later found on the original property with the liver eaten out but with the face and throat intact. It was probably killed at the same time as the sheep.

There are but three species of animals in Tasmania that could cause such damage; namely the dog, the Tasmanian Devil *Sarcophilus harrisii* (Boitard), and the Thylacine. The Tasmanian Devil can be ruled out in these instances on account of the 'tidy' method of killing, the absence of struggle, and the non-return of the killer to the prey. Further, the Devil is very common in hill sheep runs and there have never been any records of Devils killing sheep. The killer was thus a dog or a Thylacine. The dog can probably be

eliminated because once a dog starts killing sheep it usually becomes a 'killer'. There is no field evidence of this behaviour pattern.

The method of killing was suspiciously like that employed by the Thylacine. One of us (E.R.G.) visited Westbury Zoo and made plaster casts of the front and rear footprints of the wombat, *Phascolomys ursinus* (Shaw), the native cat, *Dasyurus quoll* (Zimmermann), the tiger cat, *Dasyurops maculatus* (Kerr), the Devil, *Sarcophilus harrisii* and the Brush Possum, *Trichosurus vulpecula* (Kerr). Casts were made of dog pads at a later date. It is hoped to publish drawings of these casts elsewhere. This is the complete list of the larger Tasmanian marsupials except for *Thylacinus* and the Macropodidae. The macropods have a highly characteristic and unmistakeable 3-toed print, so no attempt was made to get impressions of their feet.

The tracks in the vicinity of the kill were examined for pads, and two plaster impressions, one each of the fore and rear foot, were taken. These were emphatically not similar to any obtained from the animals listed above, but closely resembled impressions obtained from the feet of museum specimens of *Thylacinus cynocephalus*. It should be stated that these specimens were distorted and would not therefore give an accurate impression. This evidence led us to conclude that a Thylacine or Thylacines were not only in the area but probably were responsible for the sheep killing. Further field investigations yielded more prints from an adjoining property on which the owner claims to have seen a Thylacine on at least two occasions. After hearing the owner's evidence, which will be published elsewhere, we have no reason to doubt that the animal seen was in fact a Thylacine.

This investigation is continuing in an effort to ascertain the number of Thylacines in the vicinity, the lair or lairs, the home range and movement pattern. It is hoped to publish the results of this work later.

We deliberately do not mention the specific localities in which the sheep were killed since it is very easily accessible by road and sight-seers and other deliberate interferences could greatly upset the programme of work. All this information will be published in the paper to which we refer above but in the meantime the details have been communicated to the Professor of Zoology in the University of Tasmania. The authors are very concerned at the risk that, if the locality is named prematurely, this animal or animals may be maliciously destroyed and negotiations are proceeding to ensure their future safety and availability for ecological study.

It is most noteworthy that Thylacines are to be found close to Hobart and in country which has been under some degree of pastoral development for many years.

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How Important is Mycorrhiza to Introduced Conifers?

Thirty years ago forestry prescriptions for growing *Pinus radiata* often referred to the need for effective mycorrhizal inoculation if nurseries, and subsequently plantations, were to be successful. Gradually the references to this have become rarer and it is now common experience to find always one or more mycorrhizal fungi, and especially *Boletus granulatus*, in *Pinus radiata* plantations. At the same time it has generally become unnecessary to ensure deliberately that the mycorrhizal fungus is present in *Pinus radiata* nurseries as this appears to occur throughout the country.

There is no mystery about the introduction of such fungi to Australia, since it was the custom in the first days of settlement and sailing ship travel to carry living plants in pots from country to country, and in a good many cases the necessary microbiological equipment must have been introduced with some of the plants. Later introductions were more usually by seed without soil, and there is now in fact a rigid quarantine restriction against the earlier practice. At the same time it is quite likely that amongst the early introductions many were also introduced without the soil of their native habitat and it would not be easy to decide now which were likely to have come as living pot plants or by seed.

So far as conifers are concerned, the almost exclusive cultivation of *Pinus radiata* in southern Australia has, due largely to its faster and more effective growth on all sites, tended to depress interest in other conifers and perhaps has resulted in a somewhat misleading appreciation of their potential growth. Obviously, in the growth of a species introduced to a new country, there are many separate factors which determine its final performance; and poor growth, with a good many conifers, may be simply a matter of climatic or soil unsuitability. But there are many cases where it seems that the growth of such species is not so good as might be expected, and a simple trial which it became possible to set up two years ago supports the idea that lack of a suitable mycorrhizal fungus may still be a