

## PROTECTION AND CONSERVATION OF COASTAL AREAS

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### The History of Man's Influence on Sandy Point Domain.

#### Evolution of Dune Culture

The sand menace has probably been present at least from the very early days of the human era, but until the end of the 18th century man everywhere except possibly in the Netherlands tacitly admitted himself beaten when faced with the moving and dangerous areas, although the sterility was often, if not always, brought about by his own unheeding interference with nature's treatment of the problem. The dispoiled and restless sands were always in the long run left to re-establish their own stability, an end which was rarely attained before enormous damage had been done to adjacent fertile land. However, nature had her own safe method of stabilising this type, as well as every other type of countryside, and careful study of ecology of dune areas, revealed that the process of stabilization was a gradual one, effected naturally by a series of successive different types of vegetation covering the soil. The whole series culminating in a forest covering which from the exterior gave no plain clue to the extremely mobile nature of the soil beneath, but which was absolutely permanent and which so long as man did not interfere with it rendered sand areas wholly innocuous.

In New Zealand a Sand Drift Act was passed in 1903 and was later amended and consolidated in the Sandy Drift Act, 1908 and these Acts aim at enforcing a scheme of fixation in particularly menacing areas, and at apportioning the cost among the landowners concerned. In 1911 the Lands Department published a masterly and detailed report on the dune areas of New Zealand by Dr L. Cockayne FRS.

#### Sandy Point

Sandy Point Domain is composed of a sand spit formed at the mouth of the Oreti River in Southland. The Domain, 2070 hectares, is bounded on three sides by water, the sea on the west, the estuary on the south, and the Oreti River on the east. The area is only 6 kilometres from Invercargill city, so is readily accessible to the public and recreation users therefore careful management is required to protect the fragile nature of the area. History of the area has shown how man's interference has turned this once bushclad area into a sea of sand, then struggled to reclaim it back to its former condition. For

approximately 300 years before the arrival of the first Europeans the Domain had been a favourite area for the Maoris, traditionally being one of the most fertile areas of Southland. The good supply of fresh water and wood for fuel attracted the whalers in the 1830's. In the late 1830's Owen McShane, the Cooper, was responsible for getting the Maoris to cut down many of the cabbage trees in the area so that he could distil rum from the cabbage tree. Apparently he had a very large spirit still and it may be this which attributed to the drunken state of many of the ships' crew in the area. By 1844 Bishops Selwyn census showed that there were two settlers in Sandy Point grazing some 200 head of cattle showing prime condition from the excellent feed. By 1851 George Pritz had four acres of wheat, barley and potatoes, 30 cattle, 20 pigs, a horse, and spirit still. In 1853 the Otago landed a mob of sheep at Sandy Point, the first sheep to arrive in the south and this date there were numerous lagoons on the Domain and ridges covered in coarse vegetation and there was recorded as being plenty of feed in the area. About this period the Domain was much used as a landing place for ships and furnished an anchorage for vehicles of considerable draught, some reports put the estuary up to 40 feet deep in places. Throughout the 1860's and early 1870's the cattle runs prospered and no-one seemed to recognise the gradual change in the vegetation that must have been noticeable by that time, was starting to transform the area into a desert. The introduction of the rabbits in the late 1850's early 1860's was the last step in the destruction of the area with their numerous burrows soon loosening the sand hills and eating the grass, roots and all. Thomas Waugh, the Borough Gardener, in a paper he produced in 1895 recalls accounts of the rabbits being liberated with ceremony, some speeches being made and it was even said some whisky was drunk. An Ordinance of the Southland Provincial Council was passed protecting rabbits and a few years afterwards when someone was seen to be hunting a rabbit, Inspector Welden received orders to look more strictly after the enforcement of the Ordinance. The rabbits under such favourable conditions multiplied rapidly and when it finally dawned on the authorities what mischief had been done to the country they did not want it known that they had been responsible for importing them. By the 1880's and 1890's the rabbits were in such hoards on the Domain that many of them starved for the lack of food. The change from the 1862 to 1886 was indeed striking, the original black surface sand favourable for plant growth had wholly disappeared, removed by the westerly winds from thousands of hectares leaving only a few detached flats here and there, with the original surface on them. The loosened sand travelled before the strong westerly winds uncovering moa bones, human skeletons and Maori cooking places. To add to this the Land Board also gave the best remaining piece of bush in the area to sawmillers. In 1886 the Harbourmaster formally warned the Borough Council

of the immense quantities of sand continually being blown into the harbour from Sandy Point causing the silting of the harbour and recommend some plantings of marram grass be carried out to bind the moving sand. Because it was not foreseen that Bluff Harbour was to take the place of the Invercargill harbour the Council was naturally alarmed at the prospect of serious damage from the blown sand. If it were not for the silting of the harbour one wonders if any action would have been taken to stabilize the area. There was a further danger that as the ocean had encroached considerably at one particular place it might break through to the Oreti River turning Sandy Point into an island. The Council ordered some experiments to be tried with couch grass which was common in Invercargill at the time. A large boat was taken to the beach full of sods and manuka branches brought in and placed to shelter the grass, this first experiment was a total failure. Eighteen months elapsed before the first supply of marram seed arrived in Invercargill from Scotland, although it was later found that the seed could have been obtained from Taranaki which introduced the grass about 1880. Until the marram seed arrived various other plants were tried on the exposed areas without success, these included Pinus species, Scots Broom, tree lupins, willows, elderberry, sea lime grass, poa pretentious stub grass, johnson grass, goose grass, cocksfoot, rye grass cleanings, native toi toi grass and three species of native sedge or carex, most of the experiments were on a small scale and did not cost much. The seed arrived in 1887 and was grown for two years in nursery boxes in Invercargill, being finally planted out about of 1889. Sowings in situ were taking place at the same time. Fortunately the very first efforts with marram grass gave a good strike of the grass and no further importations of seed were necessary. The first grasses were planted in lines spanning the large bite on the foreshore where it was feared the sea might break through to the Oreti River. The grass planted there flourished exceedingly well, but without assistance from scrub fence or artificial structures it had aligned itself around the natural shoreline of the bite and still left a wide bare expanse of beach. The area reported as the danger spot in 1889, the bite, was still regarded to be a danger area in 1924, although doubtless much improved by the presence of a fringe of marram grass. The benefit derived from marram plants was enormous, yet at the same time it was not used to its potential because of the lack of a system in the planting and because there was no assistance in dune formation by the use of scrub or fences. It became apparent as early as 1890 that planting the roots was the only way to be sure of getting continuous lines of grass to grow. Thomas Waugh wrote of the problems he had with marram grass because of the numerous names it was called at the time, both scientific and otherwise as he was continually questioned whether he had the right grass or not. He wrote in 1895 that to this day people will

say "did you see in the paper about the new sand-binding grass that was very successful at such and such a place"? When all the time it was our old friend the marram grass. Here are some of the names it was called at that time: *Arundo arenaria*, *Amophila arundinacea*, *psamma arenaria*, *Calamagrostis arenaria*, *Spartum anglicanum*, Gourbet, Marram, Sand reed, Beach grass, Mat weed, Star grass, Dutch grass, Comber grass.

A few months before the first marram grass was planted, Sandy Point was gazetted a recreation reserve with the Borough of Invercargill (Gazette Proclamation dated January 21st, 1889). At that time the Proclamation was for an area of 2,266 hectares more or less, it was only six years later Waugh states that hundreds of acres have been submerged since the survey was made. The first use made of the Domain after this Proclamation was to lease it to a settled McLennan, for the annual rental of 7 pounds 10 shillings, with a clause in the lease that the tenant was to keep down the rabbits on the area. McLennan used it as a sheep run and naturally it continued to deteriorate. One of the provisions of the Gazette Proclamation was that the area was to be improved and for this purpose a 10 chain wide strip along the foreshore was withheld from the lease and all protective and improvement work was confined to the strip. By 1895 records show that no fewer than 21 species of plants had already been tried and failed, but this was not surprising considering the fact that the work was confined to such a narrow strip exposed to the fiercest winds without protection of any foredune, without adequate sandfixing plants, and without protection from the rabbits and sheep. The only relief was when the marram grass began to spread naturally and hold some of the sand. Thirty-four years after the first marram grass was planted the foredune which it had helped formed were nowhere more than 15 feet in height and in most places considerably below this. All this time deteriorating influences had been at work in the area and this had offset the benefits that being derived from the marram grass. For 17 years it remained a Recreation Reserve and was rented out as a sheep run. In 1906 by the Sandy Point and Grasmere Domain Vesting Act its status was altered to that of Harbour Endowment, on the grounds that it was unsuitable for recreation purposes, but the alterations in its status apparently made little difference to its treatment. In 1907 the first thorough survey was made of the area and the road reserve around the river estuary and shoreline was surveyed off for the first time. About the same time the main industry changed from sheep farming to flax milling and this certainly allowed some vegetation to regenerate in the area. C.M. Smith produced a report and control plan for Sandy Point Domain in 1924, in which he wrote "an originally fertile area with a well fixed sandy soil underwent slow deterioration from the time it was taken over by the white settlers. Soon after the introduction

of the rabbits deterioration became extremely rapid until reclamation measures were absolutely essential, and were insisted on by the Government when the land was handed over to the Borough. The measures adopted were partly successful and retarded but did not eliminate deterioration of the soil. They have now reached or probably passed their maximum utility, sand drift in many places is increasing too fast for the marram cover to keep pace with it. The time consequently is more than ripe for the protection scheme that will be both adequate and permanent. Over the next few years parts of his report were gradually implemented and some progress was made in the stabilising of the area.

Experimental tree plantings which were carried out in the 1920's as a stabilising measure was restricted by the wandering stock and rabbits. The planting of *Pinus radiata* was started in the 1930's and proved to be very successful. Although for the first years only the ridges were planted giving a patchy appearance, but these provided shelter and helped dry the hollow areas so that they could also be eventually planted. Afforestation has been treated a commercial venture since 1946 until today there is 480 hectares of the Domain planted. In C.M. Smith's report, 1924, he stated "if adhered to closely the Domain could be stabilised for all time and provided after forty years a perpetual reserve for the town from forestry".

In 1929 the Dunns Road Bridge was built across the Oreti River giving direct access to the Domain. This resulted in a large increase in the popularity of Oreti Beach.

The Oreti Beach Association was formed in 1928 to raise funds to carry out improvements necessary to cope with the increasing popularity of the area.

In 1930 By Laws governing the beach were formulated by the Association and adopted by the Council, one of these being: Sand Dunes - That sliding on sand dunes shall be prohibited so that no interference may be made with the growth of the amrram grass which acts as a support for the formation of the sand dunes.

The first steps were to complete the fixation of the dunes. This began with the foredune just above the recorded highwater mark. A construction of the foredune was by three variations of scrub fence created by driving stakes at a uniform height with scrub, and in this case manuka, woven as evenly as possible so that the fence has a uniform density from top to bottom of the fence, butts of scrub should be alternated with bushy tops. The dimensions for the fence were 1 metre high and 1 metre distance between the pickets. Manuka was freely available across the water at Omaui and was floated across for use

in building the fences. As an ultimate these lateral dunes were constructed three tiers high, constructing the second and third tier on the accumulated sand produced by the first fence. These scrub fences were erected across the bite in Oreti Beach and used to gradually reclaim the area. The place of the foredune is to present a permanent barrier to the constant fresh supplies of sand from the sea. Its surface should then be uniformly covered with a growth of the best sand-binding material available. This uniform covering of vegetation stops all sand gradually, in such a fashion that by the time the end of the landslope is reached, there is no sand left to drift inland. The gradual stoppage ensures an even distribution of all fresh sand over the whole foredune, so that there are neither hummocks or gullies to cause wind eddies and consequent increased wind erosion. In imperfect foredunes, irregular lines can channel wind and cause cuts that the wind goes through at greatly increased velocity. The dense patches of marram at the end of these gullies stop all sand, in a dense heap that smothers the marram killing it out and allowing new erosion to begin. Marram plantings on the foredunes should begin when the dune is about three metres high. Small young healthy plants of marram is planted in lines 1 metre apart and 2 metres between plants. After six to ten lines have been planted on this system the distance between plants is gradually decreased as work progress up the dune face, so that the uppermost row has not more than 225mm between plants. The lee face may carry a much less dense covering, approximately one metres between lines and a uniform two metre between plants. Clearing the foreshore of all driftwood etc is also essential as this allows the wind to blow uniformly against the fence giving a uniform distribution of sand. Once the foredunes are established and covered in marram grass it is essential that regular maintenance be carried out to prevent both wind cuts and marram hummocks from forming as these will cause an uneven build-up of sand. Wind channels are readily blocked by a simple scrub fence across the mouth. If at any spot there is a constant route to the foreshore, a flight of raised wooden steps should be made as constant foot traffic can very quickly disrupt the marram growth.

#### Wandering Dunes.

These are easily distinguished from ordinary moving sand and must receive special treatment in sand reclamation scheme. Their origin of course is the same as that of the moving sands, sand once borne to land by the waves of the sea but in this case, as the sand has drifted inland, it has aggregated into a special type of sandhill and no longer spreads itself in the thin layer over the countryside. The once freely moving sand now moves slowly on as a mass, not as individual sand grains. Their weather slopes are long and gentle rises, up which sand grains roll or hop before the wind their lee slopes are extremely

steep and move forward by the constant slipping of the sand at the crest. When a dune this shape has been formed it is no longer dependent on fresh supplies of sand from the shore, or from any other dunes. Without fresh supplies it moves forward as a whole the bluff forward face engulfs anything that comes in its path. In course of time solid obstacles long since buried beneath this slipping face are uncovered again behind the long slope of the tail when the dune has wandered onwards for a distance equal to its own length. These dunes must be fixed quite independently of work on the foreshore the tail and the forward slope of the wandering dune must be fixed with marram supplemented with small shelter fences where necessary until it gets a firm hold. If these areas are disturbed once they have been fixed they will very quickly revert back to a moving mass of sand.

Nature takes a long time to forgive and heal the scars that man has inflicted on the area. Between the 1907 and 1985 surveys of the area 121.55 hectares of land has been built up on the area first treated for erosion. This area now serves to protect large areas occupied by sports clubs claimed back from the sea by the City but now comes under the control of the Southland County because it is outside the original 1907 survey, and they are reluctant to hand it over to the City mainly for political reasons but no matter who owns this accretion it is very essential that it be maintained for the protection of the inner areas.

Sandy Point today is a sports playground with many clubs having their headquarters in the area. These include water activities, winter sports codes which have the advantage of natural all-weather sand fields, rodeo clubs, sports car clubs, stock-car clubs, and many others. Many kilometres of walking tracks are provided through both the forestry and native bush areas. The area is used by thousands people each week and with careful treatment the last remaining remnants of Halls totara in the area have regenerated remarkably well and the whole area has taken on a reasonably stable appearance. One of the biggest dangers that could affect the stability of the area now would be fire. In spite of a generally equal distribution of rain Southland does, at times, experience quite long dry periods when rainfall is minimal. These dry periods if coupled with drying winds can help produce a definite fire hazard as was experienced in 1964 when a fire outbreak took five days to finally extinguish.

Bibliography

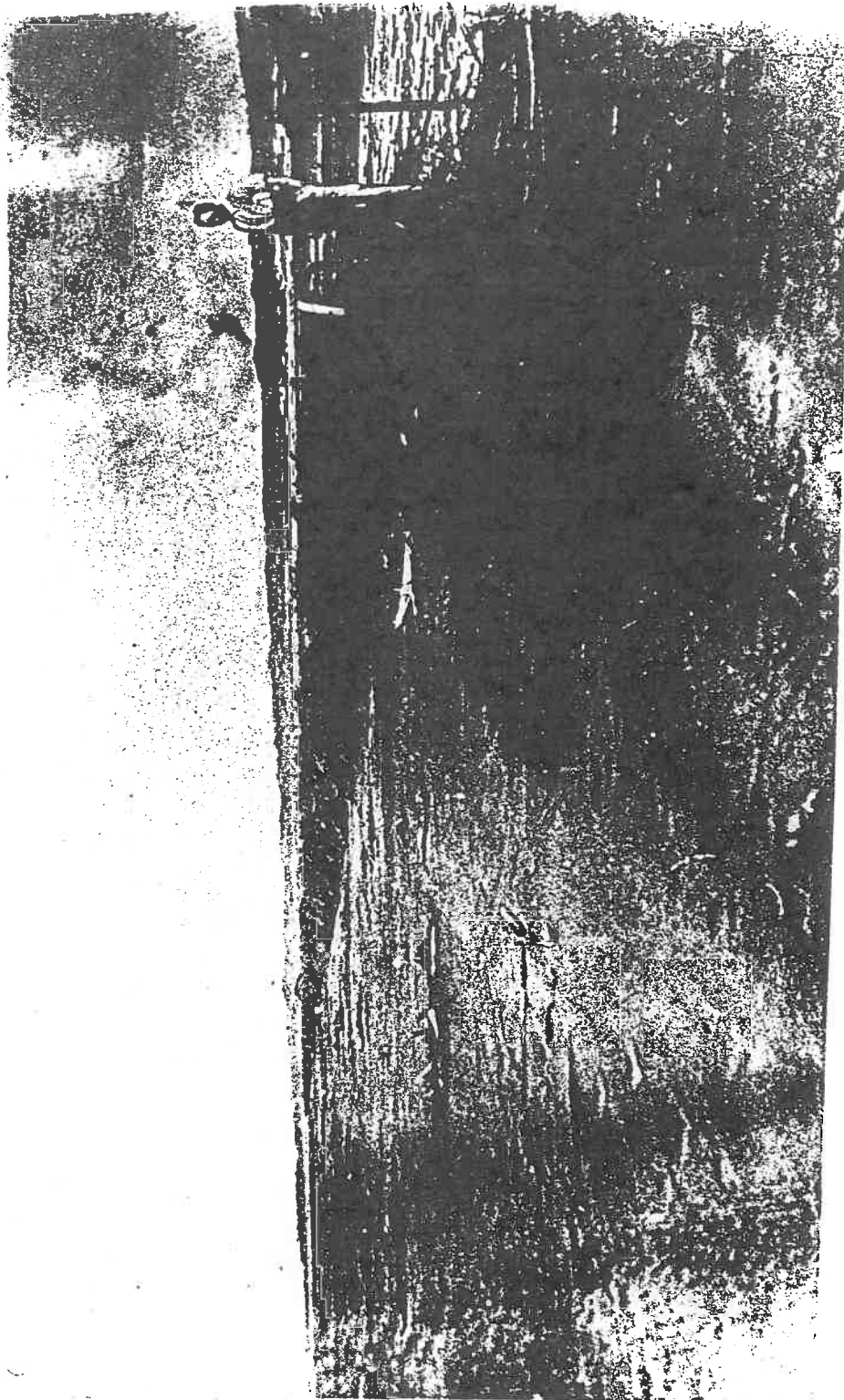
Smith, C.M.            1924

Report on Sandy Point Domain Afforestation Scheme

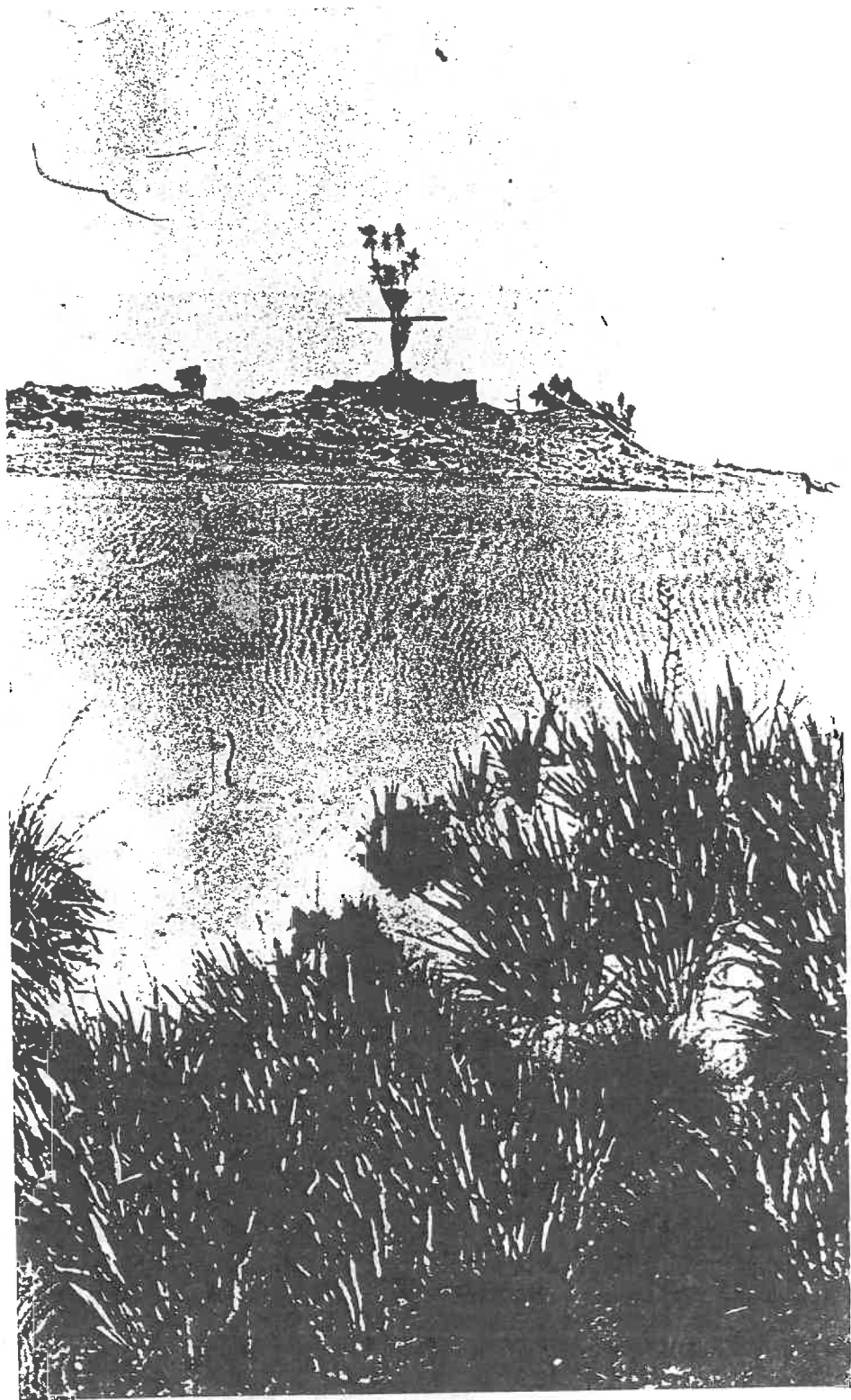
Waugh T.            1890 - 1896

Sandy point Domain  
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Picket and Scrub Fence at Sandy Point in course of erection.

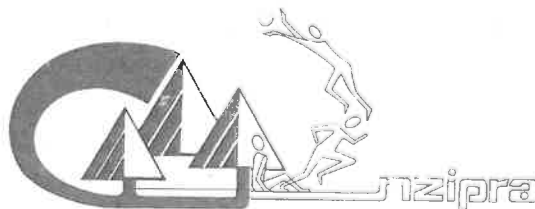
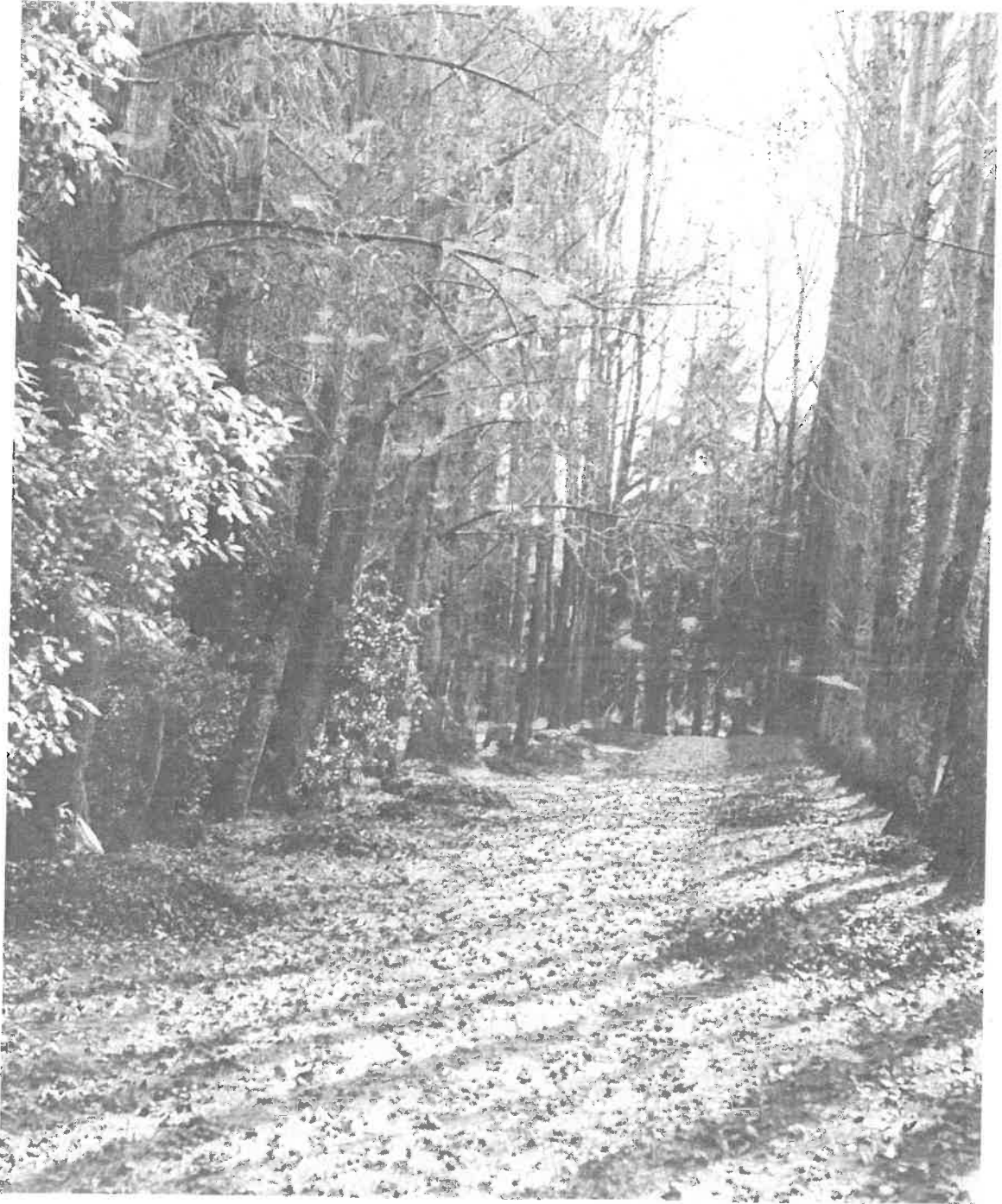


Part of crest of Sand Dune. The line marks height to which cabbage tree has been buried and then uncovered again.

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