Development of a Small North Canterbury Sheep Run

M. S. Foreman, Fields Instructor, Department of Agriculture,, Rangiora.

THIRTY years ago "Vulcan Downs" was a typical North Canterbury grazing run, well managed when judged by the standards of that time, but in no way different from. many other similar properties. Today "Vulcan Downs" is still a North Canterbury grazing run, but it is far from typical. It .now enjoys a reputation of prosperity and its enviable record has been achieved solely through the unremitting efforts of its owner, Mr. Eric Gardiner. The story of some grazing runs is often a depressing one, a story of steady retrogression and ever-diminishing returns. What the ultimate fate of much of this country will be who can tell? Years of overstocking and injudicious management have left a mark which can never be erased, and the possibility that valuable country will be abandoned -to scrub and second growth is a very real one. In the light of this dismal prospect the account of the development of "Vulcan Downs" holds an even greater appeal.

This property is situated about 3 miles from the seacoast at 'Motunau, some 50 miles north of Christchurch. It comprises an area of 2500 acres of well-watered, warm limestone country. Some 900 acres of the property are ploughable, 500 acres being river flats of limestone and sandstone origin and 400 acres easy downs. The remaining 1600 acres is rideable hill country rising to a height of 1100ft. at the highest point. In common with most North Canterbury coastal districts Motunau enjoys a reasonably temperate climate with an average rainfall of 34in., which falls fairly evenly over the twelve months.

The Motunau district was first settled over one hundred years ago by the Greenwood brothers, who were whalers. Some years later the actual Motunau Estate was granted to 'the Holmes brothers in part payment for constructing the Lyttelton tunnel. "Vulcan Downs" was not part of Motunau-Estate -but-was leased by the Holmeses. The late Mr. W. Acton-Adams subsequently bought the leasehold block and it became part of the Tipapa Estate: He later sold a considerable portion of this estate, including the property under review, to a syndicate which also bought some of the surrounding country, which they subdivided and gradually disposed of. The "Vulcan Downs" block had several owners before being sold to Mr. A. P. A. Nidholls, who eventually sold it to the present owner.

Mr. Gardiner took possession of "Vulcan Downs" in 1919. Since then continuous development has taken place until it has now reached a highly-improved state. Although the story of the development of this property embraces the whole period from 1919 to 1948, it can be divided into three essentially different phases, the end of each phase marking a change' in management policy. The first covers -the vears from 1919 to 1929, the second a period of 10 years terminating with the beginning of the war, and the -third the war and post-war years up till March, 1948.

When Mr. Gardiner took over pasture improvements had been effected to the extent that 750 acres of the downs and flats had been ploughed and sown to good English grasses. While most of the flats held grasses fairly well, the downland and some portions of the flats showed signs of running out after three or four years, the better species disappearing and giving place, to inferior grasses such as sweet vernal and hair-grass. The unploughed portion of the property had a native cover of danthonia and poa tussock, and there were some 300 acres of dense manuka scrub on portions of the downs and hills. On the flat there was an undrained swamp about 20 acres in area which was suitable only for limited cattle grazing during dry periods.

During the first five or six years Mr. Gardiner methodically went about regrassing the whole property with high-quality pasture species.. Gradually all the unploughable tussock country was autumn burnt and surface sown with a mixture of 8lb. of cocksfoot, 3lb. of perennial ryegrass, and a little crested dogstail per acre. After 25 years these grasses are still persisting, in fact they play a very important part in the composition of the tussock-country sward. These areas of new-sown grass were not given any preferential treatment in their early life, but the vigorous growth of the tussock gave the young plants some protection from stock until they had become well established. Some time later 31b. of subterranean clover per acre was sown over part of the hill country with most satisfactory results: in fact. this subterranean clover has now spread

over the whole of the hill block, although it was originally sown only on a limited area.

During this early period the flats were drained with open drains and a pasture-sowing programme was carried out. All the ploughable downland and flats, apart from a small area of heavy flat, was turned over and resown. The ploughing was done with a team, and since that time only 25 acres of land has been ploughed a second time. During the years between 1923 and 1928 practically all the downs and flats had been regrassed with a mixture of 201b. of perennial ryegrass, 10lb. of cocksfoot, 2lb. of red clover, 2lb. of white clover, and 21b. of crested dogstail per acre.

In May, 1923, a heavy rain occurred at Motunau, some 24in. of rain falling in about as many hours. The two creeks which run through the flats rose in high flood and inundated the surrounding land, depositing a layer of fine silt up to a depth in some places of *over* 5ft. This flood destroyed miles of fencing and despoiled much good pasture. The softness of this sediment made it impossible to get on to the ground with a team until early summer, so nothing could be done until it had consolidated. When the silt settled the ground was simply harrowed and sown down. The resultant pasture is still there today. However, it is an ill wind that blows nobody any good, and Mr. Gardiner's experience was no exception. What had been an area of niggerheads and rushes was now a otential pasture with only the tops o4 the niggerheads protruding above the silt. A deep drain was cut through the middle, the silt was ploughed and sown, and what had once been a swamp is now one of the best paddocks on the farm.

During this period of initial development "Vulcan Downs" carried an average stocking of 2500 ewes, 1000 dry sheep, and 40 breeding cows. The lambs were generally disposed of as stores,, although some: attempt at fattening was sometimes made. Lambing survival was about 90 per cent. and the average wool clip was 8lb. Occasionally cattle were brought in and fattened, but this happened only in favourable years and was by no means a common practice.

The year 1930 is a milestone in the history of "Vulcan Downs" and marks the end of the first phase of development. For a few years prior to this Mr. Gardiner had been conducting experiments with artificial fertilisers, and though the results were by no means conclusive, they were sufficiently encouraging to warrant a radical change in management policy. Convinced that continuous pasture replacement was too expensive to be carried on indefinitely, he sold the team and implements, bought a crawler tractor and topdresser, and started a manuring programme. In the third and subsequent years after the team was sold 40 tons of fertiliser were used annually, except for one year when 80 tons were sown. Even during the early years of the manuring phase Mr. Gardiner was continually experimenting with different fertilisers, and actually the 80 tons used in the peak year was a mixture made up of one-third 44/46 superphosphate, one-third Walpole Island guano, and one-third blood and bone. Other fertilisers were also used, but the responses from them were never spectacular enough to warrant their continued use; but this mixture was undoubtedly most satisfactory. Owing to its very offensive smell, however, it was not popular with those who had to sow it and its use was discontinued in favour of 44/46 superphosphate. For a number of years before lime was freely used reverted superphosphate was exclusively sown in an effort to prevent depletion of the soil lime content. During the peak year 300 acres of tussock country were topdressed with fertiliser and subterranean clover with excellent results. Towards the end of this period experimental areas laid down by Mr. Gardiner showed a marked response to lime, and,, in addition to the 40 tons of fertiliser, 400 to 500 tons of lime *were sown* annually right up *to* the beginning of the war. Just before the war tests were carried out by Lincoln College officers which showed the flats had a very high pH and so lighter dressings were recommended.

During the early years of the second phase all of the manuka country was gradually brought into production. The manuka was all cut by hand and burned. The ground was then ploughed where possible (about 80 acres in all) in the spring, and sown down with rape and chou moellier. The *grass* mixture used was 20lb. of perennial ryegrass, 61b. of cocksfoot, 2lb. of crested dogstail, 2lb. of red clover, and llb. of white clover per acre.

Much of this development was made possible by replacing the team with a tractor. All the tractor work could be completed in two months, which meant that a man was available for other work for the remainder of the year. On a portion of this area 31b. of subterranean clover was added to the mixture. On the whole ploughed area a dressing of 30cwt. of lime per acre was applied immediately prior to sowing and 2cwt. of superphosphate was broadcast with the seed. Of the 300 acres brought in at this time only 50 acres have reverted to second growth and efforts are being made at the moment to clear it again.

The carrying capacity during this second phase was considerably higher

than in the previous period. The ewe numbers increased from 2500 to 2800 and the number of dry sheep correspondingly rose from 1000 to 1200. The most remarkable increase, however, was in the cattle numbers. Breeding cows were dispensed with and upwards of 150 store cattle were carried instead. On an average about 70 fat cattle were sold annually either at 2½ or 3½ years old. During the third phase, however, the number of cattle carried was increased to 260. The lambing survival increased from 90 to 100 per cent. and the wool weights rose from 81b. to over 91b.

The beginning of the war marked the end of the second phase. Lime and superphosphate shortages made Mr. Gardiner decide to sell the tractor, and contractors were then employed to carry out such topdressing as was possible under rationing. As a result of this only country that was traversable by motor truck was topdressed. Except in 1939, when 1000 tons of lime were applied, the only topdressing done on the property during the early years of the war was the annual application of 20 tons of superphosphate allowed as the owner's ration. These restrictions had a somewhat depressing effect on pasture production and ewe numbers were reduced by 100 on pre-war figures. Since the end of the war. however. 2000 tons of lime and 45 tons of superphosphate have been applied. Last year a rotary topdresser was purchased and this has proved a great success on this country in every way, and now it is possible to give the sides of steep gullies a partial dressing of lime and superphosphate by running the machine along the edge of the gully.

During this period 600 Romney ewes were bought 'as an 'experiment and mated to Southdown and Romney rams, but the difficulty in maintaining half-bred flock replacements caused the scheme to be discontinued.

As far as material development was concerned, the third phase was undoubtedly the least significant. Apart from 75 acres of downland that was. brought in about 1939 no substantial development has been attempted. Nevertheless, the third phase was the most spectacular. because it was during this period that over 25 years of sustained effort bore fruit. In the last two years the property has been subdivided into three self-supporting units.

In 1946 a block comprising 640 acres was sold to Mr. Gardiner's son-in-law, Mr. I. R. McKenzie, an ex-serviceman. This block is made up of a good balance of flats and downs and is a representative section of the property.

In March of this year a further 761 acres were handed over to trustees for Mr. Gardiner's son who will take over the block when he attains his majority. Mr. Gardiner retains the balance of 1100 acres. Although the properties are three completely-separate entities and have their own earmarks and brands. all are worked by a common labour pool. Mr. McKenzie acts as manager for all three properties, with Mr. Gardiner merely in a general advisory capacity, while his son and a married couple make up the rest of the labour complement.

The present carrying capacity of the son-in-law's block is sufficient to make it a prosperous unit. This winter 850 ewes and 360 dry sheep were wintered in addition to 40 dry cows and 16 3-year bullocks which are being fattened. On the trustees' block 845 ewes 'and 320 dry sheep were shorn and 61 head of mixed-aged steers were also wintered.

This then-is the brief outline of the development of "Vulcan Downs" from 1919 to the present day, but the story of progress by no means ends here. Even though Mr. Gardiner has relinquished the full responsibility of managing "Vulcan Downs," progress and development will go on.

On the 1100-acre block a full-scale' experiment with cattle has been begun in an endeavour to improve the quality of the native cover. Past observations and experience convinced Mr. Gardiner that adult cattle were of immense value in promoting vigorous rejuvenation of tussock swards. In March of this year all the sheep were sold off the block and, by buying cattle when they were available, Mr. Gardiner raised the number carried to 395 steers, mostly 3-year-olds. The new policy for a normal season is to denude completely the tussock block during the winter and then leave it totally ungrazed until the autumn. Thus in the second week of October all the cattle were mustered off the hill country and turned *on* to the flats and downs. It is expected that a fair proportion of these cattle will be sold fat this season, and if the present condition of the beasts is any criterion this optimism is fully justified.

It is believed that this cattle programme will prove to be economically sound and if this is the case it will be carried on probably for five years. The inauguration of this scheme has been to some extent encouraged by the theories of Mr. Bruce Levy and the writings of such men as Edward Faulkner and Louis Bromfield.

This experiment should prove of the greatest interest to those who hold the opinion that large areas of pastoral land in the Dominion are tending to become more or less sheepsick.

This is not the only experiment to be made on "Vulcan Downs," however. for a regrassing programme is to be

started this autumn. Influenced again by the writings and opinions of Edward Faulkner, Mr. Gardiner proposes to, resow some rather. poor matagouri country by an,, adoption of the "Ploughman's Folly technique. By using bush and bog harrows Mr. Gardiner hopes to form a mulch of semi-rotted vegetation on which he will sow a mixture of pedigree -grasses. The mixture per acre will include 81b. of cocksfoot, 2lb. or more of subterranean clover, 1 bushel of perennial ryegrass, strawberry clover (which incidentally does exceedingly well on some of this country), Montgomery red clover, and perhaps some crested dogstail.

Shelter is also to be improved by the planting of well-placed shelter belts and the replanning of existing subdivision.

During recent years about four miles of internal roads' were constructed to enable lime to be carted on trucks to nearly all parts of the property. Annual maintenance cost has been very low, as a few hours' work with a bulldozer or a light grader is all that has been required.

One of the greatest tasks of the future is the continued control of nassella tussock. For some years nassella has caused Mr. Gardiner considerable worry. North-westerly winds have carried large quantities of nassella seed on to parts of "Vulcan Downs," but painstaking labour has prevented the establishment of this pest. About the end of November all the available labour is concentrated on to the critical area and all the young plants are grubbed. This task takes many hours, but control is effected and at the present time there are very few mature plants on the property; in fact nothing but a few seedlings were observed during a recent inspection.

Two years ago an interesting and apparently successful experiment was carried out on a patch of rushes. About 7 acres' of heavily-infested flats were cleared about 20 years ago and although the pasture was good for the first few years and received a liberal dressing of lime and fertiliser, the rushes gradually became dominant again. Two years ago the rushes were mown with a tractor and scrub-bar, and a 90 per cent. clearance effected. One further cutting will probably eliminate the rushes. Altogether 1 ton of lime and lcwt. of superphosphate per acre have been applied each year since cutting and the sward is now thick and healthy again. The rushes were just left to rot on the surface, and though there was a big bulk of material, it proved in no way detrimental to the re-establishment of the grasses and clovers.

Any account of the development of "Vulcan Downs" must of necessity be a rather mechanical description of systematic progress over the years. Words are somewhat inadequate to describe the immense amount of physical effort required to make this development possible. No one man, no matter how enthusiastic. could hope to achieve full success; and Mr. Gardiner would like to pay tribute to those men who worked with him and whose keenness and efforts helped to make "Vulcan Downs" what it is today. He would also like to thank the staffs of the Department of Agriculture and Canterbury Agricultural College, Lincoln, for the interest they have shown and the advice they have given.

The key to success cannot be attributed to 'any one factor, but several features of management stand out. Probably one of the most important points is that at no time during the 29 years under review have anv cash crops been grown. Another outstanding feature is the high ratio of cattle to sheep that has been maintained for many years. Just how great a part cattle have played can never be assessed, nor can the exact value of the use of lime and superphosphate. Pasture harrowing has been practised for many years, but was discontinued during the war period after the tractor was sold. Last year, however, a set of heavy grass harrows was bought and is to be used again extensively to assist pasture rejuvenation. Heavy harrowing has proved very valuable in the past in reducing the vigour of Yorkshire fog.

This then is the history, briefly if somewhat inadequately told as regards its early days, of a property which-has not been exploited at any period by those connected with it but rather treated in some degree as a heritage. It can at least be said of Mr. Gardiner and of those who have worked for or with him that they have served the land faithfully with initiative, vision, and ability for observation. and lastly but by no means least by sheer hard work.