

FERTILIZERS.

The consolidated sand areas vary in fertility according to type, but are all deficient in phosphate and nitrogen. Poor pasture-swards (Fig. 7), consisting of stunted paspalum, *Lotus hispidus*, brown-top, sweet vernal, tar-weed, and danthonia, cover a large area of the Te Kopuru soil type. These poor pastures respond quickly to phosphatic top-dressing (especially basic slag), while applications of lime also give improved responses when used in addition. The fertility of this soil is extremely low, while the drainage is poor, and even with heavy applications of phosphatic fertilizers and lime it is practically impossible to establish and maintain a high-producing pasture. Top-dressing will, however, improve the existing sward, but it is doubtful if it is a payable procedure.

On the other hand, the Red Hill sandy-loam soil type has good drainage and higher fertility, which makes pasture establishment on this soil type an easier proposition. Considerable areas of this soil type have in past years been burned and surface sown. The resultant pasture-sward (Fig. 8) has been neglected, and the sward now consists of ratstail, danthonia, suckling clover, catsear, and in places paspalum—a very poor unpayable type of sward, for on this land a first-class pasture consisting of perennial rye-grass, white clover, cocksfoot, and paspalum can be established and maintained provided the necessary precautions regarding good cultivation, sowing good strains of permanent grasses, and using adequate supplies of phosphate are taken.

Fertilizer experimental work in pasture top-dressing carried out on these soils has given the following results:—

Experiment No.	Soil.	Responses to Fertilizers: 0, no response; 1, slight; 2, fair; 3, good; 4, very good; 5, excellent.						
		Superphosphate.	Lime.	Potash.	Superphosphate plus Lime.	Superphosphate plus Lime plus Potash.	Slag.	Slag plus Lime.
16/1/226 ..	Red Hill sand..	4	1	0	4½	4½
16/1/227 ..	Red Hill sand..	3	0	0	3½	3½
16/1/228 ..	Red Hill sand..	4	1	0	5	5
16/1/229 ..	Red Hill sand..	4	0	0	4	4
16/1/98 (D)	Te Kopuru sand	2	1	0	3	3	3	4

Experiments 16/1/226, 227, 228, and 229 were laid down during the autumn of 1933; at laying-down, plots received lime at 1 ton per acre, superphosphate at 3 cwt., and 30 per cent. potash salts at 2 cwt. per acre. At the end of two years and a half, fertilizer responses on Red Hill sand show an excellent response (Fig. 9) to superphosphate, a slight additional benefit for lime when used with superphosphate and no response for potash.

Experiment 16/1/98 (D) was laid down in July, 1929, and kept under observation until June, 1933. In this experiment basic slag and rock phosphate were used in addition to superphosphate. At