

strating the establishment under arid conditions of plants from seed buried by the trampling of sheep (see Fig. 1).

In 1912 Mr. D. Petrie, M.A., F.N.Z.Inst., in a report to the Department of Agriculture,* had intimated that the regrassing problem demanded experiment. He suggested that an area of land be fenced in above the race feeding the Cromwell dam.† "Such a station," he writes, "seeded from the plants growing on the edge of the race, would soon show whether sun-scorching and wind-desiccation or the eating-out of the seedling grasses is the dominant factor in preventing the native grasses from reclaiming the desert lands on which they formerly flourished. I know of no locality where this important question can be tested more conveniently or in a more conclusive way." Farther on, the same writer expresses his conviction that spelling alone will do no good; nevertheless he considered that "The question is of sufficient importance to justify the enclosure of a typical and fairly large patch of the desert hillside, to ascertain what spontaneous improvement a few years' rest could effect." He considered the Earnsclough area of 20 acres as altogether too small, and not varied enough in its stations for plants, to give reliable results.

It will be seen from what follows that Petrie's suggested experimental methods and mine are essentially different, except in the matter of natural sowing from growing plants; but even in that regard Petrie relies on seed coming from plants outside the enclosure, while I choose areas which already contain living plants suitable for producing and scattering seed.

OBJECTS OF THE EXPERIMENTS.

The general object of the regrassing experiments is either to find out methods which may be used for regrassing the depleted area, or to gain evidence that regrassing at anything like a reasonable cost is impossible. In order to procure such information precise knowledge on certain matters must be ascertained. The following appear the most important:—

1. To find out the effect of spelling alone, and the length of time which must elapse before results of moment come about. Here comes in the spelling of a large area with various soil conditions and aspects, and the spelling of uniform areas of different kinds. It is also important to find the effect of keeping out sheep alone and rabbits alone—a matter which Mr. Middleton considers of fundamental importance.

2. To ascertain the results brought about by sowing the seeds of various kinds of pasture-plants, apparently suitable for regrassing operations, both in the presence and absence of stock and rabbits. Here misleading information may easily arise owing to the number of stock or rabbits being a highly variable quantity.

3. To study the effects of different soil or climatic conditions with regard to the germination of seeds, the establishment of plants, and their subsequent rate of growth.

* "Report on the Grass-denuded Lands of Central Otago," Bull. No. 23 (n.s.), N.Z. Dept. Agri., 1912, p. 13.

† For photograph of the race and area adjacent, see No. III of this series in this *Journal*, Vol. xix, Sept., 1919, p. 134.