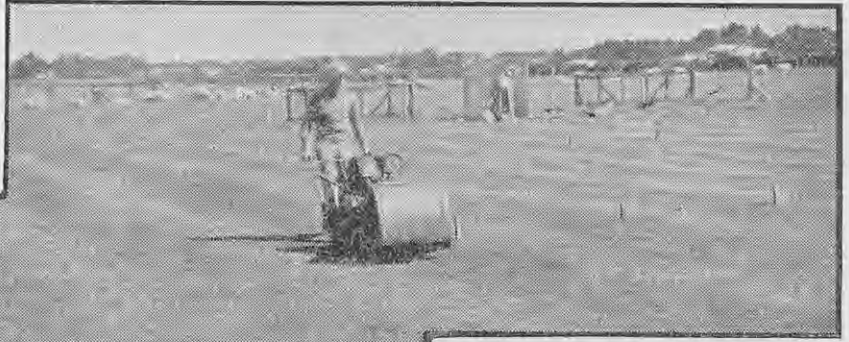


coast from the Mokau River to Raglan Mairoa ash has also covered all undulating and slightly hilly country and has been washed off only from the steeper hills and the more recent alluvial plains. The texture of the soil is friable and the colour ranges from light brown to dark chocolate. The darker and more andesitic soils derived from these showers occur west of the south Waikato basin in the coastal hill region.



A trial begun in 1932 at the Marton Experimental Area to compare basic slag and other phosphatic fertilisers. Topdressing was suspended from 1932 to measure residual value of treatments, but will be resumed this autumn on half the plots to study how quickly production can be raised to the former level by the use of fertilisers alone.

Both Mairoa soils and Hamilton soils react similarly to basic slag. On ground requiring liming basic slag appears at least equal to and sometimes slightly better than superphosphate or serpentine superphosphate. When adequate liming is carried out, however, superphosphate and serpentine superphosphate seem to be slightly the better fertilisers. What applies to Mairoa and Hamilton soils applies equally to their alluvial derivatives, which are found south of Manukau Harbour and in the Henderson-Hobsonville district.

An attempt was made to correlate progressive stages of leaching with basic slag response, because it was thought that basic slag might be better on the higher-rainfall areas than on the lower-rainfall areas, but no evidence was found to support this. In the Hamilton soils, however, one trial found basic slag superior to superphosphate on limed and unlimed pastures. This trial was situated on Churchill clay loam, a very leached and poor soil derived from Hamilton ash and pumice alluvium.

**Pumice soils:** A large area in the Putaruru, Rotorua, and Taupo districts is covered with soils derived from Taupo ash. These soils respond to lime only rarely. Perhaps for this reason basic slag appears more frequently to be inferior than superior to superphosphate and serpentine superphosphate, but the difference is only slight. In general, therefore, basic slag can be regarded as being as good a fertiliser as the more soluble types on the pastures of these districts.

**Volcanic ash soil of the Bay of Plenty:** On these soils derived from the Kaharoa, Waihi, and Whakatane showers, basic slag does not seem to be suitable. Even at its best in the slightly lime-responsive soils of the Waihi district basic slag seldom equals superphosphate in efficiency.

**Hill soils of Auckland Province:** The hill soils derived from underlying

sedimentary rock tend to vary greatly within any one district. A very large number of trials are therefore necessary to cover all variations in hill soils and this is impracticable. General tendencies in pasture response to basic slag can, however, be observed, but they are as yet of limited practical value.

Basic slag without lime seems superior to superphosphate without lime on the well-weathered but only moderately leached and often quite fertile hill soils of Raglan, Manukau, and Franklin Counties, but little difference is seen when pastures are adequately limed. Only on one observational trial, near Whangamarino, on very poor and leached hill clay resembling Northland gum soils was basic slag found to be definitely better than superphosphate on limed and unlimed pastures. Strangely enough, however, on the poor leached hills of Coromandel no difference could be seen between superphosphate and basic slag. Both gave good pasture responses.

Much further south near Ohura trials have been conducted on quite fertile hill soils which have undergone less weathering than related soils in the north. Here basic slag was equal to superphosphate.

**Recent alluvial soils and meadow soils:** Though the Hauraki Plains represents the largest area of these soils, pockets of alluvial and meadow soils are found in all districts. In general no differences in pasture response have been observed between basic slag and superphosphate.

#### Remainder of North Island

The remainder of the North Island, for the purpose of observational pasture trials, extends southward from the East Cape, the Raetihi-Ohakune district, and the Mokau River. In the northern part of this region soils derived from various showers of volcanic ash are

important. Taranaki soils are developed from various showers of andesitic ash. The Ohakune-Raetihi district was covered with ash showers from Mt. Tongariro and the Taupo eruption. On the east coast from Tokomaru Bay to Eskdale various Taupo pumice showers have influenced soils on the easier hills and rolling country.

**1. Volcanic soils of the Ohakune district:** These soils are developed under an average yearly rainfall of 70in. Pastures respond well to liming and good results from basic slag on unlimed ground could therefore be expected. In fact basic slag appears to be very slightly better than superphosphate under such conditions, and is equal to superphosphate on pastures which have been adequately limed.

**2. Volcanic soils of Taranaki:** Basic slag is popular in Taranaki, and a great number of observational trials comparing superphosphate with basic slag have therefore been carried out. In south Taranaki and the coastal districts of Waitotara County there is evidence that basic slag alone is slightly better than superphosphate alone; where lime dressings were applied, however, no differences between the two fertilisers were detected. In north and central Taranaki, in the higher-rainfall belt, observational trials have failed to establish any superiority of basic slag.

**3. Recent alluvial flats:** This group covers a wide variety of soils. The soils vary from the heavy, often badly drained soils of high fertility found on the east coast and Hawkes Bay to the barren stretches of shingle and stones along some of the Hawkes Bay rivers. On the whole, where a pasture response to phosphates can be detected the quick-acting fertilisers seem slightly better than basic slag.

**4. Older alluvial soils:** These are mainly "light plains" soils such as in the Takapau-Ruataniwha flats in south