

methods of disinfection. The corresponding effects under field conditions, and the relative efficiency in control of the smut, will be taken up in future work in the field.

### *Methods.*

Samples of seed were obtained from the Instructor in Agriculture, Christchurch, and three were selected (to represent the three classes of wheat chiefly grown in New Zealand)—namely, Pearl, College Hunters, and Purple-straw Tuscan. From each of these, twenty-four lots of 100 seeds (fair average sample) were counted out, placed in corked test-tubes, and treated in duplicate as follows:—

(1.) Dry-dusting with copper carbonate. Weights of dry, finely powdered copper carbonate, equivalent to weights of  $\frac{1}{2}$  oz., 1 oz., 2 oz., and 3 oz. per bushel, were vigorously shaken with different samples of the seed.

(2.) Dry-dusting with a mixture of 50 per cent. finely powdered anhydrous copper sulphate and 50 per cent. finely powdered calcium carbonate. Weights of the mixture, equivalent to weights of 1 oz., 2 oz., 3 oz., and 4 oz., were shaken with the seed as in No. 1.

(3.) Bluestone dip: 1 lb. bluestone (copper sulphate) in 10 gallons water.

(4.) Bluestone dip: 1 lb. bluestone in 5 gallons water.

(5.) Formalin dip: 1 pint commercial formalin in 40 gallons water. Each of the dip treatments (Nos. 3, 4, and 5) were tested in four different ways as follows:—

A. Sample covered with the dip solution for ten minutes, then surplus solution poured off and sample left in wet mass for twenty minutes, then spread out on blotting-paper in room to dry overnight.

Aw. Sample treated as in A, but rinsed in clean water immediately before being spread out to dry.

B. Presoak method: Sample first covered with clean water for ten minutes, then surplus water poured off and seed left in wet mass for six hours, then treated as in A.

Bw. Presoak method plus wash: Sample presoaked as in B, then treated as in Aw.

Three series of each wheat were thus treated. One lot was placed in the germinators on the day following treatment; the other two lots were stored in corked test-tubes till tested, one at fourteen days and the last lot at twenty-eight days after treatment. With duplicates and untreated controls a total of 378 samples of 100 seeds each were tested for germination. The results are set out in the accompanying tables.

The following references apply to the bluestone and the formalin treatments in each of the three tables:—

A treatment—Cover with solution 10 minutes, drain 20 minutes, then spread out to dry.

Aw—Same as A, but treated seed washed in water before drying.

B—Soaked in water 10 minutes, drained 6 hours, then treated as in A.

Bw—Same as B, but washed in water after treatment and before drying.