

*Serpentine-superphosphate Investigations.*—In order to examine inter-relations in the effects of potash and magnesium further pot experiments using Sherry River soil have been set up. The crop was Western Wulths. Three series were run: Series A, base dressing of 1 cwt. sulphate of ammonia per acre; Series B as A, with addition of 2 cwt. muriate of potash per acre. In these two series superphosphate, and superphosphate plus magnesium oxide equivalent to the magnesium in the serpentine-superphosphate were used. The phosphate in all cases was equivalent to a rate of 3 cwt. superphosphate per acre. To the eye there were no great difference visible in the growth of the crops of the A series, and only slight differences in the B series. By weight of dry grass, the best crop was obtained in the A series from superphosphate plus magnesia. No significant differences were shown between superphosphate, basic superphosphate, and serpentine-superphosphate. In the B series use of the potash salt appreciably increased the yield with superphosphate and basic superphosphate, and slightly with superphosphate plus magnesia, but had no effect where serpentine-superphosphate was used.

In series C, 1 cwt. sulphate of ammonia and 1 ton of magnesium carbonate per acre were used as a base dressing. Superphosphate and serpentine-superphosphate, with and without 2 cwt. muriate of potash per acre, were used as variants. Where potash was omitted very poor germination and growth were obtained. Browning of the leaf tips was severe. This browning also appeared later on the other treatments, being least apparent with superphosphate. Taking the superphosphate pots as 100, the comparative yields in this series were as follows: superphosphate, 100; serpentine-superphosphate, 37; superphosphate and muriate of potash, 198; serpentine-superphosphate and muriate of potash, 113. It is of interest that the yield from the superphosphate pots in this series was only just over half that with superphosphate in series A. Magnesium carbonate at the above rate reduced the yields with superphosphate and serpentine-superphosphate to 80 per cent. and 60 per cent. respectively of the corresponding yields in series B. The yield from serpentine-superphosphate plus sulphate of ammonia was reduced by the magnesium carbonate to only 21 per cent. of the yield from the phosphate and nitrogen only.

It is evident, therefore, that there is a very strong reciprocal action between potassium and magnesium under the conditions of this experiment. There is a strong response to potassium, a fact not surprising in view of the occurrence of potassium deficiency symptoms in some crops on this soil-type.

#### TOMATO INVESTIGATIONS

During the past season a great deal of work on different aspects of tomato-production has been carried out. The investigations have comprised (a) studies of steam and formalin treatments of glasshouse soils in relation to yield and quality of tomatoes; (b) the effect of fertilizers, compost, charcoal, sand, and differential rates of watering on yield and incidence of "cloud"; and (c) the effect of steam, soil disinfectants, fertilizers, and soil amendments on yield and incidence of "hard-core" in outside grown tomatoes.

(a) *Use of Steam and Formalin for the Treatment of Glasshouse Tomato Soil.*—Steam sterilization again showed to great advantage over formalin treatment for our tomato soil, the following results being obtained for representative plots under the different treatments:—

| Treatment.                                                | Yield per Plant. |      |
|-----------------------------------------------------------|------------------|------|
|                                                           | lb.              | oz.  |
| Steamed each season .. .. .                               | ..               | 7 10 |
| Formalin (1 pint of 40 per cent. per square yard) .. .. . | ..               | 5 8  |
| Unsterilized .. .. .                                      | ..               | 4 10 |

NOTE.—Standard fertilizer used in all treatments.

The results show the marked improvement in yield effected by steaming the soil. Formalin treatment resulted in an increase of 14 oz. tomatoes per plant, but was decidedly inferior to steaming both in growth of plant and yield of tomatoes. The yields of all treatments are lower than last season due to somewhat drier conditions in the house.