three strains is apparent. The same was found after injections with larger doses. Injection of 0·02 μgm. resulted after a period of 5 hr. in about 0·017, 0·005 and 0·003 μgm. in strains S, U_2 and D respectively.

In another series of experiments 0·01 μgm. of paraoxon per fly was injected. After different periods of time a number of flies were homogenized, incubated and the inhibition of the cholinesterase was determined. Paraoxon was found to be eliminated more rapidly by the more resistant flies. Elimination of about 0·0085 μgm. of paraoxon was found after 6¾, 4 and 2¾ hr. in the strains S, U_2 and D respectively.

The fact that only small differences in susceptibility of the strains were found after injection of paraoxon may be explained by the very rapid action in this case. Apparently the elimination process can only protect the flies from the action of paraoxon if it appears in the body gradually.

The occurrence of only small differences in susceptibility after injection of paraoxon makes it less probable that an alteration of the affected enzyme is a cause of the resistance. As cholinesterase may possibly be this enzyme we estimated its activity in the strains and the amount of paraoxon required for its inhibition *in vitro*. Neither quantitative nor qualitative differences were found which could contribute to the resistance.

It is remarkable that strain U_2 —which was selected with γ-BHC —eliminates paraoxon much faster than strain S. This difference is not incidental, for it was found that strain U, a substrain of U_2 that has been bred for some years without selection and has lost its resistance to γ-BHC, has the same susceptibility to parathion as strain S and about the same capacity to eliminate paraoxon. There seems to be in this case some relation between the resistances to these quite different types of insecticides.

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Boron Deficiency in Tea

Tea must be the last commodity crop to show a need for boron. This is probably due to its low calcium requirement and to the fact that tea gardens are very rarely limed. The boron deficiency syndrome first appeared accidentally in a pot experiment testing five different soils for natural potassium uptake. All plants in two soils when they were about 30 cm. high died off at their growing points and developed corky excrescences on the undersides of petioles. These two soils were known from previous pot tests with tomatoes to be deficient in boron.

Half the plants in the experiment were then treated with a complete nutrient solution and half with the same solution without boron. Growth response to each treatment was rapid; but when the new shoots of the plants receiving no boron were about 25 cm. long, brown spots appeared, first in the petioles and then in the laminæ of the flush. As the young leaves developed, the brown spots enlarged in the laminæ and spread along most of the petioles and mid-ribs with considerable suberization. Normal growth was severely upset and affected leaves were strongly wrinkled and contorted. Cork was particularly thick on the underside of the petioles and often spread to the adjacent stems. Laminæ of affected petioles drooped to a near vertical position but remained quite turgid. Internodes were reduced to less than 1 cm. and finally growing-points died. Old leaves that had reached maturity before the boron deficiency became acute, exhibited suberized cracks on both sides of the upper surface of the main veins.

So far as can be ascertained the above has not yet been observed in field-grown tea bushes.

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Rate of Calcium Loss resulting from Ammonium Sulphate Treatment of a Tea Soil

Full results of our investigation into the effect of treatment with ammonium sulphate on the calcium economy of a tea soil will be published elsewhere[1]; but certain preliminary observations can now be made. The soil under study, which is typical of the tea soils of north-east India, can be described as a highly acid loamy sand of alluvial origin, having pH about 4·5 and a low calcium content.

It is generally assumed[2] that the loss of bases resulting from application of 100 lb. of ammonium sulphate can be made good by applying about 110 lb. of calcium carbonate to the soil. The calculated rate of loss under our field conditions is, however, only about a third of the above figure. Our results appear to provide an indirect proof that tea growing in an acid soil and manured with ammonium sulphate absorbs nitrogen in the 'ammonia' form. It also follows from the results that, under our conditions, the tea plant takes up a considerable portion of its nitrogen requirement as 'free nitric acid'. The theoretical basis on which this latter deduction is made has already been explained by Pierre[3]. A chemical analysis of the tea plant growing in an acid soil supports the above deductions. As an illustration, the acidic and basic constituents in plucked tea shoots are given below (calculated by Truog's method[4]). The figures quoted do not refer to the whole plant and will not hold good in all cases, but they will serve to indicate the nature of the balance.

Total base-forming constituents, approximately 90 m.equiv./100 gm. dry weight.
Total acid-forming constituents excepting nitrogen, approximately 38 m.equiv./100 gm. dry weight.
Nitrogen content, approximately 375 m.equiv./100 gm. dry weight.

Our results also indicate that the rate of loss of calcium is higher in the case of shaded tea (that is, tea growing under a canopy of shade trees, in this instance, under *Albizzia chinensis* (Osbeck) Merr.) as compared with unshaded tea. Andrews and Cowart[5] have calculated the effects of fertilizers on the base supply of cotton soils from the unrecovered nitrogen percentage and chemical analysis of seed cotton. Although our case is complex, the same method can be used in the case of tea also. Under the plains conditions in north-east India, 1 lb. of nitrogen applied in the form of ammonium sulphate to unshaded tea is known to bring about an ultimate