XXXII.—*On the Essential Oil of Lime Leaves (Citrus Limetta).*
Preliminary Notice.

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THE leaves and young shoots of the lime tree yield a fragrant yellow oil by distillation with water or in a current of steam. About 230 c.c. were prepared for the purposes of the present investigation.

The oil is moderately soluble in rectified spirit of wine, and has a sp. gr. = 0.8777 at 33° (water at 4° = 1). When agitated with soda solution, no appreciable diminution of volume was observed.

The oil was submitted to fractional distillation, and the several fractions were agitated with a strong solution of sodium bisulphite. It began to distil at about 170°, and the portion which passed over at this temperature did not combine with the bisulphite. It consisted of a hydrocarbon. On the other hand, the fraction obtained at 220—230° formed a crystalline mass with the bisulphite. But as this fraction had no action or but very slight action on silver nitrate, it was inferred that it consisted of a ketone rather than an aldehyde.

About one-third of the original oil boils at a temperature above 280°, has a viscid consistence, and exhibits a green fluorescence. It has, in fact, the appearance of colophene, and may possibly have been produced, at least in part, by the action of heat in the course of distillation.

From the lowest fractions, after digesting with sodium, a hydrocarbon was separated, boiling at 176—177°, inactive to polarised light, and having a refractive index at 30° of 1.4611 for red light. This compound unites with hydrogen chloride, forming a hydrochloride which melts at 49—50° in an atmosphere of hydrogen chloride. It also gives Riban's colour reaction with ferric chloride. Except with regard to its action on polarised light, this hydrocarbon resembles the citrenes.

From the action of sodium on the lower fractions of the original oil, and the production of a deep purple coloration when hydrogen

chloride is passed into them, the presence of terpinol is rendered very probable. It was not found possible to isolate it.

In order to determine the constitution of the ketone already referred to, it was oxidised by means of chromic mixture. Abundance of acetic acid was produced, and pelargonic acid was recognised by means of its copper salt. These facts, coupled with the boiling point ($220-230^{\circ}$) of the compound, and the peculiar smell of pelargonium oil noticeable in some of the fractions, prove that the substance is methyl nonyl ketone, $\text{CH}_3\cdot\text{CO}\cdot\text{C}_9\text{H}_{19}$.

The watery alkaline solution resulting from the first washing of the original oil was found to contain acetic acid, and the liquid submitted to distillation smelt strongly of amylic acetate. The quantity of this compound was, however, too small to admit of its separation.

From these results, it would appear that the principal constituents of the oil of lime leaves are, a citrene (b. p. 176° *circa*), terpinol ($\text{C}_{10}\text{H}_{17}\cdot\text{OH}$), methyl nonyl ketone, and a colophene.