A NEW COLOUR REACTION FOR CITRAL AND CERTAIN OTHER AROMATIC COMPOUNDS.

By Herbert E. Burgess.

(Read at the Meeting, May 2, 1900.)

In various endeavours I have made to discover a quantitative reaction which could be used for the estimation of citral (especially in oil of lemon), I was led to try the action of mercury salts on aldehydes, with a view to determine the amount of reduction, or, if possible, to weigh the compound so formed. Up to the present time I have been unable to base any satisfactory quantitative method on my results, owing to the fact that many other allied aromatic compounds form salts with the reagent I employ, and also that these mercury compounds are not easily crystallizable, and are probably of indefinite composition and transitory.

I have, however, noticed well-defined colour reactions with many of the aldehydes, alcohols, and other constituents found in various essential oils, and it is to these reactions that I wish to draw attention now.

The reagent mentioned above is prepared as follows:

Ten grammes of mercuric sulphate are dissolved in and made up to 100 c.c. with 25 per cent. pure sulphuric acid.

Then 2 c.c. of the substance to be examined are placed in a small phial fitted with a cork, and 5 c.c. of the reagent added. The whole is then vigorously shaken, any change in colour noted, and again examined after standing for about ten minutes. A porcelain tile will be found useful when only small quantities of an oil can be obtained. The sensitiveness of the colour reaction is not in any way impaired by the use of such small quantities. One drop of the oil is placed on the tile and 3 to 4 drops of the reagent added, and well stirred with a glass rod.

Twenty-five per cent. sulphuric acid itself gives no reaction with the substances I have examined.
The following reactions are characteristic:

Citrinal.—Bright red colour forms on shaking, which rapidly disappears, and at the same time a whitish compound is formed, which floats on top of aqueous portion.

Citronellal.—A bright yellow colour forms on shaking. The compound formed retains the yellow colour for some time.

Limonene.—A very faint flesh colour at first forms, but almost instantly disappears, leaving a white compound.

Linalyl Acetate.—A brilliant violet colour, which remains permanent, increasing slightly in depth.

Linalol.—Quickly gives a deep violet colour.

Carophyllene.—A yellowish compound, but not any violet colour.

Eugenol.—A slight violet colour on standing for some time.

Cinnamic Aldehyde.—No reaction.

Terpineol.—Flesh colour and precipitate.

Formic Aldehyde.—No reaction.

Acetic Aldehyde.—No reaction.

Benzaldehyde.—No reaction.

Anisic Aldehyde.—No reaction.

The following essential oils have also been examined:

Oil of Cassia.—Yellowish compound formed, floating on the oil. No reduction on shaking.

Oil of Cinnamon.—Brown compound formed and slight violet-coloured aqueous portion. On standing, the whole becomes a black, solid mass.

Oil of Cloves.—On shaking and standing for some time, a violet colour is formed in the aqueous portion, and increases on standing.

DISCUSSION.

The President having invited discussion,

Mr. Chapman said that it would be interesting to know something of the nature of the compounds which the author had observed to be formed with the mercuric sulphate. A great deal of interest attached to many colour reactions, and more especially to those which afforded means of readily identifying some of the constituents of essential oils. But their general usefulness was to a great extent limited by the fact that they were, more than any other reactions, subject to the disturbing influence of impurities. The compounds existing in essential oils were very often extremely difficult to separate in a state of purity, when working with small quantities of material, and consequently it was possible that these colour reactions might on that account have a somewhat limited application.