had not increased. Drying the peel in the air at room temperature did not seem to affect the invertase activity greatly. One hundred cc. of a 30% sucrose solution, showing an initial rotation of 55.5° when treated with 5 grams of dried peel of the shipment of August 12th, showed a rotation of 20.7° after 17 days.

Work of a similar nature has been done by Bigelow and Gore[1] and by Scurti and DePlato[2]; the results here given are quite similar to those of the former authors, and are presented mainly for the reason that these represent oranges ripening in the Florida producing region.

Summary.—The peel of the orange contains peroxidase, catalase and invertase enzymes, but no oxidase to the common reagents. During ripening, the proportion of the total weight represented by the peel decreases while that represented by the weight of the juice increases about equally in terms of percentage of the total weight. While the total amount of acid in the juice decreases only slightly, its concentration decreases materially; the sugar meanwhile increases both in concentration and in total amount. These latter results are essentially similar to those of other investigators.

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NOTE.

Precipitating Alkaloids by Lloyd's Reagent.[3] *Preliminary Note.*—The brief note on John Uri Lloyd's patent[4] involves reactions of intense scientific interest and wide scope, the extent of which has been perceived by no one more clearly than the discoverer himself. Reserving a more detailed statement of his labors for future publication, Professor Lloyd, at the beginning, has kindly given me the privilege of investigating the chemical and physical nature of his reagent.

This reagent is essentially hydrous aluminium silicate, derived from Fuller's earth. The reagent has the startling quality of precipitating alkaloids completely from neutral or acid solutions thereof. The alkaloid may be recovered by treatment with a base and an alkaloidal solvent. Quinine bisulfate was used exclusively in the following experiments, since Professor Lloyd himself has extended his research over a great number of alkaloids and alkaloidal salts, including those occurring in plants.

The reagent had approximately the following composition: H_2O, 17.41%; SiO_2, 55.30%; Al_2O_3, 9.82%; Fe_2O_3, 14.18%; CaO, 1.58%; CO_2, % not determined. Heating the material to about 130° did not destroy its

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[1] THIS JOURNAL, 29, 767–75 (1907).

[2] *La Stazione Sperimentale*, 41, 435–55 (1908).

[3] The naming of the reagent has been urged by Dr. M. I. Wilbert who was among the first to be apprised of John Uri Lloyd's discovery.

[4] *C. A.*, 7, 683.

peculiar activity; but a red heat expelled an additional quantity of water rendering the reagent inert. When the reagent is exhausted with hydrochloric acid, the residual earth is still effective. The activity of the reagent is not impaired by concentrated nitric acid or by *aqua regia*. After the alkaloid has been removed from its combination with the reagent, the residual material retains the full effect. This process results in a jelly difficult to filter and slow to settle; it is precipitated readily by addition of an acid, or an alkaloidal salt. In drying, the jelly shrinks to a very small bulk; conversely, the solid expands remarkably in contact with water. The jelly precipitates inorganic salts also, *e. g.*, barium chloride, lead acetate, zinc sulfate, etc.

It will be observed that the phenomenon is one of colloidal chemistry. The thought suggested itself that water-deposited clay might show the same action; indeed it was found by the writer last summer that the fine blue clay so abundant in the hills of Cincinnati, after treatment with hydrochloric acid, had the same effect upon alkaloidal salts, rather faintly as may be expected, yet very distinctly.

In the course of this investigation, other colloidal materials were also examined, and it was found among others that colloidal silicic acid, or colloidal arsenious sulfide plainly precipitated quinine sulfate.

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