produce the desired temperature and the temperature of the tube regulated with the same degree of constancy. J. N. PEARCE.

PHYSICAL CHEMICAL LABORATORY,
THE STATE UNIVERSITY OF IOWA.

Measurement of the Vapor Pressures of Solutions.—In the December number of THIS JOURNAL[1] there is an article by Frazer and Lovelace on the measurement of vapor pressures of solutions by means of the Rayleigh manometer. A very similar method will be found described by me in THIS JOURNAL in 1908,[2] except that I employed the form of manometer devised by Morley.[3] The principle of the two manometers is, however, the same, and the sensitiveness of one can be made fully equal to that of the other. O. F. TOWER.

CLEVELAND, O.

[CONTRIBUTIONS FROM THE DEPARTMENT OF CHEMISTRY OF COLUMBIA UNIVERSITY, No. 243.]

THE ADDITION COMPOUNDS OF ALDEHYDES AND KETONES WITH ORGANIC ACIDS.

BY JAMES KENDALL AND WILLIS A. GIBBONS.

Received November 14, 1914.

In the first article of this series,[4] it has been shown that dimethylpyrone forms addition products with organic acids, and that these addition products are uniformly more stable the stronger the acid employed. The basic (unsaturated) properties of dimethylpyrone were regarded as due to the presence of the carbonyl group, $>C = O^{\pm}$, the compounds formed being oxonium salts. These views have been more fully developed in subsequent papers,[5] and found to be consistent with the experimental results throughout.

In the present investigation the same problem is taken up from the reverse direction. The *acid* component of the system is kept constant, while the *basic* component, containing the typical carbonyl group, is made to vary. For the acid component trichloroacetic acid was selected, since in the previous work it has been found, as the strongest of the simple organic acids, to give the most stable compounds with substances containing unsaturated oxygen. For the basic component two substances were chosen as starting points: benzaldehyde, the simplest aromatic aldehyde, and acetophenone, the simplest aromatic ketone.[6] The examination of the freezing-point curves of these substances with trichloroacetic

[1] **36**, 2439 (1914).
[2] THIS JOURNAL, **30**, 1219 (1908).
[3] *Am. J. Sci.*, **13**, 455 (1902).
[4] Kendall, THIS JOURNAL, **36**, 1222 (1914).
[5] Kendall, *Ibid.*, **36**, 1722 (1914); Kendall and Carpenter, *Ibid.*, **36**, 2498 (1914).
[6] Aliphatic aldehydes and ketones will be studied in a future communication.