The chlorides of various metals, with the exception of ferric chloride and cupric chloride, were found to lessen the time required for the gelation of the colloid, although the difference in basic radical caused no great difference in this period.

The two acid sodium phosphates were found to cause silicic acid to jell very rapidly, but the trisodium phosphate at strong and medium concentrations had a strong peptyzing effect. The di- and trisodium citrates accelerated the setting of the colloid greatly, the effect decreasing with the concentration, but in the case of the monosodium citrate, the time required for the setting of the colloid was the same at all concentrations.

The acetates of various metals had the greatest jelling effect, notably the acetates of the "heavy metals," excepting mercury. The effect of the inorganic salts of the "heavy metals" was slight.

The alkali salts of the various organic acids had an extremely powerful accelerating effect upon the setting of colloidal silicic acid, although the carbonates and the bicarbonates had a peptizing effect in medium to dilute concentrations.

CINCINNATI, OHIO.

THE DETECTION OF WOOD ALCOHOL IN BEVERAGES, ETC.*

BY JOSEPH L. MAYER.

Complying with the request of the New York City Health Commissioner, many local pharmacists are now dispensing whiskey on physicians' prescriptions, and due to the number of deaths which resulted recently from drinking beverages containing wood alcohol, many inquiries are being made for a test to detect this dangerous adulterant.

The test for the detection of methyl in ethyl alcohol, found on page 36 of the United States Pharmacopoeia (which is practically that of Denigès), is not of much value when applied to beverages, etc., as sugar and glycerin in the distillate will give a weak reaction, indicating the presence of methyl alcohol where none occurs.

The method, which was official in the U. S. P. VIII (page 34), oxidation of the liquid with a heated copper spiral, is that of Scudder and Mulliken (*Amer. Chem. Jour.*, 21, 266), and is far from being dependable, due to the fact that, as noted by Deghuee (U. S. Dept. of Agr., Bureau of Chemistry, *Bull.* 99, 53) and others, ethyl alcohol will form traces of formaldehyde if the oxidation is carried too far and, thus methyl alcohol might be indicated where none was present.

The suggestion of Sieker (*The Druggists Circular*, March 1901, 65), to heat the alcoholic liquid and then use the heated copper spiral to oxidize the vapor above the liquid and note whether there is produced an irritating vapor, which acts upon the mucous membrane and is characteristic of formaldehyde, would be satisfactory were it not for the fact that pure ethyl alcohol very frequently responds faintly to this test.

Without going any further into the subject, it is sufficient to say that all of these copper spiral tests as now applied are unsatisfactory.

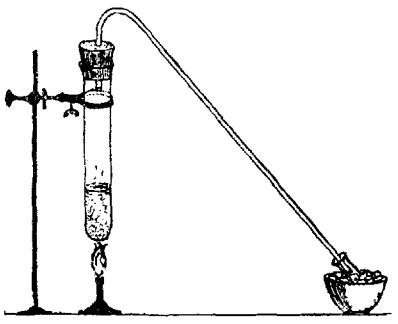
Skilled analysts recognizing this fact employ the Trillat test (*Analyst*, 24, 13, 211–212, 1899); that of Riche & Bardy (Allen's "Commercial Organic Analysis,"

* Read before the Kings County Pharmaceutical Society, February meeting, 1920.

3rd Edition, Vol. 1, p. 80); and the refractometric method of Leach and Lythgoe (*Jour. Amer. Chem. Soc.*, 27, 964, 1905), for the detection and determination of methyl alcohol in beverages, etc. These methods are thoroughly reliable but are not suitable for the use of pharmacists, as even trained chemists regard them as tedious and time-consuming.

After a thorough trial of the numerous tests suggested for the detection of methyl alcohol in beverages, etc., I have adopted the following with excellent results. The method is in effect that of Hinkel (*Analyst*, 33, 417), and is applied by me as follows:

Into a test-tube about 8 inches long and one inch in diameter, capable of being connected to a Liebig condenser by means of a cork and bent tube, add a piece of pumice stone which has previously been heated to a white heat and plunged into water: One mil of the suspected liquid; 0.800 gramme ammonium persulphate; 3 mils of 20 percent sulphuric acid; and 16 mils of water. Connect with the condenser and distil, heating carefully to prevent foaming. Reject the first 4 mils of distillate and then collect three succeeding portions of 2 mils each in four-inch test-tubes. To each of these three add a few drops of one percent morphine sulphate solution and, after mixing thoroughly, underlay with strong sulphuric acid by pouring the acid carefully along the inner wall of the test-tube to form a substratum. The presence of methyl alcohol in the material is indicated by the formation of a violet ring at the zone of contact in any or all of the three tubes. If the tubes are examined in bright daylight and held against a white background, such as a sheet of white paper, the coloration appears much sharper. If the violet ring does not appear at once allow the tubes to stand about ten minutes, reëxamine them and, if necessary, gently rotate them so as to form a slight admixture of the two layers. In the absence of methyl alcohol there will be formed a light brown or orange-colored ring at the zone of contact, which is due to the acetaldehyde formed by the oxidation of the ethyl alcohol.



This Apparatus May Be Used in Place of a Liebig Condenser.

This test, applied as above to various whiskies, brandies, gins, wines, spirit of camphor, chloroform liniment, tincture of vanilla, essence of lemon, ethyl alcohol, and other substances known to be free from methyl alcohol, produced a negative result in every instance.

One percent of methyl alcohol was then added to each of the samples, which, being subjected to the test, yielded a very positive reaction.

In originally applying the test to samples of ethyl alcohol, free from methyl alcohol, the first two mils of distillate always gave a faint rose-red reaction and, as a result, it was decided to reject the first 4 mils. The original method calls for a one-half of one percent solution of morphine hydrochloride. For the sake of convenience a one percent solution of morphine sulphate is employed.

The test is dependent upon the fact that methyl alcohol is oxidized to formaldehyde, which is distilled over and then identified by the Marquis reaction, which

is that official in the U. S. P. for the identification of morphine (U. S. P., page 276). It was found that by employing a small piece of pumice stone, previously heated to a white heat to keep it from floating, bumping prevented and the liquid distilled quietly.

AN IMPROVISED CONDENSER.

In view of the fact that not all pharmacists have access to a Liebig or other form of water-jacketed condenser, I carried out a series of experiments to ascertain whether the test could be made without the use of such a condenser, by having the long arm (about 25 inches) of the bent tube extend into the test-tube receiver, which was placed in water containing ice.

The three fractions of 2 mils each were tested, and in every case where a positive reaction was obtained by employing the Liebig condenser an equally characteristic color was produced by this apparatus, thus indicating that if the water-jacketed type of condenser is not at hand, the simple expediency of using a long glass tube is satisfactory.

The above method of testing for methyl alcohol in beverages and pharmaceuticals is trustworthy, easily applied and rapid.

RESEARCH AND ANALYTICAL LABORATORIES
OF THE LOUIS K. LIGGETT COMPANY.

VINEGAR BEE.*

BY LEASURE K. DARBAKER.

Some years ago there existed a fad for making vinegar artificially, by using the "vinegar bee," molasses, sugar and water. This fad has returned, probably brought back by the national prohibition. Many enterprising firms are advertising the vinegar bee under various names as vinegar bees, beer bees, wine bees, Australian bees, California bees and other designations. Extravagant claims are made for this product and a fancy price is asked, which is much out of proportion to the original cost and value. Some years ago the writer studied this peculiar collection of organisms known as the "vinegar bee" and submits the following account of his results, which are not complete, due to the loss of some of the notes on this work.

Vinegar bees consist of a mixture of various organisms, held together in masses by the organism's mucilaginous sheath and also by the filaments of the mold, with which the bacteria and yeasts are mixed.

Our cultures were obtained from various sources and were grown as follows: About 15 Gm. of the dried bee or 30 Gm. of the moist bee were added to 1 l. of water, in which had been mixed one tablespoonful of molasses. The cultures were placed in a wide-mouth vessel, covered with gauze, and kept at room temperatures and were fed every morning by adding to each culture one teaspoonful of sugar. When a light-colored molasses and white sugar were used a pale-yellow colored vinegar was produced, but when dark-colored molasses and brown sugar were used, the vinegar was of a dark brownish color.

In about 10 days the greatest amount of alcohol was obtained and in about

* Read before Pittsburgh Branch A. Ph. A., January 7, 1920.