In view of the great amount of work that will have to be done in determining the constitution of the large number of hydrocarbons with high molecular weights in Pennsylvania, California, and other petroleums, it would be a great advantage if a method for the determination of carbon and hydrogen could be devised that would avoid the tedious routine of the present method. But with present knowledge of this subject this method is probably all that can be hoped for. The Geissler potash bulb and the sulphuric acid tube seem to be as convenient forms as can be devised and they are capable, as shown above, of retaining carbon dioxide and water with as rapid delivery as is consistent with complete combustion. Rubber corks are objectionable, but they are the only convenient and reliable means of connection available.

We have tried successfully weighing the bulbs full of oxygen, thus avoiding the expulsion of oxygen by air. But since the time necessary to carry forward all the carbon dioxide is equivalent to that necessary to displace oxygen by air, there is nothing gained by weighing the bulbs filled with oxygen. The precautions necessary to insure cleanliness of the bulbs and constant conditions of moisture and temperature in weighing must be carefully observed.

CIDER VINEGAR: ITS SOLIDS AND ASH.

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DURING the past few years the question of vinegar adulteration has received considerable attention from food chemists. Heretofore the sophistication has consisted almost entirely of the sale of colored distilled vinegar for pure fermented apple juice. As distilled vinegar contains little or no solids or ash this fraud was easily detected by very simple determinations. During the year 1899, however, there appeared for sale on the markets of this state, vinegar containing the necessary amount of solids and ash required by the statute for cider vinegar; but on ordinary analysis of this the solids and ash did not have the usual appearance of solids and ash of vinegar from pure apple juice. It was to ascertain the character of these vinegars

that the investigation of the solids and ash of cider vinegar was made.

THE SOLIDS.

The solids of pure cider vinegar consist of glycerol, albuminous substances, gums, malic and other organic acids, and mineral matter. The solids of pure cider vinegar give no rotation with the polariscope and little or no reducing action on Fehling solution after the customary clarification with lead acetate. Pure cider vinegar gives with lead acetate a heavy, flaky, light reddish brown-colored precipitate, which carries down with it all the coloring-matter leaving the solution above clear and nearly colorless. For analysis of solids 1000 cc. of pure cider vinegar was evaporated to a thick sirup on a water-bath and this residue taken up several times with distilled water and the water evaporated off to remove acetic acid. The suspected vinegars were treated in the same manner. The appearance of the solids on evaporation should be noted. Pure cider vinegar solids have a pleasant baked apple odor and are light and foamy in appearance. The spurious vinegars gave solids like molasses in appearance and of sharp acid odor. These residues gave the following results on analysis :

	Pure cider vinegar solids.	Apple pomace vinegar solids.	Suspected vinegar. (1)	Suspected vinegar. (2)	Boiled cider.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Reducing sugar before inversion.	0 to 14	0	42.88	56.82	61.12
" " after " .	0 to 10	0	33.36	57.04	66.45
Polarization before inversion.....	0	0	+40.7°	—31.14°	—17.9°
" after "	0	0	+38.8°	—34.25°	—25.0°

THE ASH, OR MINERAL MATTER.

The ash, or mineral matter, of pure cider vinegar consists principally of potash with small amounts of sulphuric anhydride, phosphoric acid, alumina, lime, magnesia, etc. The total amount should not be less than 0.25 per cent. For analysis, 100 cc. of the vinegar are taken for the determination of the total solids and ash in the usual way. The ash is dissolved in dilute hydrochloric acid and quantitative analysis made by the usual

method. The results in the following table are given as the average composition as determined by a large number of analyses. The suspected vinegars, Nos. "1" and "2," and also the ash of vinegar made by repressing moist fermented apple pomace, are given for comparison.

	Pure cider vinegar ash. Per cent.	Apple pomace vinegar ash. Per cent.	Vinegar. (1) Per cent.	Vinegar. (2) Per cent.
Calcium Oxide (CaO)	3.40 to 8.21	4.73	4.70	37.95
Magnesium oxide (MgO) ...	1.88 to 3.44	4.12	2.00	2.22
Potassium oxide (K_2O)	46.33 to 65.64	37.00	None	7.84
Sodium oxide (Na_2O).....	Trace to trace	Trace	49.71	Trace
Sulphuric anhydride (SO_3) .	4.66 to 16.29	34.78	27.04	12.74
Phosphoric anhydride (P_2O_5.	3.29 to 6.66	9.66	0.005	1.82
Iron oxide (Fe_2O_3)	None to trace	Trace	Trace	1.60
Carbon dioxide, loss, etc....	40.44 to 0	9.61	16.54	35.83

The results of these analyses plainly showed that suspected vinegar No. 1 was composed of dilute acetic acid, glucose, and soda-ash. Suspected vinegar No. 2 was a mixture of acetic acid, boiled cider, and lime.

LABORATORY MICHIGAN DAIRY AND FOOD DEPARTMENT,
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NOTES.

Test for Tin.—I have found the blue color produced by the action of stannous chloride upon ammonium molybdate to serve as a very delicate test for tin; and have had my students use it for the last few months with very good results. In working this process one should go through the usual separation, filter off the black flakes, dissolve them in hydrochloric acid, then take a few drops of this solution and add a little water and then some ammonium molybdate. Blue color shows the presence of tin.

To determine the delicacy of the test, I used a standard solution of stannous chloride, and noticed results obtained from the mercuric chloride and ammonium molybdate tests.

Strong solution of $SnCl_2$ gives a heavy blue precipitate; with mercuric chloride a heavy white precipitate.

A solution of $SnCl_2$ containing 0.000021 gram to 1 cc. gives a deep blue color; with mercuric chloride a faint cloudiness.

A solution of $SnCl_2$ containing 0.0000042 gram to 1 cc. gives a