from a mixture of barley and malt. Malt vinegar is of a
decided brown color, and in specific gravity varying from
1.017 to 1.019, the strongest known as proof vinegar, con-
taining from 4.6 to 5 per cent. of acetic acid. Glucose
vinegar is prepared from a mixture of glucose and water,
by allowing it to undergo alcoholic fermentation, and then
running it through the generator in the usual way. The
vinegar sometimes contains large quantities of dextrine
and sulphate of lime, left in the glucose as an impurity
during the process of manufacture.

Molasses vinegar is made in the same way as glucose
vinegar.

The larger part of the vinegar now on the market is
made from a dilute alcohol. This vinegar as it comes
from the converters is colorless as water. It is colored by
the addition of burnt sugar (caramel) and sold as cider
vinegar.

*Characteristics of Different Vinegars.*—Cider vinegar
should have a yellow color and a cider-like odor. Evapor-
ated to dryness on a water bath it leaves a dark brown resi-
due, having a taste of burnt apples. The amount of ex-
tract is from 1.5 to 5 per cent., depending on the age of the
sample and method of manufacture. Cider vinegar made
by the old process contains malic acid, and on the addition of
acetate of lead gives a heavy yellowish precipitate of malate
of lead. The ash from cider vinegar contains considerable
quantities of alkaline phosphate. The residue from wine
vinegar contains the salts found in wine. It is dis-
tinguished from other vinegars by containing cream of tar-
tar. According to the *Edinburgh Pharmacopoeia*, it may
be distinguished from malt vinegar by adding ammonia in
slight excess, which causes in wine vinegar a purplish
muddiness and slowly a purplish precipitate, but in malt
vinegar no precipitate or only a slight one.

Spirit vinegar made from dilute alcohol should leave only
a very small residue; if caramel has been added to color it
the residue will be of a dark black brown and leave no ash
on burning.

Beer vinegar is yellow and has an odor of sour beer. It
contains as much as 6 per cent. of solids on evaporation. Beer vinegar does not contain more than 2.5 to 3 per cent. of acetic acid and requires to be fortified by the addition of a stronger vinegar. Glucose vinegar has the taste and smell of fermented grain. It usually contains considerable impurities, such as dextrine, sulphate of lime and sometimes sodium chlorides.

*Adulteration of Vinegar.*—Blythe classifies the adulteration of vinegar as follows:

1. Water; 2. mineral acids, usually sulphuric, rarely hydrochloric or nitric; 3. metallic adulterations; or, more properly, impurities as they are introduced from the apparatus. There are arsenic, derived from the sulphuric acid; copper, lead, zinc and tin from the solvent action of the acetic acid on any metallic surfaces with which they may come in contact; 4. Pyroligneous acid; 5. various organic, such as coloring agents, capsicum, etc.

The chief adulteration is the addition of whiskey vinegar to cider vinegar, or the coloring of whiskey vinegar with caramel, and selling it for cider vinegar.

The analysis of a sample of vinegar consists in a determination of the specific gravity, the amount of acid present and total solids. The specific gravity is taken by a Westphal balance. To determine the acidity 20 c. c. are measured into a beaker, 100 c. c. of water and a few drops of phenol–phthalein (in alcoholic solution) are added, and the acid titrated with a normal alkali solution. The solids are found by evaporating 20 c. c. to dryness at 100° C. (212° F.) Thus far no free acid other than acetic or other impurities have been found in Wisconsin vinegar.

The following table gives the analyses of vinegar examined: