CIDER AND VINEGAR.

By W. French Smith, Ph. D.

This investigation was commenced in September, 1882, to ascertain the maximum and minimum percentages of alcohol and acetic acid which genuine apple-juice would produce.

In each case the apples were selected, and the juice expressed under my own supervision, and the cider was allowed to ferment slowly for two months in a cellar, at an average temperature of 14°C. At the expiration of this time the alcohol was determined by the ordinary method of distillation and specific gravity. Duplicate estimations were made with each sample.

The ciders numbered I. to VI., inclusive, were of agreeable flavor and aroma, but VII. and VIII. were barely palatable.

Cider No. I., prepared from selected apples of the variety generally known as "August Sweets," gave 9.40 per cent. alcohol.

Cider No. II., from average "August Sweets," gave 6.05 per cent.

Cider No. III., from "August Sweets" not thoroughly ripened, gave 4.80 per cent.

Cider No. IV., from selected "Porter" apples, gave 4.85 per cent.

Cider No. V., from "Porter," only partially ripened, gave 4.05 per cent.

Cider No. VI., from "Greening" apples picked from the trees, gave 4.00 per cent.

Cider No. VII., from "Greening" apples taken from the ground, gave 3.85 per cent.

Cider No. VIII., from poorest "Greening" apples taken from the ground, gave 3.00 per cent. alcohol.

The average of these determinations is five per cent.*

These results indicate that a good cider should contain about five per cent. and a fair sample ought not to fall below four per cent. of alcohol, and if it is less than 3.5 per cent. the cider must have been diluted, or prepared from extremely bad apples, for in number VIII. I endeavored to select a fruit which would produce a cider of the lowest possible alcoholic strength. In my opinion cider made from such apples is unsuitable for use.

* These percentages are *by weight.*

In the autumn of 1883 I determined the acidity and solid residue in the first six of these samples. Nos. VII. and VIII. could not be protected from putrefactive decomposition, during the summer of 1883.

The acid was estimated by titration with standard sodium hydrate, and the residue by evaporation, and drying at 100°C.

Vinegar No.	Per cent. of acetic acid.	Per cent. of solid residue.
I.	10.10	3.64
II.	6.80	3.35
III.	5.65	3.10
IV.	5.70	3.20
V.	4.40	2.70
VI.	4.45	3.22
Average.	6.18	3.20

The actual amounts of acetic acid found are lower than the alcoholic percentages in the original ciders demand, but this can be explained by imperfect acetification. I find manufacturers pretty generally agree that perfect conversion, by the cellar process, requires from two and a half to three years. I regret that I was unable to examine these samples again later, owing to an accident.

The percentages of alcohol found in the original ciders would require the following acidities, if the oxidation had been complete, viz.:—I., 12.22 per cent.; II., 7.86 per cent.; III., 6.24 per cent., IV., 6.30 per cent.; V., 5.26 per cent.; VI., 5.20 per cent.

Theoretically, one part of alcohol should yield about one and one-third parts of acetic acid; practically, the manufacturers realize about one part acid for each part of alcohol. Calculating upon this basis, the averages of the vinegars produced by the first six ciders would be 5.53 per cent. acid.

While a genuine cider vinegar may contain less than 4 per cent. acetic acid, it is evident that a good article should consist of about 5 per cent., and vinegar prepared from the better grades of cider will represent from 5.5 to 7 per cent. acidity.

I believe that apples must be *carefully selected* to yield a vinegar above 7 or 8 per cent.

It is noticeable that samples V. and VI. could be preserved,

while putrefactive decomposition could not be arrested in Nos. VII. and VIII. In one case the difference in alcoholic strength is only 0.15 per cent.

The lowest solid residue is 1.2 per cent. higher than the figure defined in the Massachusetts Statutes as the minimum for a merchantable vinegar, *i. e.* 1.5 per cent., while the average is more than double this standard.

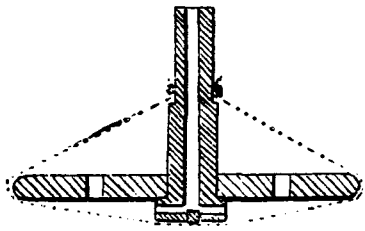
BOSTON, March 1, 1885.

TWO NEW FILTERS AND A NEW ASPIRATOR.

BY P. CASAMAJOR.

I propose to describe two new filters which I have lately used with advantage, and also an apparatus for starting an aspirator. This apparatus may be applied to one of the new filters described or to others working in a similar manner.

Fig 1



One form of filtering apparatus is shown in section in Fig. 1. The vertical portion is a tube open at the top. The horizontal portion is a circular disc, provided with a few holes to establish communication between the upper and lower surfaces of the disc. Below the disc, horizontal openings are made to allow the vertical tube to communicate with the space below the disc. The vertical tube may have the same diameter throughout, but the walls of the tube are thicker in the lower portion than in the middle, and in this thicker than in the upper. The tube does not taper uniformly on the outside, but there is a shoulder between each portion and the one above it, the lower shoulder being designed to hold the disc in its place.

The filtering medium used with this apparatus is a circular piece of cloth, the center of which is placed under the vertical tube. The cloth is folded over the edge of the disc, so that the edges of the cloth meet above the shoulder between the middle and upper portion of the tube. These edges are fastened above this shoulder by