alcohol required to hold a globule of fat in equilibrium at 15° C., has a strength of 57 per cent., then: (57 — 53.7) × 0.18 = 3.3 × 0.18 = 5.95, or say $\frac{6}{10}$ of oleomargarine. If the alcohol had a strength of 58, then (58 — 53.7) × 0.18 = 4.3 × 0.18 = 7.72, or about $\frac{8}{10}$ of oleomargarine.

The proportions of butter and oleomargarine in a mixture may be also determined without the aid of an alcohometer, by using the two solutions of 53.7 per cent. and of 59.2 per cent. These may be placed in graduated glasses and poured cautiously into a third glass, until an alcohol of sufficient strength is obtained to keep in equilibrium a globule of the fat under examination, at 15° C.

The relative volumes of the two solutions used in making the mixture, give the proportions of butter and oleomargarine.

XXI.—Detection of Starch Sugar Syrup Mixed with Sugar-House Molasses.

By P. Casamajor.

In previous communications I have given processes for detecting the adulteration of cane sugar by starch sugar. The adulteration of sugar-house syrups by starch glucose is still more extensively practised than that of sugar, and a great portion of the syrups sold by retailers in this market is mixed with starch glucose.

This form of adulteration may be very easily detected by the use of strong methylic alcohol, in which the alcohometer of Tralles, or of Gay Lussac, will indicate about 93½°.

A straight sugar-house syrup, when mixed with three times its volume of this strong methylic alcohol, will dissolve by stirring, giving a very slight turbidity, which remains suspended, while yrups c ontaining the usual admixture of starch sugar give a very turbid liquid, which separates, when left at rest, into two layers, the lower being a thick viscous deposit containing the glucose syrup.

Considerable quantities are sold of a thin syrup, of about 32° Beaumé, in which the proportion of sugar to the impurities is greater than in common sugar-house molasses. When a syrup of this kind is stirred with three times its volume of methylic alcohol, a marked turbidity and deposition will take place, which consists of pure sugar. The crystals are hard and gritty; they adhere to the sides of the glass, and are deposited on the bottom. There is no resemblance between this precipitate and that due to starch sugar syrup.

It may not be useless to mention, that if a straight sugar-house

syrup, of about 40° Beaumé density, is stirred with three times its volume of ethylic alcohol of about 93½°, the syrup will not dissolve. Hence, ethylic alcohol of this strength is not suitable for distinguishing a syrup mixed with starch glucosé syrup from a straight sugar-house syrup.

The presence of starch sugar in sugar-house molasses may be easily detected by the optical saccharometer, when the syrup has the usual density of about 40° Beaumé, and when starch syrup has been added in the usual quantities.

For making the test, the usual weight should be taken (16.35 grms. for Dubosecq's saccharometer, and 26.048 grms. for Ventzke's instrument). The direct test should show a percentage of sugar not higher than the number of Beaumé degrees indicating the density, and it may be from 1 to 3 per cent. lower. To understand this we must refer to the composition of cane sugar molasses of 40° Beaumé:

Sugar	37.5
Soluble impurities	37.5
Water	25.0

If the direct test should indicate 55 per cent. of sugar, and if the molasses was straight, the composition would be:

Sugar	55
Soluble impurities	20
Water	25

Now, a product of this composition would not be a clear syrup at 40° Beaumé, but a mixture of syrup and crystals. Therefore, if the product is a clear syrup of 40° Beaumé, and it tests 55 per cent., it cannot be *straight.— Q.E.D.*

The presence of starch sugar in a sugar-house molasses may also be detected by the copper test. The possibility of applying this test, as well as those already indicated, rests on the fact that starch glucose is always added in very large quantities for the purpose of adulteration. A small addition could not be satisfactorily detected.

The detection by the copper test rests on the observation that about one-half of the soluble impurities in sugar-house molasses consists of glucose in the shape of inverted sugar. We have seen above that for a molasses of 40° Beaumé, the soluble impurities amount to about 37½ per cent. We may then lay down the rule that the percentage of glucose shown by the copper test cannot, in a straight sugar-house molasses, be much greater than one-half the number expressing the density in Beaumé degrees. The reason is obvious from what has been said of the test by the optical saccharometer.