

presence of 10 per cent. of resin or mineral oil in non-drying oils delays their solidification with the nitrate of mercury test.

Oils may be classified according to their commercial value. The first class embraces only sperm oil. The tests recommended by Mr. Coleman, for adulterations in this oil, are five in number :

1. Examine for mineral oil.
2. Examine into its drying properties by exposing some of the oil for some hours in a thin layer to 200° F.
3. Notice that other fish oils darken much more notably than sperm oil when shaken up with dilute sulphuric acid.
4. The most likely adulterant is African fish oil, which produces intense heat when mixed with concentrated sulphuric acid; thus, a mixture of 1 part acid and 4 parts oil develops about 112° of heat, against a development of upward of 250° with African fish oil. The specific gravity of African fish oil is said to be about 0.866, and it is a very bad lubricant. Other adulterating oils may also be detected by this test.
5. That, as the use of sperm oil is dependent upon its viscosity, an accurate test thereof, in a suspected sample, may be useful.

Class II comes next in value to sperm oil, viz., the oleins obtained by pressure from animal fats, known in the market as tallow olein, lard olein, and neatsfoot oil. Lard and tallow oils should have a specific gravity of 0.915. If the oil is heavier, it may contain fish oils, seed oils, olive oils or cocoa-nut olein. Olive oil, cocoa-nut oil or fish oils can be detected by the smell, color, taste and Calvert's tests, so that the real difficulty lies with seed oils, one of which, rape oil, is nearly of the color, and exactly of the specific gravity, of animal oleins. If a sample of animal olein be too heavy, it probably contains some partially-drying oils like cotton seed, which range from .920 to .930. Those seed oils which cannot be detected by variations in the specific gravity are rape, henbane-seed, horse-chestnut and plum-kernel oils. The last three may be disregarded. The processes for the detection of rape are the following :

1. Heating to 400° F. and allowing to cool to 90°. Tallow and lard oils are rendered odorless, while the peculiar penetrating smell of rape oil is developed.
2. One part, by weight, of the oil is mixed with three parts of concentrated sulphuric acid, and the heat developed is compared with the heat developed by a similar experiment made with pure oil.
3. The nitrate of mercury test is said to indicate the presence of even 10 per cent.

Finally, lard oil is distinguished from tallow olein by difference of viscosity.

Class III embraces the olive oils. The adulterations to be sought are drying oils, fish oils, mineral and resin oils. The specific gravity of olive oil is 0.917. Rape oil would make it lighter, and cotton-seed oil heavier, but a proper mixture of the two could be ad-