

view is that the oil contains certain active principles, which some have actually attempted to separate from the oil itself.

Certain researches by Heyerdahl seem to show that cod-liver oil has a much more complex composition than was previously believed, and that there is neither olein nor stearin in the oil, and only four per cent. of palmitin, while two very unstable glycerines, which have been called therapin and jecolein are each present to the extent of twenty per cent. The composition of cod-liver oil is therefore something *sui generis*.

There is, unfortunately, a great tendency in cod-liver oil to the formation of hydroxy-acids, bodies not only actually injurious in themselves, and very apt to set up gastric disturbances, but imparting to the oil a nauseous taste.

It is very important, therefore, that great care should be exercised in the manufacture of the oil, and that the livers used should be fresh and carefully selected. The best oil will, however, become rancid when exposed to the air for some length of time.

At the present day cod-liver oil is probably in much less favor as a remedy than it was formerly. The amount of oil consumed by the patients at the Brompton Hospital has greatly diminished, and the quantity used by others than hospital patients has probably become still more restricted. I am, however, old-fashioned enough to believe that it is one of the best remedies we possess for the treatment of chronic cases.

The dose and mode of administration are matters of considerable importance. As to the dose, opinions have varied considerably. The practice at the Brompton Hospital is ordinarily to give it in doses of one or two teaspoonfuls twice a day. Larger doses are seldom given. Jaccoud was of the opinion that the best results were obtained by the administration of doses of from two to three tablespoonfuls three times a day. We do not consider that such large doses are necessary or beneficial. The oil should not be given on an empty stomach, but either along with or after food. Some patients can be induced to take the oil with orange wine when they will not take it by itself.

A great variety of modes of administration have at one time or another been introduced.

Flavorings such as eucalyptus, cocoa, anise, etc., have been added, but were not found to improve it. It has been made into a liniment with limewater and syrup, into a jelly with gelatine, or into a compound with iron, ozone, chloral, or creosote: but all of these have proved unpalatable. Two forms of preparation have met with great success—at all events, as far as the manufactureres are concerned. These are emulsions with gum acacia, tragacanth, sugar, hyphosphites and water, and mixtures with malt extract. The former contain at the most sixty-six per cent. of oil, but frequently not more than fifty per cent., and sometimes not more than twenty-five per cent. The latter contain from fifteen to thirty five per cent. of oil, with malt extract and water. Some of these are erroneously called solutions, because the separate globules of oil cannot be detected with the microscope. This depends, however, on the fact that the index of refraction of the oil and that of the malt extract are nearly the same. The addition of osmic acid will at once show that there is no real solution.

Many patients will take emulsions who will not take the plain oil, but, on the other hand, some much prefer a pure oil to any emulsion. It should always be pointed out to patients that the dose of the emulsion is twice as much as that of the oil. Apart from the question of palatability, there is no reason to suppose that an emulsion has any advantage over the unsophisticated oil, and the question of palatability must be left to the patient to decide. The preparations with malt extract stand on a somewhat different footing from emulsions, for malt extract has some nutritive value which gum, sugar, and water do not possess. Malt extract, moreover, fairly well masks the taste of the oil. The only objection is that the preparation is generally so dilute in cod-liver oil that a tablespoonful is probably the equivalent of a teaspoonful of the oil.

Malt extract alone cannot be regarded as a satisfactory substitute for cod-liver oil, but on account of the diastase it contains, it helps to digest starchy food, and if taken with meals may be useful when the digestive powers are weak.

Glycerine has some nutritive value, but