

plication, or inflammation recommences, and the boil follows the usual course. It is desirable to apply fresh coatings of collodion over the old ones, allowing them to remain till the pustule has dried up, and the sore has healed. If much pus accumulate beneath this covering, causing considerable pain, the collodion should be incised under carbolic acid, and the pus allowed to escape. The subsequent treatment should be conducted on Lister's carbolic acid plan. This treatment allays the great irritation often accompanying the early stages of boils. Dr. Hare prefers the contractile collodion, and attributes much of its success to the pressure it exerts. The author has succeeded with flexible collodion; perhaps the contractile would have answered still better.*

Collodion, solutions of gutta-percha, or india-rubber in chloroform, prevent the pitting of small-pox. The flexible variety of collodion is better for this purpose (*vide* p. 200).

A mixture of collodion and carbolic acid is useful in tooth-ache due to an exposed and inflamed pulp. A jelly is made by melting in a test-tube some crystallized carbolic acid, then adding an equal quantity of collodion, and a portion of this preparation on a small piece of cotton-wool, inserted into the hollow painful tooth, at first may aggravate the pain, but in a few seconds, diminishes, and soon abolishes it.

Contractile collodion, with which some mix iodine, painted over the inflamed part in acute gout, will speedily relieve the pain, although for a brief space the application increases it. Too many coats must not be applied, or the contraction is too great and dragging on the skin excites a good deal of pain, or even produces vesication.

Sir D. Corrigan treats the incontinence of children with collodion. The prepuce is drawn forward by the left hand, and the little cap thus formed at its extremity is smeared over with collodion, which contracting, draws closely together the edges of the prepuce, and effectually prevents the exit of

* The extension of a carbuncle may be limited by tightly strapping with strips of adhesive plaster applied concentrically from the border inwards, around and over the swelling.

urine. A fortnight of this plan, which gives no pain and does not prevent sleep, sometimes suffices for the cure. When it is needful to pass water, the little cap of collodion can be easily chipped off with the nail. The prepuce in the morning is found distended with urine. Sir D. Corrigan thinks that it would answer as well to paint the collodion over the orifice of the urethra. The author finds this plan unsuitable for girls as it excites smarting, and induces them to pick off the collodion.

Two parts of glycerine to a hundred parts of collodion, sets without contracting or dragging the skin.

COD-LIVER OIL, ALMOND OIL, POPPY OIL, HEMP-SEED OIL, LINSEED OIL, COCOA-NUT OIL, DUGONG OIL, PALM OIL, LARD, SUET, WAX, &c.

FATS in one form or other are found abundantly in both the animal and vegetable kingdoms, showing their great importance in organic life.

Fats are necessary foods to the animal body, being heat-giving, force-supplying, and plastic. Their combustion contributes mainly to the generation of the heat of the body. They are essential to tissue-formation, for without them nutrition and growth would be very imperfectly performed, if not impossible.

Their combustion, moreover, supplies most of the force appropriated by the nitrogenous structures, and through them to be converted into muscular force, secretive force, nerve force, etc.

For the most part, all fats, so far as we know, have the same physical properties, differing only in the melting point. In their chemical nature, however, they differ much, but after their entrance into blood they are probably converted into fats having much the same composition.

Oils and fats are used to lubricate and to supple the skin when it has lost its elasticity, and become dry, hard, and liable to crack; for instance, in many scaly diseases, as psoriasis and xeroderma. They should be employed in conjunction with warm baths.

Fats, moreover, are applied to the surface of the body to prevent irritation from such excreta as urine or fæces, or by acrid discharges, as in eczema, and when used for this protective purpose, some stimulating substance is generally added, as oxide of zinc.

Simple oils are used to soften and facilitate the removal of scabs, as of impetigo, eczema, and favus. In favus, preparatory to epilation, poultices are likewise useful.

Oils are sometimes rubbed into the skin of the whole surface, with occasional success, to prevent the debilitating sweating accompanying exhausting diseases, as phthisis; but this process is inferior to that of sponging the skin with a weak acid wash, and to other means. With the ancient Romans, during the decline, when warm baths were so much indulged in, it was the custom to anoint the body with fats to check the profuse sweating caused by this enervating habit.

Fats have been rubbed into the skin with a view to their absorption, so as to minister to the nutrition of the body.

Fats and oils are in general use as excipients for the application of various agents to the skin.

It has been asserted that, if the body is rubbed over with fatty substances, a considerable fall in its temperature occurs; but in one instance tested by the author he found this statement to be incorrect.

The irksome sensation of heat and tightness produced by the rashes of scarlet fever or measles are removed by rubbing the hands and feet with some firm fat.

Some practitioners treat scarlatina solely by inunctions. The skin of the whole body is well anointed twice or three times a day with a bland fat or oil which is allowed to remain. Dr. Budd, of Bristol, recommends inunction of oil towards the end of scarlatina. During convalescence the

patient takes a bath at night, and, after being wiped quite dry, a bland oil, like almond oil, is rubbed over the whole body. This treatment is said to assist desquamation, and to prevent sequelæ; moreover by preventing the branny particles of the skin being carried about the room by currents of air, this method claims to lessen the risk of contagion:

It is a useful practice to grease the head very freely in cases of ringworm, as it prevents the sporules reaching the unaffected hair and thus prevents the spread of the disease. The uncontaminated members of the family should also use grease to the hair freely for the same purpose, and probably it would be beneficial to use a mild mercurial pomade or quinine dissolved in glycerine so that the sporules may alight on some poisonous substance.

Oils and fats are not used topically in diseases of the mouth, nor do fats undergo alteration in this cavity. They are almost as little affected in the stomach. If enclosed in albuminous walls, as in the form of cell, these being dissolved, the fat is set free. Although themselves not acted upon by the stomach, fats, however, act upon the other forms of food. They certainly promote the fermentation of sugar and starch; and it is generally accepted, that fats, by assisting those chemical changes which constitute digestion, aid the conversion of the nitrogenous food. For example, the presence of fats assists the fermentation of milk, and promotes the process of artificial digestion. This action of fats upon food has been demonstrated outside the body. In what way fats effect these changes, and whether they themselves are in any measure modified in constitution at the same time, are questions at present quite unsettled. The importance of this property of fats must be sufficiently apparent, and needs no further comment. In large quantities they hinder digestion, possibly by their decomposition and the formation of acids foreign to the stomach.

These substances undergo a variety of changes in the intestines; among others, they are absorbed both by the lacteals and veins, but how this is effected is still an undecided question.

They are emulsionised by the alkaline pancreatic juice, and it has been thought that this facilitates their absorption; but it is difficult to understand how mere division should assist their passage from the intestines to the blood; further, it is maintained that when the pancreatic duct is tied, animals remain as fat as before.

It has been surmised that fat may become saponified, and so pass through the walls of the intestines into the blood. A small part probably does pass in this form into the circulation; but as much unsaponified fat is visible in the epithelial cells covering the villi, and much can be extracted from the chyle, the chief part must undergo absorption in another manner.

The passage of fats through the moist animal membranes forming the intestinal canal is probably justly ascribed to the action of the bile. In support of this proposition apart from other evidence possible to adduce it may be advanced that:—

I. In capillary tubes moistened with water fats rise scarcely at all, if the tubes are moistened with bile the fats rise from twelve to fourteen times higher.

II. While fats pass with extreme difficulty through moist animal membranes, it has been experimentally proved that if these are moistened with bile the fats pass readily.

Fats, by the agency of the intestinal juice, pass, to a small extent, into the blood.

The chief part of the fat passes into the lacteals; a little into the veins; this portion being conveyed to the liver, there to be converted into cholic acid; or, at least, it is probable that the oleic acid undergoes this change. The cholic acid, uniting with the soda set free when the hydrochloric acid of the gastric juice is poured into the intestines, forms a kind of soap, namely, the taurocholate and glycocholate of soda. These again find their way into the intestines, and after serving their destined purpose there, the base reunites with the acid of the gastric juice from which it had been separated.

The influence of fats on the secretion of bile varies accord-

ing to circumstances. If taken on an empty stomach, fats lessen it; if taken with or after food, they increase it.

As food greatly augments the flow of bile, we have here an indication, abundantly corroborated by experience, to give fats either with or soon after a meal.

The melting point of a fat must influence its absorption; for if this point is above the temperature of the body, the fat must remain unabsorbed, unless dissolved in the more liquifiable fats.

The stomach tolerates animal fat better than vegetable fats; moreover animal fats may be given in larger doses, and continued for a longer time; circumstances which, in some measure, explain the medicinal superiority of animal over vegetable fats.

There is a limit to the quantity of fats absorbable by the body. At first only a small quantity is taken up, and often for some weeks after the administration of cod-liver oil some of it reappears in the motions. By custom, however, more and more of it becomes absorbed, till large quantities may be taken, and find an entrance into the circulation; but in too large a quantity it is liable to decompose, and to form hurtful acids, exciting nausea, vomiting, colic, and diarrhoea. This limitation to the quantity absorbed, as well as the irritation caused by any excess remaining in the intestines, are sufficient reasons, to say nothing of economy, to make it undesirable to give more fat than can be appropriated. Too large a dose is both wasteful and harmful. By examining the motions day by day we can learn at any time if too much is administered.

Catarrh of the intestines is a condition unfavourable to the absorption of fat. Oils are sometimes given after a poisonous dose of a corrosive substance, with a view of forming a protective sheathing to the mucous membrane; but it is impossible to coat with oil a membrane moistened with water.

Fat is speedily saponified in the lacteals and bloodvessels, and most of it in the bloodvessels appears to collect in the blood corpuscles, and may contribute to their formation, growth, etc.

Fats, as we have said, are heat-giving, force-supplying, and plastic. In common with other combustible substances, they uphold, by their oxidation, the temperature of the body. Though an important, this is not their only, nor their most valuable function.

Fats, like phosphate of lime, are necessary both to growth and nutrition; for in the most vitally-endowed organs, fats are found in excess, and abound wherever cell-growth progresses rapidly; and this applies to both health and disease, for much fat is found in rapidly-growing cancer; it is found, moreover, associated with the more highly organised constituents. Thus the fat existing in pus is chiefly associated with the corpuscles, comparatively little being found in the serum. More fat is found in plastic than in non-plastic formations. In fact, observations day by day demonstrate more and more the importance of fats as tissue-forming substances. Facts like these obviously bear on the application of the members of this group in disease; but to this subject we shall return shortly.

Recent observations tend to show that fats are force-yielding substances, and that the peculiar forces of the body are mainly derived from the fats we consume. Only a short time ago it was considered that the forces of the body were derived from the combustion of the nitrogenous structures; but many circumstances tell conclusively against this hypothesis.

1. After severe and prolonged exercise, the urea of the urine is scarcely increased; and as this substance is a measure of the consumption of nitrogenous materials, it follows that at such times but little of it is consumed.

2. Under exertion, enormous quantities of carbonic acid are exhaled from the lungs, pointing indubitably to the combustion of carbo-hydrates, or of fatty substances, the urea at the same time not being increased.

3. The combustion occurs chiefly, not in the blood, but in the muscles themselves; for when these are separated from the body, and made to contract under a bell-glass, they are found to yield during the time of their activity an enormous quantity of carbonic acid.

4. It has been found by experiment that, when only starchy and fatty foods are eaten, great exertion and prolonged labour can be endured, while at the same time the urea of the urine is but little increased.

Fats, being necessary to growth, nutrition, and the due performance of the functions of the body, are peculiarly suited to convalescents from acute general diseases. Fats are also useful in many chronic affections. For example: On the subsidence of many acute inflammations, as of the kidneys, heart, or lungs, a more chronic, but not less fatal, condition may be left, the danger of this being in proportion to the health of the patient previous to the acute attack. If the patient's health has been impoverished, or if he is the subject of tuberculosis, or of scrofula, many sequelæ are apt to occur. Middle-aged and old people, in whom the nutritive process begins to flag, are more liable to chronic diseases after acute attacks. A like danger threatens children whose previous health has been damaged by unhygienic conditions. The chronic malady depends on deficient nutrition, and as fats are peculiarly promoters of nutrition, they are especially useful in such chronic maladies.

The dependence of chronic affections on the state of general nutrition may be shown in another way. Persons are found to suffer from some slight local affection, which, while the health is unbroken, troubles them but little; but as the weakest link of the chain is the first to yield, so if the health gives way, the local mischief becomes immediately developed or aggravated. Thus many persons are able to measure the state of their general health by the condition of a local disease. Here again, any treatment restorative of the general health will reduce the local affection to its former unimportant state. In such a case cod-liver oil is often indicated.

Thus experience confirms the efficacy of cod-liver oil in many chronic inflammations, as of the heart, lungs, and kidneys, and in the sequelæ of the acute specific diseases, as the chronic discharge from the ears or nose so often left by scarlet fever or measles.

The chronic degenerative diseases of old age are benefited by the same remedy.

Cod-liver oil is of special service in scrofula, removing the various manifestations of this disease, as chronic discharge from the ears and nose, strumous ophthalmia, strumous disease of the bones, strumous abscesses, etc.

In the treatment of phthisis cod-liver oil stands pre-eminent. The term phthisis, however, includes several distinct diseases. For our purpose it is sufficient here to divide them into the febrile and the non-febrile varieties:—those forms manifesting preternatural heat of the body, and those in which the temperature is natural, or rises only occasionally, and for a short time.

The existence of fever in the febrile forms of phthisis is by no means an indication of the uselessness or harmfulness of cod-liver oil, for in this condition many patients derive considerable benefit from it. In this form of phthisis, as, indeed, in all cases, we must be guided, in the employment of this remedy, not only by the nature of the disease, but also by the state of the patient in other respects. If the digestion is good, cod-liver oil may generally be given with advantage; but, if the stomach is irritable, then cod-liver oil does harm by still further disordering the digestion.

In the chronic or non-febrile forms of phthisis, cod-liver oil is generally well borne, and does great good; but, as with the more acute varieties, it sometimes upsets the stomach. It is generally held that diarrhœa in phthisis is a decisive indication against the employment of the oil; but this is only partly true. Cod-liver oil, no doubt, sometimes increases the diarrhœa, but this often arises from a dose unduly large, or too frequently administered; for if only a teaspoonful is given at a dose, once or twice a day, it often happens that the diarrhœa is even controlled by cod-liver oil. In cases of phthisis with diarrhœa, it is a good plan to begin the cod-liver oil with caution, and then, if it suits, it may be given with greater freedom. An excellent method is to give a teaspoonful the last thing at night, immediately before the

patient lies down to go to sleep. In this way oil may often be borne without producing either nausea or diarrhœa, when previously it occasioned one or both of these symptoms.

As might be expected, phthisis, in the early stage, is most benefited by the use of oils.

Phlegmatic persons, with sallow skins and dark complexions, benefit more by cod-liver oil, it is said, than persons of a sanguine temperament, with florid complexions.

Cod-liver oil is often very serviceable in chronic rheumatism, rheumatoid arthritis, chronic gout, chronic skin affections, syphilitic or otherwise. It is also particularly useful in emphysema of the lungs and chronic bronchitis; in the former checking lung degeneration, in the latter controlling expectoration.

Many persons, especially the aged, complain of much sinking, or a sensation of "craving," at the epigastrium, relieved, for a short time only, by food, a condition sometimes connected with atonic dyspepsia, and sometimes dependent on the general state of health. If the intestinal canal is not in an irritable condition, cod-liver oil will remove this sinking. Middle-aged patients, suffering from that anomalous group of symptoms called hysteria, sometimes complain of the same irksome symptom, which also oil will remove, while the other symptoms of the group are often simultaneously relieved.

Cod-liver oil and quinine is the best treatment for giddiness occurring in the aged, when not ascribable to serious organic disease of the brain, but probably to atheromatous changes in its vessels, or to a weak heart.

Fats are of especial use in the chronic diseases of children, arising from mal-nutrition. On restoring nutrition and growth to the healthy state, the local malady will generally disappear.

Cod-liver oil often renders the course of laryngismus stridulus, rickets, chorea, the middle and after stage of whooping-cough, and chronic coughs, both milder and briefer.

The obstinate constipation met with in children sometimes yields to cod-liver oil.

Chronic diarrhœa, of a few pale, stinking, pulpy motions daily, reduces a child a few months old almost to a skeleton. The skin becomes leathery and wrinkled. Its food is perhaps rejected. When brought to this dangerous pass, thrush breaks out. Whilst combatting the diarrhœa or vomiting, a teaspoonful or half a teaspoonful of cod-liver oil given to the child nightly before he is put to sleep, gradually increasing the quantity and frequency, will neither increase the vomiting nor the diarrhœa, but will promote nourishment, growth, greatly improve the general health, and rescue the patient from its perilous condition.

Hitherto, fats have been spoken of for the most part in common, but they certainly are not all equally useful therapeutic agents.

Animal fats, as we have seen, are to be preferred to vegetable fats; and liver fats are generally esteemed beyond all others. Whether cod-liver oil is superior to that of the livers of other animals, is difficult to decide—as much of the cod-liver oil of commerce is derived, no doubt, not only from the livers of various fish, but likewise, it is said, from those of other marine animals.

The superiority of liver oils has been thought to depend on the minute quantities of iodine, phosphorus, or bile they contain,—a conjecture clearly wrong, for the effect of these substances in disease is dissimilar to that of cod-liver oil.

The superiority of liver oils is ascribable to their easy toleration by the stomach, for they can generally be taken without inconvenience for months or years, while other fats and oils often produce nausea, loss of appetite, and diarrhœa. Moreover, there is reason to think that cod-liver oil is more easily absorbed than other oils.

Cod-liver oil at first, often excites nausea, vomiting, and disagreeable eructations, and occasionally the difficulty in overcoming the distaste for this medicine is almost insuperable. Generally, however, this disgust is overcome, and in a short time the oil is taken even with relish; children, indeed, often come to look on the oil as a treat. Sometimes at the

commencement of the course a child becomes languid, appetiteless and appears worse; but this should not always discourage us, for usually after a week or ten days the oil begins to be tolerated, and then improvement sets in.

The nausea and vomiting sometimes caused by this remedy arises not uncommonly from the undue largeness of the dose. At first, a teaspoonful only, or even less is enough, and if the stomach manifests any intolerance of it, one dose only should be given daily. It is a good practice to take it at night-time, immediately before lying down to sleep.

Cod-liver oil is often administered in quantity so large, that it can scarcely be borne even when the stomach is accustomed to it. Weeks, and even months may elapse, before much oil can be digested and absorbed; hence, if swallowed in undue bulk, it merely passes off by the motions, and by its decomposition is liable to disorder the intestines. An examination of the motions shews whether the oil is given in unnecessarily large quantities.

Cod-liver oil should be taken after food on orange or ginger wine, or weak brandy and water, or some agreeable bitter like tincture of orange-peel. It should be so poured upon either, as not to touch the glass, but to float on the surface as a globule, then tossed off, and some agreeable food or condiment will completely remove the taste. A little salt taken immediately before and after the oil often removes the taste and prevents nausea, and it is said that a few drops of ketchup added to the oil will cover its taste.

A mixture composed of equal parts of cod-liver oil, fresh mucilage of gum acacia and water, has very little taste, and the addition of two minims of oil of lemons to each ounce of this mixture, conceals effectually the fishy flavour.

A cod-liver oil jelly has recently been prepared, containing 70 per cent. of oil. Bolted like jelly it is almost tasteless.

Notwithstanding these ingenious devices, it is not uncommon to meet with patients unable, even after repeated trials, to tolerate the oil, on account of the resulting eructations, loss of appetite, nausea, or vomiting. In some cases this intoler-

ance is due to dyspepsia; but it is generally owing to that inability to digest and absorb fat so commonly noticed in consumption, even before its development. This fact has been much dwelt on by Dr. Balthazar Foster, who, led by some suggestive experiments of Claude Bernard, uses ether as a means of assisting the digestion and absorption of fat in the case of patients otherwise intolerant of oil.

Claude Bernard has shown that the action of ether "is twofold—(1) it stimulates the pancreas and glands of the duodenum to pour out their secretions freely,* and (2) at the same time it facilitates the absorption of those very substances which these secretions are designed to digest. In other words, ether not only obtains for us the secretions required to digest," but promotes the absorption of these fats when digested. After a prolonged investigation of the influence of ether, Dr. Foster finds that by its aid, oils and fats which otherwise caused nausea and sickness are retained and digested, and that the combination increases appetite, nutrition, and weight. Dr. Foster employs ether *purus* of the Pharmacopœia in doses of from ten to fifteen minims to every two drachms of oil. The ether may be given either separately or with the oil; but as the ether masks the un-savouriness of the oil, he generally combines them.

Lime-water mixed with the oil sometimes obviates nausea, and even diarrhœa.

Fats are consumed in the body, but sometimes a small quantity escapes with the fœces and urine. The quantity escaping by the urine is, however, insignificant, except in the disease called chylous urine, when fat is often present in considerable quantities. In Bright's disease a little fat is voided with the uriniferous casts in the urine.

* Bernard maintains that fats are chiefly absorbed by means of these secretions.

CASTOR OIL.
CROTON OIL.

THESE oils consist of a bland oil with a variable quantity of an acrid irritating purgative matter, which imparts to these oils their characteristic properties. It exists in small proportion in castor oil and in a larger quantity in croton oil. Croton oil irritates the skin, producing redness, vesication, and, after a strong application, even pustulation, followed by scars. The irritating effect is increased by the admixture of alkalies, and liquor potassæ is sometimes added to intensify the effects of croton oil.

Its action is very variable, sometimes several applications on successive days produce but slight vesication, whilst sometimes a single moderate application produces great irritation, much vesication, and even pustulation. Caution is therefore needful for the first application. Sometimes when applied too energetically, or continued too long, croton oil liniment produces superficial white round scars with a hair follicle in the centre. These scars gradually disappear. Croton-oil liniment applied to the chest of phthisical and bronchitic patients is highly esteemed by some as a counter-irritant. Owing to the vesication it produces it cannot generally be repeated more than once or twice on successive days; sometimes only one application can be borne. Some prefer croton-oil liniment to mustard poultices, in bronchitis and phthisis, and indeed certain patients aver that croton oil gives them greater relief than mustard poultices. The vesication, however, being a decided disadvantage, the patient must carefully avoid conveying any of the croton application to tender parts of the skin, lest troublesome or severe inflammation be excited in the face or scrotum. Dr. Tilbury Fox states that croton oil sometimes produces a symmetrical erythema of the face, lasting for a few days, where no direct application of the drug could have occurred. The author too has seen this erythema of the face occur during the employ-