EVERY-DAY FACTS

FOR

EVERY-DAY LIFE.

A BOOK FOR THE HOUSEHOLD.

C.

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Preface.

WHEN entrusted with the task of producing this little work, the author and compiler resolved to confine his attention exclusively to the practical and useful, to collect with industry and care, and, by condensation, to pack within its pages as much reliable information on as large a variety of subjects as would render the book valuable in connection with nearly all the requirements of every-day life. In what degree he has failed or succeeded it is for others to determine.

The reader will recognise much that is not new, for such a work must necessarily be largely one of compilation and selection; but its parts, whether new or old, have not been thrown carelessly together, and each fragment, before taking its allotted position in the body of the work, has undergone a process of digestion and assimilation.

The dictionary form has been adopted, because it is both the simplest and the best for a work of reference; and where one set of facts throw light on another set of facts, cross references have been inserted to avoid repetition, and in order that either may be readily turned to when needed. To afford yet further facilities of reference, the subjects have all been separated, classified, and grouped together, each class in a special index. These indexes will be found at the end of the volume.

A. H. W.

FACTS AND HINTS

FOR

EVERY-DAY LIFE.

Aberfrau Cakes.—Beat half a pound of fresh butter to a cream, with half a pound of loaf sugar well pounded, adding slowly half a pound of fine flour. The cakes are to be cut round, impressed with a shell, and baked quickly.

Abernethy Biscuits.— Make a stiff biscuit paste, consisting of one quart of milk, six eggs, eight ounces of loaf sugar, and half an ounce of caraway seeds, with flour sufficient to give it the proper degree of consistency. These biscuits should not be so thick as captain's biscuits, nor baked in too hot an oven. Their great repute is due to the ease with which they are digested. Eggs are not always used, but we give that receipt which we consider the best. It is usual to *dock* or make holes in the upper side of the biscuit and crimp the lower side, the former process being intended to prevent the biscuits from swelling up to the form of cakes. The quantities given above will be sufficient for making about fifty biscuits.

Ablutent Medicines.— Medicines which are used for purifying the blood. (See *Medicines.*)

Ablution.—The innumerable pores of the skin serve to convey from the system a superabundant supply of fluid and solid matter which we term perspiration. (See pages 238 and 318.) The fluid portion passes off, but the solid portion is deposited, and if not removed by ablution, clogs up the pores, and prevents the performance of their necessary and most important functions, both as absorbents and as drains for carrying away from the system those impurities which are productive of disease. When this system of drainage is thus stopped, the digestive organs will be burthened and deranged, the alimentary canal, the lungs, liver, and kidneys all suffer, and there is a predisposition created for the reception of colds and fevers. Erasmus Wilson, one of our authorities on the subject of skin diseases, says :—" I counted the perspiratory pores in the palm of the hand, and found 3,528 in a square inch. Now each of these pores being the aperture of a little tube of about a quarter of an inch long, it follows that in a square inch of skin on the palm of the hand there exists a length of tube equal to 882 inches, or 73½ feet. Surely such an amount of *drainage* as 73 feet in every square inch of skin, assuming this to be the average of the whole body, is something wonderful ; and the thought naturally intrudes itself,—what if this drainage were obstructed? The number of square inches of surface in a man of ordinary height and bulk is 2,500; the number of pores, therefore, is 7,000,000, and the number of inches of perspiratory tube 1,750,000, that is, 145,833 feet, or 48,600 yards, or nearly 28 miles !" These statements will lend force to our remark, that the skin is one of the most important of all our organs, and show how necessary it is by frequent ablutions to keep these pores, or cutaneous vessels, open and unobstructed to the greatest possible extent.

Abscess.—An abscess is an inflammatory tumour due to a progressive formation of matter proceeding either from a serious blow, bruise, or other accident, or from the acrimonious state of the blood (see *Acrimony*), or from a morbid disposition of the fluids. An abscess is a cavity continually enlarging internally by the propulsive force of matter collecting within ; therefore, any course of treatment which repels the discharge of this matter while it is thus in process of formation, is obviously a seriously wrong one. When there are no immediate signs of suppuration, the use of moderately strong repellents may, however, be judiciously made use of. So long as the symptoms of increased swelling and great heat with pricking and darting sensations and pain from pressure remain, the formation of matter is still going on, and repellent applications are dangerous. Abscesses will form in most of the bodily organs and tissues ; in some they are of comparatively small consequence, but in others they rapidly become more or less dangerous. Where the formation of an abscess has been rapid, and without much previous inflammation, it will sometimes be gradually dispersed by absorption into the system.

Absorb.—It will help our readers to appreciate many of the actions and principles we shall have to refer to in these pages, if they remember that this term implies a process which we see in operation when a sponge sucks up water, and not that apparent absorption which we perceive when water dissolves such a substance as sugar. In this latter case the sugar is merely *dissolved*, not *absorbed*. We insert this explanation as one of considerable importance, because by confounding these two distinct processes, a common error leads to mistakes in matters of domestic importance.

Absorbents. — The anatomical name given to certain very important small extremely delicate vessels, which imbibe the fluids and convey them into the system. They are divided into *lacteals* and *lymphatics*. (See *Digestion* and *Blood*.) In surgery, such absorbents as lint, &c., are used in dressing wounds ; in medicine, the term applies to chalk, magnesia, and similar things, when given to absorb or neutralise the acids which are sometimes formed in the stomach. (See *Indigestion*.)

Absorption.—In animal physiology this term is applied to that process which takes place in our body when the old particles which have served their office in the economy of the animal system are taken up to make room for the new particles prepared to continue the work they are no longer in a fit condition to perform. (See *Food* and *Digestion*.) There is not a fluid nor a solid, a surface nor a tissue, internal or external organ, in nature which is not in its turn subject to the act of absorption. It is the function by which external substances are received into the body, and the component particles of the body are taken up from one part of the system and deposited where they are required in another part. By its action the component particles of the living body are kept in a state of perpetual mutation. Plants absorb moisture from the atmosphere, the dew, and rain; the body of an animal so placed in water that none can enter its mouth will absorb; it will be found that what the water has lost in weight the animal has gained. When plunged in coloured water the interior of the bodies of snails acquire the colour of the water.

Absorption of Heat.—In our article on heat (see p. 220) we have pointed out that by every object heat is either transmitted or absorbed. The experiment of placing pieces of differently-coloured cloth over snow, is there mentioned to show how black cloth absorbs or sucks up the heat, and how the white cloth transmits it. Iron is a bad absorber of heat, as may be seen in the fact of fire-irons upon the fender remaining cold before a good fire. A kettle boils faster when its bottom and back are covered with soot, because soot absorbs the heat of the fire very quickly. For the same reason black cloths are warmer when worn as outside garments than light-coloured clothes are. Black kid gloves are too warm for summer wear, and gravel is warmer to the feet than a stone pavement would be for the same reason. You may have noted how hoar frost has remained visible on the stone steps before your door after it has melted away from the gravel path leading up to them. The gravel absorbs heat, the stone does not.

Acacia.—(See *Gum Arabic.*)

Accommodation Bills. — Bills for which no consideration has been received.

Acetic Acid.—This acid is obtained either by the oxidation of alcohol, or by distillation from wood. When wine, beer, and other fermented liquors are exposed to the air under certain conditions, an oxidising action is set up, and the alcohol which they contain is gradually converted into acetic acid. The strongest kind of acetic acid is prepared by repeated distillation. It is sometimes used for pickling on account of its great strength, but it possesses a flavour not generally considered pleasant. Acetic acid has a considerable and rapid influence on contagious effluvia, and for this reason its vapours are often selected for fumigating small rooms. It used to be generally used by physicians, who had a small sponge saturated with it placed in the gold tops of their canes. To purify a sick room, it should be evaporated on a saucer previously heated by holding it over a flame. Acetic acid is sometimes impregnated with the essential oil of cloves, and sold under the name of aromatic spirit of vinegar; but it is by no means improved by this treatment. Camphorated acetic acid, when smelled, often removes a slight headache or the faintness caused by overcrowded or overheated rooms. Acetic acid is often used in medicine as a local irritant, and its vapour is sometimes inhaled to cure certain affections of the throat. Mixed with a proper proportion of water, it forms either an excellent cooling lotion or a cooling drink which is sometimes recommended in cases of fever.

Acidity in the Stomach arises most frequently, perhaps, from an undue or improper fermentation of the food, and is productive of flatulency, purging, and indigestion. For its cure absorbent medicines are often used. (See *Absorbents.*) As much calcined magnesia as will lie upon a shilling may be given two or three times a day to a child suffering from this complaint. From five to twenty drops of spirits of hartshorn—according to age—on a piece of sugar, is also a favourite domestic remedy for it. Persons suffering from acidity in the stomach should, of course, avoid pickles, stone fruits, all acid drinks, and fermentable vegetables, such as cabbage, &c. (See also *Dessert Fruits*, *Acidulated Food*, and *Indigestion.*)

Acids.—All acids are of a sour taste, and the stronger kinds are acrid and corrosive. This should be borne in mind whenever they are used for domestic purposes. They change all colours composed of the vegetable blues and purples to a bright red (see *Stains*), and are very numerous. The use of acids to the teeth decomposes them, and leads to their rapid decay. Acids combine with alkalies, earths, and metallic oxides, to form salts.

Acidulated Drops.—Take one pound of large-grained loaf sugar, and add to it thirty grains of tartaric acid, with just enough water to render the sugar damp. Place it in a pan on the fire, and keep it there until the sugar nearly boils. Stir it well, and put a drop upon a cold plate which has been greased. If it is too thick to fall as a drop from the spoon, add water; if too thin to retain the drop shape, add sugar.

Acidulated Food. — Currants, apples, lemons, oranges, and various similar fruits known under this name, are so called because in these the acid predominates over the saccharine qualities. (See *Dessert Fruits.*)

Acidulated Lemonade.—Add four ounces of fresh lemon-juice, half an ounce of thinly peeled fresh lemon-peel, and four ounces of white sugar to three pints of boiling water. When cold it should be strained.

Acidulation.—This term is sometimes employed in gastronomy to indicate the preservation of food by vinegar. (See *Preserving.*)

Acorn "Coffee."—In Germany this is used, and greatly liked, as a substitute for the ordinary coffee berry. The acorns are shelled, split, dried, and roasted. When taken out of the roaster, a little butter is added to them. They are sometimes mixed with coffee. In their raw state, acorns are known to be powerfully astringent, but they lose this quality in the process of roasting. In some respects, acorn "coffee" is preferable to the real article, having none of the drying properties attributed to coffee.

Acrimony.—A state of the blood in which the quantity of serum (see *Blood*) being too largely in excess of the crassementum, a predisposition to disease is generated. This is often due to the nature of the food eaten, as may be seen by reading our paper on "Blood," and that on "Food."

Acute Rheumatism. — (See *Rheumatism.*)

Adelaide Pudding.—Take six ounces of butter, six ounces of sifted sugar, and beat them together; then add one table-spoonful of ground rice, and the yolks of six eggs. This will make six puddings. Put apricot juice, or the half of a large apricot (that has been preserved whole) at the bottom of the cups. Then fill the cups half full, bake for half an hour in a slow oven, at the end of which time the puddings ought to rise to the top of the cups. Send them to table turned out of the cups, with the apricot at the top.

Adhesive Plaster, or Strapping Plaster, is used for protecting cuts and sores, and as a gentle stimulant in the process of healing (see *Wounds*). It is composed of a coating formed by the mixture of the oxide of lead with olive oil, to which powdered resin is mixed in the proportion of one part of resin to six of the first mixture.

Adulteration of Food.—The extent to which the practice of adulterating food has been carried is astonishing. In some cases, the purpose has been to improve the appearance of an article, in others to enable the seller to dispose of it at a lower price, in others to gratify a morbid taste. The principal articles so adulterated are flour, bread, milk, beer, cider, wines, spirits, coffee, tea, chocolate, sugar, cheese, vinegar, pickles, anchovy paste and sauce, ketchup, olive oil, pepper, mustard, soap, butter, lard, &c. For adulterating flour are used bean or pea flour, chalk, burnt bones, powdered flint, and plaster of Paris, sometimes one, sometimes another. Bean or pea flour may be detected by the smell, and the others by burning the flour (see page 7). Arrowroot and tapioca, being but a variation of starch, may be adulterated with potato flour in such a way as to render detection exceedingly uncertain. For adulterating bread, alum, carbonates of ammonia and magnesia, chalk, sulphate of copper, sulphate of zinc, carbonate of potash, sulphate of lime, and pipeclay. All these are injurious additions to food which are used more or less, some by one baker, some by another, throughout all our large towns. To detect their presence, the best plan is to steep the bread in water, and then subject the solution to the test of certain acids. Milk is commonly adulterated with water, with starch water, and with gum water, mixed with chalk and coloured with a little turmeric, and, it has been said, sometimes with calves' brains. The best mode of detecting the presence of such adulterations is by observing the difference in the specific gravity. For the adulteration of beer and porter, Cocculus indicus, berries of paradise, quassia, tobacco, and chamomile flowers are used, besides coarse sugar and, for heading, sulphate of iron. Cider is adulterated with carbonate of soda, carbonate of potash, and carbonate of alum, &c., and in some instances with carbonate of lead, in order to give an acid taste (see page 249). Port wine is adulterated in many ways, and here again lead is sometimes found, in some one or more of its forms. Spirits are mixed with water, turpentine, capsicum, gum, and pepper. Coffee is commonly adulterated, as is now well known, with chicory; chicory with vegetable powder, and vegetable powder with Venetian red, which in its turn, being adulterated with brickdust, makes our coffee a queer mixture indeed. Coffee is also adulterated with roasted beans, peas, and corn, and in some cases with roasted horse-liver. It has also been adulterated with other coffee damaged by sea-water. Even artificial coffee-berries are manufactured of broken chicory-nibs with clay. Tea is adulterated with the leaves of the elder, the hawthorn, and the sloe, and also with used tea-leaves re-dried. Black tea is frequently treated so as to look like green tea, for which it is sold. Cheap cocoas and chocolates often contain flour, potato-starch, sugar, cocoa-nut oil, lard, tallow, red ochre, yellow ochre, red lead, vermilion, plaster of Paris, chalk, the cocoa-nut shells ground to a powder, and starch. Sugar is not adulterated with sand, which would form a sediment in every cup of tea, but with potato-starch, or flour, which, moreover, improves the dark colour of the common sugar. Its presence may be detected by dissolving the sugar in cold water, which will not dissolve starch; or by dissolving the whole in hot water, and then adding a little tincture of iodine, which will turn the mixture containing starch blue. Cheese is sometimes adulterated with a material coloured with vermilion, and as this pigment is often adulterated with red lead, such food is rendered very unwholesome. Confectionery is coloured with many dangerous and poisonous pigments. Vinegar is adulterated with sulphuric acid, berries of paradise, capsicum, and various metallic salts, including those of lead and copper. Pickles are sometimes improved in colour by the addition of a salt of copper, or by being boiled in a copper vessel, and by the use of substitutes for vinegar. Anchovy sauce and paste are often adulterated with Venetian red, and worse, sometimes even with red lead. Plaster of Paris is often used in making false anchovy paste. Ketchup often contains copper. Olive oil is adulterated with inferior oils. Soap with water and pipe-clay; pepper with pepper dust; and pepper dust with dirt; peppercorns are imitated with oil-cake, clay, and a little cayenne pepper. Mustard frequently contains bean-flour and linseed cake coloured with yellow ochre, and sometimes an inferior kind of flour and starch. Butter and lard are adulterated with flour. A new method of adulterating lard has been introduced, which consists in mixing with the lard from two to five per cent. of the milk of lime. This is done not only to render the lard of a pearly whiteness, but also to allow of a large quantity of water being stirred in while the melted lard is cooling, so as to increase its weight. With regard to pickles it is evident, on a moment's reflection, that if no other metallic vessels, save those of copper or brass, can communicate the peculiar *green* colour to pickles which these impart, it must needs proceed from a dissolution of the copper in the acid used in pickling; and let it be remembered, that all salts of copper, without exception, are poisonous. *Verdigris* is formed by the action of acetous acid or vinegar on the copper vessel. So far has this singular ambition carried the *cuisinier*, that even halfpence are directed in some early cookery-books to be boiled up with the pickles to make them "beautifully green." In preserves, the same fatal poison is developed by the use of copper or brass pans, unsecured by tin lining; fruits contain peculiar acids (the citric, malic, acetic, &c.), which form salts of copper, and become strong poisons. The same thing takes place where oily or fatty substances are cooked in copper vessels; they contain usually a peculiar acid, called *sebacic acid*, equally formidable in its effects. Where copper is suspected to be present, the liquid, after being passed through bibulous or blotting paper, should be tested by the following re-agents:—

1. *Ammonia* will produce a beautiful *violet colour*, and if carefully dropped on the surface of the liquid, a violet-coloured film or stratum will be evolved. A slip of card paper being dipped into ammonia, and subsequently into the liquid, will therefore be tinged violet, if copper be present.

2. Arseniate of potassa will form a delicate *apple-green* tint.

3. Ferro-cyanate of potassa produces a *brown* precipitate.

4. A fragment of phosphorus is coated with metallic copper.

These are the best tests for the detection of copper. It may be added, however, that a rod of bright *iron* will become coated with a film of copper when introduced into a liquid containing any salt of this metal, and pure iron-filings will soon be invested with a film of pure copper, when allowed to remain in the solution. Although we give these tests, we do so because the subject is one of such extreme importance to the pickle-eater, not that we think the reader will often find it necessary to have recourse to them. Pickles of the bright green kind, formerly common, are now seldom seen, although they are occasionally seen. With further reference to the adulteration of tea, we must note that the Chinese sometimes mix the leaves of other shrubs with tea, but this is easily discovered (if not at first sight) by making an infusion of it, into which put a grain and a half of blue vitriol or copperas; if it be good, genuine green tea, and set in a good light, it will appear of a fine light blue; if it be genuine bohea it will turn of a blue, next to black; but if the tea is adulterated, green, yellow, and black colours will be seen in them. After this fraud was detected, the Chinese dyed the leaves of damaged and ordinary green tea, with Japan earth (Terra Japonica) which gives the leaf, the infusion, and the tincture the colour of bohea. This is to be discovered many ways: for 1st, a less quantity of this dyed tea gives a deeper colour to the same proportion of water than if it was good. 2ndly. The colour it gives the water will also be of a reddish brown, whereas it should be dark. 3rdly. When the leaves have been washed by standing a little, they will look greener than good bohea. 4thly. This dyed tea is generally much larger; therefore it is a good way also to buy small leaf bohea. 5thly. The infusion, which should be smooth and balsamic to the palate, tastes rough and more harsh. 6thly. If milk is poured into it, it will rise reddish instead of a dark or blackish brown. 7thly. A little sulphate of iron put into this liquor will turn it light blue, which ought to be of a deep blue, inclining to black. And 8thly. Water of ammonia makes the good tea of a brownish yellow after it has stood a while, like new-drawn tincture of saffron; but it has not that effect in bad tea. Green tea is also counterfeited by dyeing bad bohea with green vitriol. But this is also easily discovered: For, 1st. If a bit of gall is put into the infusion it will turn it of a deep black colour, which it would not do were there no sulphate of iron in it, for galls do not tincture tea naturally. 2ndly. If the liquor is of a pale green and inclines to a bluish dye it is bad. 3rdly. Spirits of hartshorn will make it of a purple colour, and cause a slight precipitation, instead of a deep greenish yellow, when it has stood for about six minutes.

Red wine is sometimes adulterated with alum, the mischievous effects of which the reader will find described on page 14. To detect this add to the wine a sufficient quantity of a strong solution of chlorine in water until it is changed to a yellow colour; let the precipitate (composed of the chlorine and the vegeto-animal matter contained in the wine), which immediately forms, become settled, then filter the liquor and evaporate it to one-fourth of its volume; it will now, in consequence of the presence of the alum, have an astringent sweetish taste, and will furnish a *white* precipitate on the addition of nitrate of barytes, which is insoluble in water and in nitric acid. It will give a *yellowish-white* precipitate with pure potass that is soluble on the addition of an excess of the potass; and a precipitate of the same colour with the sub-carbonate of soda, which is decomposed by the action of heat into carbonic acid gas and alum, substances easily to be recognised by their characteristics (see page 83). Wax is adulterated sometimes with starch, a fraud easily detected by oil of turpentine, which dissolves the former and leaves the latter substance, and more frequently with mutton suet. This fraud may be discovered by dry distillation; for wax does not thereby afford, like tallow, sebacic acid (benzoic), which is known by its occasioning a precipitate in a solution of acetate of lead. It is said that two per cent. of tallow may be discovered in this way.

If you have reason to suspect that lead or copper may have been used in the adulteration of certain wines, as it is well known these are sometimes used for that purpose, put into a crucible one ounce of sulphur, and one ounce of pure lime, and keep them in a white heat for nearly half an hour; when cold, add one ounce of the super-tartrate of potass, and boil the whole in a matrass or flask with distilled water for about half an hour. Decant the supernatant liquor into small phials, adding about twenty or thirty drops of muriatic acid to each. The phials must be well stopped and preserved for use. Lead, copper, and other deleterious metals will be precipitated, of a black colour, by this liquid, if poured in the quantity of only a few drops, into the suspected wine or cider. The muriatic acid is added to this test, to prevent the precipitation of iron, which might exist in the wine without any mischief resulting from its use. Another test for these pernicious metals in wine and cider, exists ready formed in nature. Pour into a glass of suspected wine, cider, or perry a few drops of Harrogate water. If any lead, &c., be present, it will fall down in the state of a black precipitate, being combined with the sulphuretted hydrogen by which these waters are impregnated. The adulteration of wines with cider can easily be detected by filtering and adding ammonia in excess. The apple juice will immediately deposit crystals on the side of the test-tube. Genuine wine sheds a pulverulent deposit, which does not adhere to the glass, and is devoid of a crystalline structure. Acetic acid will dissolve either of these precipitates. The deposit from the cider consists of flat crystals with parallel sides; that from wine shows star-shaped formations. The treatment with acetic acid shows the presence of lime and phosphoric acid in both cases, the quantity of lime in the wine being minute. We have recommended the test of burning for flour. Wheat-flour when burnt never leaves more than one per cent. of ash; if therefore on burning anything supposed to be composed of wheaten flour, such as a biscuit, anything in the way of ash above this proportion may be regarded as mineral additions. The most reliable test for rice is the microscopic appearance of rice-starch, which is specially characteristic. Snuff is adulterated with the chromates of potash and lead, with earths, oxide of lead, carbonate of ammonia, lime, powdered glass or silex, orris root in powder, red and yellow ochre, &c. We may now quit this subject, merely adding, that for selling articles adulterated a penalty can be inflicted of £50 for the first offence and six months' imprisonment with hard labour for the second.

Aërated Waters.—This term is applied to a variety of acidulous and alkaline beverages more or less impregnated with fixed air, or carbonic acid gas. Water under the pressure of the atmosphere (see *Atmosphere*) absorbs about its own bulk of carbonic acid gas.

By applying a pressure of double this strength, its absorbing power is increased proportionately, and the water acquires a pleasantly acid taste. When a small quantity of potash or soda is applied to water in this condition, together with such ingredients as are needed for flavouring, it resembles natural mineral waters. The required pressure is given by a machine. (See also *Mineral Waters.*)

Aërial Acid.—(See *Atmosphere.*)

Ague.—A form of intermittent fever now happily becoming rare. Its fits generally last from twelve to fifteen hours, and, according to the regular intervals between the paroxysms, it is known as quotidian (daily), tertian (third day), or quartan (fourth day). It consists of three well-marked stages—the cold stage, the hot, and the sweating stage. The first lasts from one to three hours, more or less; the second and third, from three to twelve, or fifteen hours. The aim should either be to prevent the recurrence of the paroxysm, or to diminish its violence. The most effective remedy—and it is wonderfully so—is quinine, two or three grains of which should be given in water containing a few drops of dilute sulphuric ether every four hours. When the cold stage is reached, warm drinks and clothing should be adopted; in the hot stage, a cooling drink; and in the sweating stage, care should be taken to avoid draughts. The bowels must be kept gently relieved.

Air.—(See *Atmosphere*, *Respiration*, *Ventilation*, *Vitiated Air*, and *Exercise.*)

AIR, EFFECTS OF, ON CHILDREN.—Air is to a child its first and great requisite. It even cries for it the moment it issues from its mother's womb. It is "its best cordial," and, were its nature duly appreciated and properly applied, such things as Godfrey's cordial, and all artificial excitements and sedatives, need scarcely be known. Let the infant have a due supply of air, and it will be likely to continue well during the first year or two of its existence even in spite of its teeth. Very, very often, when a child cries apparently for more food, the cry is in reality, or rather if properly interpreted, a demand for air to digest and assimilate that food with which the stomach is already too much crammed. Let the connection which the organs of breathing have with the organs of digestion be maintained in practical recollection. (See *Digestion* and *Respiration.*) Too much aliment may easily be taken, but too much air cannot.

AIR AFTER DINNER.—The free circulation of air is much better than the free circulation of the bottle for aiding digestion. (See page 12.)

AIR IN THE BEDROOMS.—Be careful in your commands that not only bedrooms but bed-clothes be freely subjected to the purifying influence of fresh air. The custom of making up beds for the next night a very short time after individuals have left the sleeping-rooms for the breakfast-parlour is a custom which should be abolished. Blue devils, and all other evils hostile to the comfort, happiness, and health of mind and body, "live and move, and have their being," in confined and impure atmospheres.

AIR IN WINTER.—Hot drinks taken immediately after being in cold air, by effecting too sudden a change in the temperature of the lungs, often produces very mischievous and sometimes serious results. Going from cold air into a warm public-house and drinking hot grog is therefore to be avoided.

AIR A COSMETIC.—Air is the best cosmetic, as well as cordial. No delicacy of complexion can be depended upon as lasting that does not result from a free and unobstructed circulation and action through the whole frame; and no paints can effect one-thousandth part of the good, even as it relates to exterior appearance, that may be obtained by a morning's walk or ride in the parks or the suburbs of the town.

AIR AT THE SEA-SIDE.—(See *Sea-side.*)

AIR, CHANGE OF.—Very few people will deny the beneficial effects secured by a change of air and scene, but there are some persons who derive very little benefit from such changes. Persons of this class are either dull and unobservant as to find no pleasure in the presence of novel objects, and so mentally inactive as to find nothing interesting in fresh scenes and new characters, or they are persons whose minds have been narrowed to a certain little round of active thought connected with their daily duties or business, out of which they become uneasy, anxious, and restless. If you want to derive full benefit from a change of air and scene make that change as complete as you can. Start with an easy mind, as free as possible from care and divested of all business thoughts. The author of "The Recreations of a Country Parson" says: "It is one thing for a dawdling idler to set off to the Continent or to the Highlands just because he is sick of everything around him, and quite another thing when a hard-wrought man, who is of some use in life, sets off as gay as a lark, with the pleasant feeling that he has brought some worthy work to an end, on the self-same tour. And then a busy man finds a relish in simple recreations, while a man who has nothing to do finds all things wearisome, and thinks life is used up. It takes something quite out of the way to tickle that indurated palate. You might as well think to prick the hide of a hippopotamus with a needle as to excite the interest of the *blasé* by any amusement which is not highly spiced with the cayenne of vice. It was a glass of water the wicked old Frenchwoman was drinking when she said, 'Oh, that this were a sin to give it a relish!'" We are not, however, denying that a mere change of air is beneficial; on the contrary, great benefit will result from this alone, although even that benefit will of course be decreased by the causes we have mentioned above (see *Health*). A mind at ease is as essential to perfect health as are most other conditions of that state of body. To secure the full effect of a change of air it is essential that we get sufficient of it. Mere dawdling and lounging about is in this respect something very different from active exercise. The amount of air we take when the heart and lungs are stimulated into more vigorous action by exercise (see *Exercise* and *Respiration*), is much greater than that received when the body is in a state of inactivity, and the blood too is purified more quickly and completely by perspiration. For this reason when the dweller by the coast seeks a change of air by travelling inland, or when the inland dweller seeks the same wholesome change by seeking the sea-shore, he or she should not be afraid of a due share of running, climbing, walking, stone-throwing, jumping, or other active exercise taken with due observance of those considerations which have their place in our article on *Exercise*. (See also *Asthma.*)

Air in the Night.—Night air is damp with dew, and rendered impure by the exhalations of plants. The disengagement of pure or vital air does not commence until the sun is up and the atmosphere rendered dry and warm. (See *Oxygen.*)

Air in the Morning.—It has been held by recognised authorities in the medical profession that the atmosphere most efficacious in expanding the lungs and oxygenising the blood is that of the morning. Moreover, after a state of repose, when the voluntary muscles have had a long rest, the heart is more powerful in its action, more regular, and slower in its contractions (see *Heart*) than it is at night, after a day of labour or perhaps fatigue and anxiety. The hints we have given in our remarks on the *Lungs* and on *Exercise* will show the importance of these conditions in connection with the fresh, cool air of morning.

Air, Vitiated.—Everything which in common language we call empty is in reality full of air, or, in other words, of those gases which, as is well known, form the air. (See *Atmosphere.*) These gases, all alike invisible to the eye, make their presence known to us in various important ways. For example, when certain gases are separated by chemical action, it is found that a lighted candle immersed into a jar filled with one kind of gas burns unchanged, that in another it burns with greatly increased brilliancy, and when placed in a third it is immediately extinguished. Oxygen air (see *Oxygen*) supports combustion, and consequently it is in this gas that bodies burn with a flame of such greatly increased intensity. A taper after it has been extinguished, if it be placed in a jar of oxygen while the wick is still sufficiently hot, will instantly burst into flame, and burn with wonderful brilliancy and rapidity. A piece of spring wire heated to redness and immersed in oxygen exhibits a most beautiful form of combustion. In fact oxygen is the great element of combustion, and bodies divested of it, such as water and carbonic acid, are consequently termed incombustible. (See *Combustion.*) In our articles on *Digestion* we have explained how food is a kind of fuel supporting a species of combustion constantly going on within us; and we have fully explained in another place to our readers how the process of digestion is essential to keep up that supply of chyle which is required for the formation of blood. Destroy digestion, and the blood must soon cease to circulate. Stop respiration, and neither the digestion of the food nor the circulation of the blood can proceed. Therefore, in our article on *Indigestion* we have pointed out as one of its causes the breathing of impure or vitiated air. (See *Ventilation.*) When air enters the lungs its vital properties are separated for the purification of the blood, just in the same way as when food enters the body its vital elements are separated for the formation of chyle. As the stomach digests food, so the lungs digest air; and fresh air is consequently as essential to the preservation of life and health as fresh food is. "To expire" is often used in lieu of the words "to die," as expressing the same meaning; and in the same way "to respire" is often used in lieu of the words "to live." Imperfect respiration and imperfect digestion are alike the elements of disease, and the one is as traceable to the breathing of vitiated or unsuitable air as often as the other is to the eating of indigestible or improper food. The air which is essential to the preservation of life, called vital air, is that which contains its proper proportion of oxygen, and in proportion to the absence of that gas the air is vitiated or impure. Now the effect of respiration on the air is to rob the air of its oxygen, of which it contains about one-fifth in proportion to its entire mass. If air be examined in which the smallest insect has respired a loss of oxygen may be discovered.

AIR, HOT AND COLD.—When the whole body, or any part of it, is chilled, bring it back to a natural feeling of warmth gradually, not suddenly. Severe colds often arise from pursuing a contrary course.

Air-beds are very useful for invalids. They require no "making," are cool and soft, and when not in use, by letting off the air, they may be folded into little compass and readily packed.

Albumen.—A viscous fluid found in its greatest purity in the white of eggs, from which its name is derived. It forms the serum, or colourless part of blood, the crystalline humours of the eyes, and enters into the composition of all animal matters. Many fungi contain it in large quantities. Its most remarkable and valuable property is that of coagulating, or forming a solid white substance by the application of heat, after which it is insoluble in water. Albumen is supposed to contain a minute quantity of sulphur. It is largely used in clarifying wines, &c. (See also *Cements*, *Diet*, and *Digestion.*) The white of eggs make, when mixed with rose-water, a good collyrium for the eyes, and it is also used advantageously in burns and newly-made wounds. To obtain albumen in absolute purity, agitate the white of an egg with half a pint of spirits of wine. This will cause the deposit of a white flocculent substance, which may be collected by filtering through blotting-paper. Albumen is sometimes used as a varnish, which is specially suited for the preservation of leather-bound books and kid shoes. For this purpose, the white of one egg is beaten up with twice its weight of cold water, until the mixture is complete. Apply with a sponge.

Albuminoids, or Flesh-formers.—Chemical analysis shows that the elementary parts of our food, and the elementary substances of which our bodies are formed, are the same. Some of these elementary ingredients of food go to build up the fabric of the body; others serve to keep up the supply of animal heat. (See *Food.*) The latter are classified as heat-producing, the former as albuminoids or flesh-formers. The solid parts of the flesh of all animals are supplied by the *fibrine*, *albumen* (see page 57), and *caseine* (see the same page), and these three elements enter into the composition of all the more important flesh-formers. *Gluten* (see page 215), better known, perhaps, as bird-lime, is a very valuable flesh-former, which exists in flour, &c. *Legumen* is another flesh-forming element, found in peas, beans, and other vegetables. For further information concerning the various kinds of flesh-formers, see our paper on *Diet.* Flesh-formers are, it will be seen, of both vegetable and animal origin. In bread we have the flesh-forming element in the proportion of eight parts in a hundred. Dr. Lyon Playfair, in some articles on food published in *Good Words*, says :—" It may justly raise a question, if it be right to consider all the flesh-formers of equal value, whether they are derived from vegetable or animal aliments. Would, for instance, the twenty-two ounces of caseine in 100 ounces of split peas be equal to the same amount of albumen and fibrine found in 100 of beef? In all probability, they would not; for when Nature presents us with three materials of like composition—fibrine, albumen, and caseine—she has, no doubt, specific functions for them to perform in building up the animal frame. But experience certainly shows us that if we present all these three materials to the body, it can exercise labour and be kept up in strength, whether they are derived from animals or vegetables. Let us take a hunt as an example. In a hunt an omnivorous animal—a man—is mounted upon a herbivorous animal—a horse ;—he is attended by carnivorous dogs, which pursue a vegetable-feeding hare or a flesh-eating fox. In the case of all these animals, a maximum amount of labour is bestowed while the hunt lasts; but the tissues, which by their consumption produced the labour, were built up in some cases by animal, in other cases by vegetable food. Undoubtedly, the nature of the food has much influence upon the character of the animal, and of their ability to exercise consecutive and persevering labour." (See *Diet*, *Blood*, &c.)

Albumen Varnish.—(See *Albumen.*)

Albuminous Food.—(See *Diet.*) By this term is understood such articles of food as eggs, the brains of animals, oysters, mussels, &c. It forms, for the most part, a light digestive aliment, without being too exciting. Eggs properly cooked and eaten with stale bread, frequently for this reason agree with very weak stomachs.

Alcohol.—Absolute or pure alcohol is a colourless limpid fluid, pungent to the taste and smell, but agreeably so. It is highly inflammable, and burns with a pale blue flame without smoke. It absorbs water from living tissues with such greediness, as to destroy life; and, if taken into the stomach undiluted, it will act as a poison. Diluted, it cheers or stupefies, according to its strength. Its quality of not freezing, even in a temperature of extreme coldness, is shown by its use in thermometers. We obtain from it spirits of wine and ether. Alcohol has great repute as a respiratory material. Those who drink it in wine or beer are found to be in less need of starch and sugar in their food, and hence eat less. Dr. Bernay points out cases in which servants who had taken the pledge were found to eat a larger proportion of bread than others who took beer with their meals. Alcohol, taken in excess, is a fruitful source of indigestion. All ardent spirits have a tendency to contract and harden the animal fibre, and to coagulate to a certain extent the juices. For this reason, the practice of drinking port wine, which contains alcohol in a very large proportion, or other strong wine, immediately before and after dinner, is often extremely pernicious. Plato advised that no person should take wine before reaching eighteen years of age. Some weakly-constituted children, however, require slight tonics; and a small quantity of beer, in the case of feeble, scrofulous children, is sometimes very beneficial. Alcohol is used as a solvent for gums in making varnishes (see *Varnishes*), as fuel in spirit-lamps, and in medicine as an antiseptic or a stimulant.

Ale.—To those whose diet is poor or insufficient ale is very nutritious, strong ale being unquestionably the most nutritive of all malt liquors. But it is difficult of digestion, and therefore ought to be taken by those of strong constitution who lead active lives. Ale is the best drink to take with cheese, as it is a good dissolvent of it. A reference to our remarks on *Cheese* will show the importance of this Hint. Ale has a laxative tendency, and so counteracts the disposition of the cheese to constipate. (See also *Beer.*)

Alkali.—This word is of Arabic origin, being derived from *kali*, a vegetable from which soda used to be extracted. Alkalies are used to neutralise acids. Thus, in medicine, alkaline medicines are adopted to destroy acidity in the stomach. (See *Absorbents.*)

Alkalies, the Fixed.—These are of two kinds, the one called vegetable alkali, or potash; the other mineral alkali, or soda. They are both known in commerce under different names, according to the substances from which they are procured.

Allspice derives its name from its scent and flavour being supposed to embody those of several spices for which it might be substituted. It is the dried, unripe berry, of a species of myrtle, which is a native of both the East and West Indies, and is sometimes called Jamaica pepper.

Allspice, Essence of.—Add to a wine-glass of strong spirits, one drachm of the oil of allspice. This is used, two or three drops at a time, for puddings, soups, &c.

Almonds are of two kinds, the sweet and the bitter. Each contains oil and mucilage, and is very nourishing; but the bitter almond has stronger medicinal properties. It is nutritive; but the proportion of oil it contains renders it not easy of digestion. Almonds yield a soft oil, generally obtained by pressure, which is used in medicine, and in the preparation of a fine kind of soap. The bitter almond contains prussic acid; and therefore should not be eaten in excess. Eaten in moderation, bitter almonds have a sedative and tonic property.

Almonds, Burnt.—The sweet or Jordan almonds are used for these. Select the almonds fine and clean, either Jordan or Valencia, and putting a pint of clarified syrup to each pound of the fruit, place them in a pan over the fire. Stir until each almond is coated with the sugar in a powdery condition. Then shift them away from the loose sugar, and separate those that have stuck together. Boil a second supply of sugar, and when the almonds are cold immerse them in it again. You must not leave them in this long enough to disturb the first coating of sugar. Sift and strain them as before.

Almond Custard Ice.—Sweet almonds blanched are used for this. To blanch almonds, they are thrown into boiling water, in which they remain until the outer skin can be readily peeled off. Then the hot water is poured off, and they are put into cold water, peeled, and dried. To three ounces of syrup of almonds you next add a pint of cream, with a few drops of the essence of bitter almonds, and one ounce of flower-water. To this the yolk of four eggs and a tea-spoonful of the essence of lemon are added. The mixture is boiled for two or three minutes, cooled, and frozen. (See *Freezing.*)

Almond Emulsion.—Take of sweet almonds, six drachms; white sugar, two drachms; pure water, one pint. The almonds are to be first blanched by infusing them in boiling water, and afterwards peeling them. They are then to be well beaten in a marble mortar, with the sugar, to a smooth pulp, when the water is to be added by degrees, and the rubbing continued till they are well blended, when the mixture should be passed through a muslin for use. This emulsion may be taken mixed with barley-water, and is very useful in inflammations of the lungs, kidney, bowels, &c.

Almonds, Essence of Bitter.—This, it must be remembered, is a powerful poison, and we must caution such of our readers as use it for flavouring pastry, cordials, &c., to do so very guardedly. Of course, it should be kept out of the way of children. It is made by dissolving one ounce of the essential oil of bitter almonds in one pint of spirits of wine.

Almond Hard-Bake.— Split blanched sweet almonds, and place them in an oiled tin, or greased plate, the flat side down. Pour upon them boiled raw sugar sufficient to cover them.

Almond Jelly.—Take one ounce of sweet blanched almonds; white sugar, three-quarters of an ounce; water, four ounces; rub into an emulsion, strain, and add eight ounces of melted hartshorn jelly, one drachm of orange-flower water, and three drops of the essence of lemon.

Almond Oil Soap.—This is made by macerating oil of almonds with nearly twice its quantity of caustic potash or soda. When it is cold, and in a jelly-like form, add a little common salt, and resume the boiling until it is sufficiently hard, after which it can be poured into moulds to dry. Seven pints of the oil and thirteen of the soap ley will make eleven pounds of soap.

Almond Paste, used to beautify the skin, and to prevent chapped hands, is made by the following mixture:—Sweet and bitter almonds, of each two ounces; spermaceti, two drachms; oil of almonds, half an ounce, and the same quantity of Windsor soap. To these add one ounce of rose-water and twelve drops of bergamot, with the same quantity of otto of roses.

Almond Powder.—Take twelve ounces of blanched bitter almonds, and benzoin, orrice root, and rice-flour, of each one ounce; salt of tartar, two drachms; oil of lavender and rhodium, each twenty drops.

Allopathy.—This term denotes a mode of treating disease by the action of remedies exerting an influence contrary to that of the particular disease under treatment. The homœopathists deny the soundness of this theory, and we give some of their arguments against it in another section (see page 227).

Alterative Medicines.—Medicines which are used to act slowly and gradually upon a diseased or languid system, by small mild doses, instead of other medicines, or larger doses, which act with speed and violence. (See page 256.)

Alum, or *Alumen.*—A triple mineral salt, composed of alumina, potash, sulphuric acid, and a large proportion of water. Used in medicine as an astringent. (See *Adulteration*).

Alum, Compound Solution of.—To compound this—which is used for cleansing old sores, and with rose-water as an eye-wash—take one ounce of sulphate of zinc and the same quantity of alum, dissolve them in one pint of boiling water, and afterwards strain for use.

Alum Baskets, &c.—Dissolve 2 lbs. of alum in a quart of hot water, pour it into a jar, and immerse in it one of the following or any similar article, and there let it remain till cold, when it will be found the alum has been deposited upon the object immersed in it, in the shape of the most beautiful white crystals. The objects may be either some twigs of a tree, covered loosely with worsted, or else a framework made of brass wire, and covered in the same way: it may represent a basket, crown, church, or in fact anything that the taste of the maker can suggest. When immersed in the alum water it must be wholly covered with the liquid, and should not touch the bottom of the vessel. It may be coloured by the use of Judson's dyes.

Alum, Burnt.—This is sometimes used to stop bleeding, to prevent mouldiness, to eat away proud flesh, and as a tooth powder. It may be prepared by putting some powdered alum over the fire in a ladle, or fire-shovel, and keeping it there until all the water has evaporated, and it has become so brittle that it may be readily converted into a very fine powder.

Alum Gargle.—This is a very useful remedy for simple relaxation of the throat. To prepare it, take one scruple of alum, one ounce of honey of roses, seven ounces of infusion of roses, and mix. It should be used frequently.

Alum in Bread.—The reasons which have been given for using alum in bread are, first, that it saves trouble in the kneading; secondly, that if the wheat be too new it improves its quality, and gives whiteness to an inferior flour. Moreover, alum possessing the power of absorbing water, a smaller amount of flour can be used with it for making a loaf of the full weight. Alum, being a powerful astringent, and very apt to produce an obstinate costiveness, ought not to be so used. Dr. Leate, in his "Treatise on the Diseases of the Viscera," asserted, from his own knowledge, that jalap was frequently used to counteract the astringent quality of the alum. (See *Indigestion.*) To detect the adulteration of bread with alum, boil some of the bread in water, and after you have filtered the liquid add to it a little spirits of hartshorn. If the alum is present, you will see it indicated by the presence of a cloudy whiteness in the water. (See also *Adulteration.*)

Alum in Wine.—To give red wine a certain peculiar rough flavour and a deeper colour, alum is sometimes added to it. To detect this, see page 6, under the head *Adulteration.*

Alum Whey.—Made by boiling a drachm of alum in a pint of milk.

Amadou, or German tinder, is made from a kind of fungus, or mushroom, that grows on the trunks of old trees, obtained by removing the outer bark with a knife, and separating carefully the spongy, yellowish mass that lies within it. This being beaten with a mallet, is easily separated; after which it is boiled in a strong solution of saltpetre.

Amber, to Join.—To join or mend amber wares, smear the parts broken with linseed oil, heat the fracture carefully over a small charcoal fire, or the flame of a gas burner, with the other parts protected from the heat, and press the edges together when they have become sufficiently soft and adhesive. When the parts so joined require re-polishing, this may be done by friction, with the aid of a little whitening and water at first, and in the finishing with a little olive oil, laid on and well rubbed in with a piece of old flannel. As by rubbing in this way the amber will become charged with electricity, the polishing must be conducted with intervals between, or the article thus treated will be apt to fly into pieces. Amber may be improved by boiling it in rape oil for twenty-four hours.

Ambigu.—A French term applied to a repast at which hot and cold dishes are placed at the same time on the table but without soups, and all the arrangements are so made as to dispense with the attendance of servants.

American Biscuits.—Pour two pints of good milk into separate vessels. In one put a quarter of a pound of butter, cut up and melted with a gentle warmth, and allow it to cool. In the other vessel put eight eggs, beaten up lightly, mixing these with the milk gradually. To this add, as gradually, the milk containing the butter. Stir in a large table-spoonful of strong new yeast, cover the pan, and set it near the fire to rise. When the batter is quite light, you take what in America is called a waffle iron, in which the batter can be shut in, baked, and turned over. This is greased, some of the batter is poured in, and it is put among the coals of a clear bright fire. They are sent to table quite hot, with a little powdered cinnamon and white sugar. They are called waffles; and we have heard American ladies complain sadly of being unable to get these delicious biscuits made in England.

American Blight.—(See *Insects.*)

American "Coffee."—Indian wheat roasted with a little butter, and previously soaked in liquorice water, is an excellent substitute for coffee.

Ammonia, or Volatile Alkali, in its pure state is in the form of gas, when absobed by water, it is the *aqua ammoniæ puræ* sometimes used in smelling-bottles, and when rendered mild by its union with carbonic acid or fixed air, and crystallised, it constitutes the common smelling-salts. When equal parts of sal-ammoniac (muriate of ammonia) and quick-lime, each in powder, are heated in a glass-retort, a gas is extricated, which if collected over mercury retains its æriform condition, and is the pure ammonia, or ammoniacal gas. If collected in a vessel containing water, it is immediately absorbed, and constitutes the aqua ammoniæ puræ, or liquid ammonia. The gas has a pungent smell, turns red vegetable infusions to green, extinguishes flame, and is fatal to animals. The chief uses of volatile alkali are as a medicine. It is produced by the putrefaction or by the distillation of almost all animal matter. It is this salt in a state of gas that gives the pungent smell and affects the eyes on entering stables, slaughter-houses, and similar places that are not well cleansed. Pure, it is a transparent, colourless gas, with a strong alkaline taste which neither supports combustion nor life. The ammoniacal liquor is mainly produced by the distillation of coal in gas-works. Solid ammonia is produced by submitting the liquor ammonia to the pressure of $6\frac{1}{2}$ atmospheric and a temperature of 32°. The gas which exists in the air is readily absorbed by water. It is evolved by the decomposition of organic matter, especially by excrements and urine. Ammonia consists of three parts hydrogen to one of nitrogen, but it cannot be formed by direct combination.

Anchovies.—This small sea-fish is caught in the months of May, June, and July, chiefly in the Mediterranean and also on the coast of Spain. Those anchovies which are in their natural state are preferable to those which are coloured red. Anchovies are of an opening nature, fortify the stomach, and provoke appetite. They agree with those who suffer from indigestion, and contain much oil and volatile salt. The best are tender, fresh, small, firm, and of a peculiarly agreeable flavour.

Anchovies, Mock Essence of.—Boil a quart of stale ale for a quarter of an hour, let it stand till it is cold; take five Dutch pickled herrings, with their liquor (take off the heads and roes), pound or mince them fine, put them into the beer, with a stick of horse-radish scraped fine, let it boil twenty minutes, strain it. Hold a clean frying-pan over the fire, that it may be quite dry; put in a quarter of a pound of flour; keep stirring it with a wooden spoon, till it is the colour of essence of anchovies; put the liquor to it, and stir it together till it boils; let it boil a quarter of an hour; when cold, bottle it. If not of sufficient colour, put a little bole Armeniæ to it.

Anchovy Paste.—Pound the fish in a mortar, and rub the pulp through a fine sieve; put into pots, and cover with clarified butter. Potted herrings may be made by preparing red herrings in the same way.

Angelica.—A fine aromatic plant, which grows freely on moist soils, used in confectionery and, when green, for infusions. It is said to have valuable stomachic properties. It is sometimes preserved by being boiled in strong syrup and dried, when it remains good for several years, and forms an agreeable addition to the dessert. (See *Angelica, andied.*)

Angelica, Candied.—Take the plant in April, boil it in water until it is tender. Remove and drain it well, scrape the outside, and dry it in a clean cloth. Place it in syrup, and allow it to remain there three or four days closely covered. The syrup must be made strong from sugar, and kept hot without boiling for some time, after which it should be put into a pie-dish, and placed near the fire.

Angelica Ratafia is a very rich, fine cordial, made by putting half a pound of the shoots of the above plant into two quarts of brandy, with a pint of water, two pounds of sugar, a few cloves, and a little cinnamon. The angelica must infuse for two months in a close vessel before it is strained and bottled.

Animal Chemistry. — Animal chemistry is a branch of knowledge which even physicians too commonly neglect, which, seeing that all the processes which take place in the human body are of a chemical nature, is, to say the least, strange. In the mastication of food we have a process requisite to prepare it for the complete and effective action of decomposing agents. Food so prepared passes into the stomach, and is subjected to the action of fluids which are poured out abundantly when the stimulus of food affects its coats. Under its influence the masticated food undergoes an important change into *chyme.* (See *Digestion.*) Passing into the intestines the thick whitish mass, or chyme, is brought under the influence of the bile, which renders it sufficiently fluid to be taken up by the absorbents (see page 2), whose mouths terminate in the gut, and carried into the thoracic direct, which leads up to the heart, where it mingles with the blood, and, passing through the lungs, undergoes another vitally important chemical change. (See *Blood.*) Thence it returns to the heart, and is distributed to the different parts of the body by the arteries, secreting in its course the pancreatic and splenetic juices (see page 148) and all the other secretions which directly or indirectly nourish the body and supply the waste of its continual combustion. (See *Animal Heat* and *Diet.*) In the organs which perform the secretions the blood in its passage through them is again entirely changed, its chemical constituents being completely altered. In the fluid secreted by the kidneys we find a large quantity of urate of ammonia and sal-ammoniac, not one of which exists in the blood. The reader will now see how important a part chemistry plays in the phenomena of his living, and how desirable it is, if he would know how to feed, clothe, and conduct himself with a view to the preservation of life and health, that he should understand something of animal chemistry. Under various heads this little book will supply him with much information of the kind required, but the number and variety of subjects on which it treats render it impossible for us to give such important matters all the attention they deserve. In the *Technical Educator*, and other valuable works now in the book market, more thorough and exhaustive papers on this subject will of course be found, and these we commend to your notice.

Animal Fluids.—The proportion of the fluids in the human body is largely in excess of the solids, and the younger the age the more largely are they in excess. The human embryo when first perceptible is almost wholly fluid, solid substances being superadded slowly and gradually. The successive increase in the proportion of solid matter from infancy to age is very remarkable, and hence the softness and roundness of the flesh in the earlier stages of life and its hard angular forms in age. The importance of these fluids is in proportion with their excess. They are the media by which the materials for the renovation of the body are effected. They convey nourishment to every part of it, and they carry off all noxious and offensive matter from it. In the brain they lay down the soft and delicate cerebral substance; in the bony framework they deposit the osseous matter and remove the worn-out particles. They are composed principally of water holding solid matter in solution.

Animal Food.—Concerning the nourishing quality of animal food, there appears to be but one opinion. It is, in fact, impossible to deny it. But when taken in excess its action becomes too strongly stimulating; and, from sheer overwork, the digestive organs are prone to become enfeebled, and the body debilitated. In warm climates, meat should be taken in smaller quantities than would be sufficient in cold climates. (See *Food* and *Diet.*) The domestic or tame animals which are usually prepared by the butchers into meat, produce one of the chief articles of food in our daily supplies; and the first among these animals stands the ox, one of the richest gifts to man; a great assistant in enriching land, and also as a mill to grind his surplus fodder into beef. Everything about the ox, from his horns to his hoofs, is profitable for some purpose or other. Nearly all these animals, while living, are known by the names given to them by our Anglo-Saxon fathers; but when slaughtered and dressed their flesh assumes another name: as the ox, with its varieties—the bullock, steer, cow, heifer, and bull—are changed to beef; sheep, consisting of the wether, ewe, stag, buck, or ram, are changed to mutton; calf, to that of veal; hog—viz., pig, shoat, barrow, sow, stag, hog, and boar—to that of pork. The same changes will also apply to some species of wild animals. Beef, mutton, lamb, veal, and pork are usually found throughout the year in various seasonable preparations, in all the public markets, and they may be reasonably considered "always in season;" but there are certain months in the year when each is found in greater perfection than at other periods of the year, although when a sound, healthy animal has been properly fed and prepared, the flesh will be found to be excellent eating in any part of the year. The additional advantage of a cool atmosphere (not freezing the flesh), permitting it to hang for several days—or even weeks, such flesh as beef, mutton, venison, &c.—will not only render them tender, but add also much to the richness of their flavour. Animals in sound health, which have been fairly fed, will have a layer of fat between the skin and the flesh, or muscles. This may be termed the outside fat, or back fat. The fat will also be mixed in through the muscles themselves, according to the quantity and quality of the feeding. When highly fed the flesh increases, the back fat thickens, the muscles become marbled with small particles of fat throughout the body, and a large collection of fat around the kidneys, which butchers call suet, to designate it from the common meat or flesh fat. We may here add that it is artificial or over-feeding that produces the prize, choice, and extra fine cattle, sheep, &c., sometimes exhibited at our fairs and cattle markets. Animal food should not be given to children too early. Sir James Clarke said that "to feed an infant with animal food before it has teeth proper for masticating it, shows a total disregard to the plain indications of nature, in withholding such teeth till the system requires their assistance to masticate solid food. And the method of grating and pounding meat, as a substitute for chewing, may be well suited to the toothless octogenarian, whose stomach is capable of digesting it; but the stomach of a young child is not adapted to the digestion of such food, and will be disordered by it." For further particulars in reference to the chemical nature of animal food, its nutritive and digestive characteristics, see *Diet*, *Food*, and *Digestion*.

In hot countries the inhabitants instinctively prefer vegetable to animal food. The Brahmins of India and the natives of the Canary Islands and the Brazils live almost entirely on herbage, grains, and roots; whilst the inhabitants of the northern latitudes, where vegetation of course is scarce, live almost exclusively upon animal food. Prince Maurice of Nassau said that the English fought bravely because they had a piece of beef in their stomachs. Prior had some such notion when he wrote—

"Was ever Tartar fierce or cruel
Upon the strength of water gruel?
But who shall stand his raging force,
When first he rides, then eats his horse?"

"Remember," says one of our dieticians, "that an ounce of beef contains the essence of many pounds of hay, turnips, and other vegetables." Hallet, one of the first of European physiologists, alleged that persons were invariably weaker after the Lent fast.

Animal Heat.—This is produced by that combustion of hydrogen and carbon in the capillary vessels which we have elsewhere explained. The heat produced in a man's body in the course of one day by a process of combustion, which is fed by that kind of fuel which we call food, has been calculated as sufficient to raise five and a half gallons of water from the point of freezing to that of boiling, which in degree is equivalent to the heat given by the combustion of a pound of coals. If fuel, or food, were not constantly supplied to preserve this animal or vital heat, our organs would slowly and gradually waste away or consume. (See *Heat*, *Food*, *Fat*, *Combustion*, and *Blood*.)

Animal Jelly.—The jelly of animals, serving as it does to renovate and repair the solid portions of their system, is obviously of value as food. The flesh and intestines of young animals afford a very digestible and nutritious jelly, but the tougher and harder flesh, &c., of old animals produce, on the contrary, a thicker and stronger jelly, which is digested with difficulty, and assimilates with the animal fluids imperfectly. The more healthy the animal is the stronger and more nourishing ill be the jelly made from its flesh, cartilages, sinews, ligaments, intestines, the sinewy parts of the legs, &c.

Animal Poisons.—The effects of poison introduced by the sting of insects may be prevented by applying immediately a little vinegar and spirits of wine, by means of some folds of old linen. From the bite of a mad animal arises the most dreadful disease known as hydrophobia, for the prevention and cure of which a great variety of nostrums have been held forth to the public; but there is no satisfactory instance of any of them having proved useful, and no means yet suggested can be depended on but the complete removal of the injured part by the knife, or actual cautery. In this most medical writers on the subject agree, with this difference, that some contend it can only be effectual when it is done in a few hours, while others are of opinion that the poisonous matter *is not immediately* absorbed into the system, and think the measures for destroying the part may be practised with success many days after. Some recommend the removal of the part as soon as possible after the accident; but, observe, if it has been neglected it should be attempted at any time before symptoms of hydrophobia take place, as there are instances of no alarming symptom occurring for several weeks after the bite has been received. Sea-bathing has been much recommended in all ages as a preventive, and lately mercury, by many eminent practitioners; but there are no well-attested cases in which they have been attended with advantage, so that little or no dependence can be placed on them. The complete cutting out of the part to which the teeth have been applied is unquestionably the most to be relied on; and as hydrophobia is so generally fatal, and the period for absorption uncertain, the sooner the excision of the part is accomplished the greater will be the chance of success. Till the operation can be done the part should be constantly washed, and even after its removal a discharge should be kept up from the surface of the wound by stimulating applications of basilicon ointment with red precipitate of mercury or spirit of turpentine.

Animal Diet excessively indulged in promotes the formation of many chronic diseases; and it has been noted that great meat-eaters who lead more or less inactive lives are usually short-lived.

Animation, Suspended.—In the case of a suspension of the vital powers produced by immersion in water, by cold, by lightning, strangulation, or suffocation by noxious vapours, whatever can be done for their restoration must, of course, be done very quickly. We cannot do better here than quote the following cautions emanating from the Royal Humane Society:—1. Never hold the body up by the feet. Never let it be rolled on casks. Avoid all rough usage. Use no salt in case of apparent death. In the case of a person who has been drowned convey the body carefully, with the head slightly raised, to the nearest receiving-house or other most convenient place. 2. Strip and dry the body; clean the mouth and nostrils. 3. Lay it on a blanket or bed in a warm room in the winter; in summer it may be exposed to the sun. 4. The body to be gently rubbed with flannel, a heated warming-pan covered with flannel or hot bricks similarly covered to be lightly moved over the body and along the spine, when this can be done without interrupting the process of restoring breathing; warm bricks covered and placed in the hands and armpits, and to be applied to the palms, soles, and pit of the stomach. 5. To restore breathing introduce the pipe of a pair of bellows into the nostril, closing the mouth and other nostril, and gently pressing down the top of the windpipe backwards and forwards towards the chest; work the bellows so as to fill the lungs; when the chest is raised by the inflation, let the mouth and nostrils be free, and gently compress the chest so as to expel the air. Repeat these processes till life appears. 6. When bellows are not at hand, endeavour to restore breathing by alternately compressing the chest and remitting the pressure. This simple process has proved highly serviceable, and as any person may employ it safely and effectually it should not be delayed a moment. 7. Electricity and galvanism used early by a medical practitioner may prove beneficial.. (See also *Asphyxia.*)

SUFFOCATION BY NOXIOUS VAPOURS.—Cold water to be thrown on the face and body, drying the body at intervals. If the body feel cold, employ gradual warmth.

FROM INTENSE COLD.—Rub the body with snow, ice, or cold water. Restore warmth by degrees; and after some time, if necessary, employ the means for restoring the drowned.

SUSPENSION BY HANGING.—A few ounces of blood may be taken from the jugular vein, or by cupping-glasses applied to the head or neck, or by leeches applied to the temples. It is peculiarly necessary to have medical aid, as the treatment must vary according to circumstances.

SUSPENDED ANIMATION THROUGH INTOXICATION.—Lay the body on a bed, with the head a little raised; then remove the neckcloth, and procure medical assistance. Warm fluids may be conveyed to the stomach by means of a flexible tube and a gum-elastic bottle. On signs of returning life, a tea-spoonful of warm water may be given, and if swallowed some warm wine or diluted spirits. Then the person conveyed to a warm bed may go to sleep if so inclined, and if carefully watched so as to guard against any sinking in the powers of life during sleep. The restorative process should be used for four or six hours. It is a wrong opinion that persons are irrecoverable because life does not speedily reappear. Electricity and bleeding should never to be employed unless by the direction of a medical man. If the restorative process were promptly resorted to, an immense proportion of lives would be saved. What thou doest *do quickly.*

Anise-seed.—This is used largely for confections and medicinally. It has an aromatic smell and a warm, pleasing taste.

Anodyne Liniment.—This is perhaps better known as opodeldoc. It is composed of soap, oil of rosemary, and rectified spirit. It is very useful for sprains, bruises, and chilblains, and is also used for dispersing inflammatory tumours. It is sometimes rendered more stimulating by the addition of half an ounce of spirits of hartshorn to every two ounces prepared. It then produces a considerable irritation of the skin, which, in cases where rheumatic pains or indolent tumours are concerned, is very desirable. It is applied either with the bare hand or with a piece of flannel. Considerable friction should be used, unless the part to which it is applied is in a state of inflammation.

Anodyne Medicines.—Medicines which mitigate pain, and help the patient in procuring sleep, bear this name.

Antidote for Arsenical Poisoning.—For arsenic an excellent antidote is that discovered by Dr. Bunsen, namely, hydrated peroxide of iron, a simple preparation, which ought to be on the shelf of every druggist, handy for immediate use.

Antimony is a brittle whitish metal usually found associated with sulphur. In type-foundries it is much used, to give hardness to lead, in the alloy called *type-metal*. The etymology of the term has been fancifully derived from its fatal effects upon some monks (antimoine) upon whom its properties were tried by Valentine.

Anxiety of Mind often proves an active predisposing cause of disease; and, on the contrary, a quiet contented disposition is productive of health. (See *Indigestion*.) To combat the impulses of a fretful, repining disposition is a matter, therefore, of as much importance to its unfortunate owner as it is to those who have to endure its effects.

Antipathies in Diet.—There is no affectation more ridiculous than the antipathies which many whimsical people entertain with respect to diet. One will swoon at a breast of veal; another cannot bear the sight of a sucking pig; and another owes as great a grudge to a shoulder of mutton as Petruchio had. How often does it occur in company that we are debarred of a necessary ingredient in a salad because somebody, forsooth, cannot touch oil! And what a rout is made, whisking away the cheese off the table, without our being suffered to have a morsel of this grand digester, if any one should happen to declare his dislike to it! There are others of an equally fantastic disposition, who, as we may say, choose to quarrel with their bread and butter. These are eternally suspicious that their food is not sweet. They bring their plates up to their noses, or their noses down to their plates, at everything that is put upon them. Their stomachs are so delicately nice that they descry a fault in all they eat. The fish is stale, the mutton is rank, or the suet pudding is musty. We knew an aunt who almost starved herself in this particular. At one time she was sure that the sheep died of the rot; at another the pork was measly; and she would not touch a piece of beef all the time the distemper was among the horned cattle. Veal she detests, because, she says, it is well known the butchers blow it up with their nasty breath; besides, the calves have brine given to them, to make their flesh white. She made an apology for the beef not being salt enough, saying that she was under the necessity of boiling it too soon, on account of the late inundations; for she was apprehensive that the drowned carcases of hogs, sheep, and other cattle would make their way up to London shambles. There is indeed some danger that people will conceive an antipathy against barrelled beef, pickled pork, and all kinds of soused meat of this description; and it is to be hoped that the contractors for victualling Her Majesty's Navy will not buy up any of the drowned cattle, to turn the stomachs of our sailors. The unwholesomeness, however, of casualty flesh I have heard denied by a gentleman who had been in Italy, and declared that he himself had eaten heartily (without any ill effects) of a hog that was casually barbecued, and an ox that was roasted whole in the eruptions of Vesuvius.

Ants. (See *Insects.*)

Apoplexy.—This disease consists in the breaking of blood-vessels in the head.

APOPLECTIC FITS.—The first thing to be done is to remove everything from the neck, and raise the head. If convenient, place the sufferer in a chair, and open the window, while a medical man is at once sent for. Should he not come quickly, apply leeches to the temples.

PREMONITORY SYMPTOMS OF APOPLEXY.—These symptoms may be referred chiefly either to the functions of the brain or those of the stomach, to the nervous and sanguiferous systems. They commonly present themselves under two forms. In the first, shiverings, headache—sometimes dull and sometimes acute, constant or remittent—delirium, slight convulsion, sensations of heat and turgescence in the head, throbbing of the temples, swelling and alternate flushing and chilling of the face, giddiness, and a heaviness for sleep, momentary loss of vision, and lassitude. The pulse becomes full and firm, and beats less rapidly. In the second form, the face grows pale and cold, the spirits are depressed, the patient grows peevish and irritable; hysterical symptoms sometimes appear, and transient feelings of paralysis; a weak and irregular pulse, giddiness, and transitory feelings of being faint and sick. A third class of symptoms are referred to the condition of the stomach and bowels; but these being less definite, and more common in connection with less serious complaints, we do not think it politic, in the interests of our readers, to refer to them.

TO AVOID APOPLEXY.—The most common cause of this disease is a softening or hardening of the walls of the blood-vessels in the head, rendering them either brittle or less elastic; due most frequently to injudicious diet, or to excessive eating or drinking. Drunkenness is a fruitful source of apoplexy. Persons who have reason to fear this disease should be careful in selecting their food (see *Diet*), and should drink weak stimulants, and these very temperately—claret and water or weak sherry. Exercise in the open air, sleeping in well-ventilated rooms, and leaving the neck free from anything in the way of tight neckerchiefs or collars, should also receive attention. Apoplexy may be distinguished from fainting fits by the noise made in breathing. It must not be supposed that a short neck is the chief cause of apoplexy.

Apples, Gathering and Preserving.—Apples should be gathered on a dry day, and preserved on shelves, or on the floor in a dry, cool place. A fortnight after gathering, the sticky matter which exudes from them should be rubbed away with a dry cloth. They should be so placed as not to touch each other, and layer over layer with straw between, but not piled so high that the lower apples suffer from the weight of those above. Once a month they should be examined, and any showing signs of deterioration should be removed. Frost must be carefully guarded against. They are sometimes packed away in sawdust, but the plan is not a good one. (See also *Dessert Fruits*, &c.) The best-known varieties in this country are:

THE CODLIN.—The apple known by this name is large, and of a pale colour. Unlike other apples, its pips propagate the species.

THE COSTARD. — The oldest of English apples, the ancient hawkers of which being called "costardmongers," have left their name to a vast host of itinerant dealers, who deal in a variety of useful articles.

THE NORFOLK BEAU-FIN derives its name from its being specially fitted for making "biffins."

THE RUSSET OR "LEATHERCOTE."—This apple is used for every purpose of cooking, and can be had all through the winter.

The Golden Pippin was first noted for its cider-producing qualities, and is very popular as a dessert fruit.

The Ribstone Pippin.—The most famous of our apples. It is in perfection during the months of November and December, but can be kept till March. The pippins are so called because they are produced from the seeds or pips.

The Jeanneting.— This is the earliest of our apples. For the nature and properties of apples as food, see *Dessert Fruits* under the head of *Diet.*

Apples in Frosty Weather may be preserved by throwing a thin linen cloth over them.

Buying Apples.—In purchasing apples they should be selected by their weight, the heaviest being the best. Large apples are better than small, and those which yield to the pressure of the thumb with a slight crackling noise better than those which do not.

Apples, Quantity of Air in.—It has been found by experiment that the air in apples is so much condensed, that if it were let out into common air it would fill a space 48 times as great as the bulk of the apples themselves, so that its pressure outwards was equal to 11,776 lbs., and in a cubic inch of oak to 19,860 lbs. against its sides. So that if the air were let loose at once in these substances they would tear everything to pieces about them, with a force superior to that of gunpowder. Hence it is in eating apples that they part with the air by degrees, as they are chewed, and ferment in the stomach, otherwise an apple would be immediate death to him who ate it.

There is a hint on eating apples pregnant with the loftiest meaning. Has it ever struck you, when eating the tempting flesh of the apple and rejecting the unpleasant core, that the seed is thus preserved,and that by the mere act of throwing it away such seed is often sown?

Apple and Custard Pancake.—Beat up four eggs, add a quarter of a pint of cream and a little cinnamon. Cut the apples into thin slices, and fry them in butter ; when they are browned a little turn them over, pour in the custard, and fry to a light brown, carefully turn it over, and serve with sugar sifted over it.

Apple and Pear Pips.—When bruised these impart a delicious flavour to tarts.

Apple Butter. — A favourite American sauce. It is made by boiling apples in cider. The apples must be properly pared and quartered, and the boiling must continue for six or eight hours, until the apples are reduced to the consistence of paste, which is then taken from the fire, and deposited in jars. After a few weeks it is ready for use. It is often eaten on bread, and in some of the States it is considered an absolute necessary of the table.

Apples, Buttered. — Peel the apples, and remove the cores without either breaking or cutting them through. Cut slices of bread the circumference of the apples ; butter the dish, and place an apple on each piece of the bread. The hole where the core was is filled with white sugar and a piece of butter about as large as a walnut. They are to be baked slowly for about twenty or five-and-twenty minutes, the butter and sugar being from time to time renewed.

Apple Cheesecakes. — Grate six ounces of apple with the same quantity of white sugar ; add these together with the juice and grated rind of a lemon. Melt three ounces of butter. Take five eggs, and leaving out the whites of two, beat them well, and mix all together. Bake in cheesecake tins lined with puff paste.

Apple Fritters.—Beat the yolks of four eggs and the whites of two eggs well together, and strain them into a pan. Then take a pint of cream made hot and a gill of port wine, with about half again as much ale, made into a posset. To this, when cool, add the eggs, beat well together, put in nutmeg, ginger, and a little salt, add pippins in slices or scraped, and fry them quickly in butter.

Apple Jelly.—Take fine reinettes,

wash them well, and cut them in pieces; boil them with water and the piece of a lemon in an uncovered saucepan. When the juice is sticky strain it through a sieve, and add some thick syrup, for which the sugar used should be of the same weight as the apples; boil and skim it, and when it is sufficiently thick to fall in flakes from the spoon, put it in your jelly-glasses, and tie it down.

Apple Marmalade. — Pare, core, cut up, and boil till soft in just sufficient water to cover the apple. The pulp must be mashed; add one pound of loaf sugar to every pint of the filtered juice, and boil for about half an hour. A little lemon and a clove or two may be advantageously added.

Apples, Miroton of. — Scald some apples, reduce them to a pulp, and place them on the dish. Boil in a teacup of water seven or eight lumps of sugar and one teaspoonful of grated lemon-peel. Add the yolks of three eggs and the white of one, with half an ounce of butter, one spoonful of flour, and another of brandy. The whole is well mixed over the fire until quite smooth. When done it is poured upon the apples. The whites of two other eggs are then beaten to a froth, and put over the miroton with some powdered sugar, just as it is being put into the oven. The oven must be slow. Bake for nearly a quarter of an hour.

Apple Pudding, Nottingham.—Pare half-a-dozen good baking apples, removing the cores without dividing the fruit, and in their places put sugar. Place these in a buttered pie-dish, pour over them a light batter, and bake in a moderately hot oven.

Apricots. (See *Dessert Fruits.*)

Apricot Ice. — Take twelve ounces of apricot jam, and add to them a quart of cream, with twelve ounces of sugar, the juice of a lemon, and the six kernels from the apricot-stones. Mash the fruit and kernels, strain, add the lemon juice and cream, and freeze. (See *Freezing.*)

Apricot Jelly.—This is an excellent thing for invalids. Cut into two thirty ripe apricots, and extract the stones, which are then broken for the removal of the kernels; pound them in a mortar with a glass of water and a little lemon-juice. Take a weight of sugar equal to that of the apricots, and after crushing the latter, place both in a stewpan, and add the kernels. Proceed in the same way as for any other jelly.

Apricot Paste.—Spread apricot marmalade on shallow tins, and dry it gradually in a slow oven. When nearly dry, cut it into slips or ornamental shapes.

Aquariums.—The dimensions of your intended aquarium having been decided upon, and the form of it, whether of the tank or inverted bell kind, the first matter requiring consideration is the principle upon which it must be managed. In order that the water with which it is supplied may have that supply of oxygen which is essential to the healthy and happy state of its future inmates, and the carbonic acid gas which all animals give off in respiration may not be allowed to preponderate, and become poisonous, you must either change the water frequently, which is inconvenient, and for various reasons undesirable, or you must adopt that system of purifying and aërating which Nature adopts by the proper association of animal and vegetable life. Then the air required by your animals will be supplied by the plants, and the air which would become poisonous to your animals is required for the support of the plants. The best aspect for the aquarium is an eastern one, as it then escapes the intense heat of the mid-day sun without losing the milder warmth of the sun's rays in the morning, it being a great point in the success of your efforts to preserve the temperature of the water at about 45° to 65° Fah. The tank should also be so placed that the lights fall rather upon its water surface than upon the glass sides. For the bottom of the aquarium the best bed will be fine cleanly-washed gravel, over which pebbles, shells, artificial rock-work, coral, or other things of a suitable kind, may be placed. The gravel should be about an inch in thickness, and the cement used for the artificial rock-work should be the Portland, other cements being liable to injure the fish. Any of the water-plants may next be introduced into your tank by fastening them to small stones, and placing them on the shingle, so that their lines combine in pretty curves and grotto-like hollows, avoiding that effect of a tangled lump or mass which we sometimes see displaying the owner's want of tact and taste. Scarcely a plant to be found in any brook or river but is suitable for your aquarium if you are careful that the specimens selected are free from decaying matter. The best, however, are the *Vallisneria spiralis* and the *Stratoides*. *Anacharsis alsinastrum*, the *Ranunculus aquatalis*, the *Myriophyllum spiratum*, and *Potomageton* are also excellent plants for the purpose. In selecting the living inhabitants, minnows, carps, perch, dace, roach, bream, or chub will be found suitable. The water-lizards, a few water-snails, and a tortoise may be added to these. The amount of animal and vegetable life in your tank must of course be selected with a proper regard to the balance of the gases, and of this you may be sure, that so long as you need a change of water to preserve the tank pure and your animals in a healthy condition, that balance has not been secured.

Argand Lamp.—This lamp is one in which the wick, and consequently the flame also, is in the form of a hollow cylinder, through the interior of which a current of air is made to ascend, in order to afford a free supply of oxygen to the interior as well as to the exterior of the flame, and thereby to ensure more perfect combustion and greater brilliancy of light than could be obtained either by the use of a single large wick, or by a series of small wicks arranged in a straight line. These objects are more perfectly attained by the addition of a glass chimney, which confines the air immediately surrounding the flame, and produces an upward current which causes it to rise high above the wick. It was invented about the year 1782, by Aimé Argand, a native of Geneva, and it is made in many different forms, one of which, with a chimney of copper instead of glass, is used in chemical operations for the emission of heat. The principle is also extensively applied to gas-burners.

Arithmetical Amusements. HOW TO FIND OUT WHEN A FIGURE HAS BEEN SECRETLY REMOVED FROM OTHER FIGURES.—A very amusing exercise is the following, by which a person secretly choosing any two out of several given numbers, and after adding them together, striking out one of the figures from the amount, tells what the figure chosen was. The numbers offered must be such as are divisible by 9; and when any two of them are added together, have no cipher in the amount. Moreover, the figures of that amount must make either 9 or 18. Such are the numbers following—36, 63, 81, 117, 126, 162, 207, 216, 252, 261, 306, 315, 360, and 432. These numbers being written on cards, when any two of them are added together, it will be what would make the other figures either 9 or 18. For example, if a person choose 126 and 252, their sum will be 378, from which if he strikes out the 7, the remaining figures, 3 and 8, will make 11, to which 7 must be added to make 18. Those who know nothing about the properties of figures may be very much puzzled to account for the way in which these feats in arithmetic are performed, although they are in reality very simple matters.

HOW TO FIND OUT A PERSON'S AGE WITHOUT ASKING IT.—You may find the difference between two numbers without knowing the greatest by the following plan:—Take as many nines as there are figures in the smallest number, and subtract that sum from the number of nines. Tell the other person to add that difference to the largest number, and taking away the first figure of the amount, add it to the last figure, when that sum will be found the difference of the two numbers. This is based upon the aphorism that when a series of numbers continually increase or decrease by one common multiplier or divisor—that is, by one common ratio, as 4, 8, 16, 32, and so on; or 81, 27, 9, 3—they are in geometric progression. For example, Mr. Jones, who is 22, tells Mr. Smith, who is older, that he can discover the difference of their ages without knowing. He therefore privately deducts 22 from 99, and the difference, which is 77, he tells Henry to add to his age. When he has done this, Jones tells him to take away the first figure from the amount, and add it to the last figure, and that last sum will be the difference of their ages. As thus:—

The difference between Smith's age and 99 is	77
The age of Jones is	35
These added together are	112
The first figure taken away leaves . .	12
The first figure added	1
Makes	13
Jones's age is	22
And this added to 13 gives the age of Smith	35

We shall notice a few more properties of numbers, which may be found interesting and useful. Every square number necessarily finishes with one of these figures, 1, 4, 5, 6, 9, or with an even number of ciphers, preceded by one of these figures. If two different numbers be divisible by any one number, their sum and their difference will also be divisible by that number. If several different numbers divisible by 3 be added or multiplied together, their sum and their product will also be divisible by 3. If two numbers divisible by 9 be added together, the sum of the figures in the amount will be either 9 or a number divisible by 9. If any number be multiplied by 9, or by another number divisible by 9, the amount of the figures of the product will be either 9 or a number divisible by 9. In illustration, ask some one to name a number, and, by adding a figure to that number, make it divisible by 9. For example, suppose the number be 72,857. You tell him who names it to place the number 7 between any two figures of that sum, and it will be divisible by 9. The sum of the figure named being 29, 7 is added to it to make it divisible by 9. You may diversify the exercise by specifying before the sum is named the particular place where the figure shall be inserted to make the number divisible by 9. In every arithmetical progression, if double the sum of all the terms in any series be divided by the first and last terms added together, the quotient will be the number of all the terms in that series. This aphorism may be applied to many useful purposes. For example, a man is to go a journey of 1,120 miles, 40 of which he proposes to ride the first day, and to increase the number by an equal addition every day to the last, when he intends to ride 100 miles. How long will he be going his journey? The reader has the clue, and by its aid ought readily to answer the question. We shall conclude by teaching how you may tell by the dial of a watch at what hour any person intends to rise. Let the person set the hand of the dial to any hour he likes, and tell you what hour he selects. Add to the number of that hour in your mind 12; then tell him to count privately the number of that amount upon the dial, beginning with the next hour to that on which he proposes to rise, and counting backwards, first reckoning the number of the hour at which he has placed the hand. An example will make this plain. Suppose the hour at which he intends to rise be 8, and that the hand is placed at 5. You add 12 to 5, and tell him to count 17 on the dial, first reckoning 5, the hour at which the index stands, and counting backwards from which he intends to rise, and the number 17 will necessarily end at 8, which shows that to be the hour he chose. That the hour at which the counting ends must be that on which he proposed to rise will be evident on a little reflection, for if he had begun at that hour, and counted 12, he would necessarily have come to it again; and calling the number 17, by adding 5 to it, only serves to disguise the matter. In playing this trick, cards are sometimes substituted for the dial, or the numbers 1 to 12 are put upon a circular piece of paper.

Aromatic Vinegar, a Cheap.—Take of common vinegar any quantity, mix a sufficient quantity of powdered chalk, or common whiting, with it to destroy the acidity, then let the white matter subside, and pour off the insipid supernatant liquor; afterwards let the white powder be dried, either in the open air or by the fire. When it is dry, pour upon it sulphuric acid as long as white acid fumes continue to ascend. Stone vessels are most proper to be used on this occasion, as the acid will not act upon them. This product is often sold in the shops by the name of aromatic vinegar. The simplicity and cheapness of the process point it out as a very useful and commodious one for purifying prisons, hospitals, ships, and houses where contagion is presumed or suspected; the white acid fumes diffusing themselves quickly around. (See page 3.)

Aromatic Wine.—Take of the di-sulphate of quinine, eighteen grains; citric acid, fifteen grains; and add these to a bottle of sound dry orange wine.

Arrowroot.—The Indian arrowroot has been cultivated of late years in considerable quantities in gardens and provision-houses in the West Indies. The following is the process for obtaining the fine powder sold in this country:—The root, when a year old, is dug up, well washed in water, and beaten in a large wooden mortar to a pulp. It is then thrown into a large tub of clear water, well stirred, and the fibrous part wrung out by the hands and thrown away. The milky liquor being passed through a lawn-sieve or coarse cloth, is suffered to settle, and the clear water drained off. The whole mass left at the bottom is again mixed with clean water, and strained; lastly, the mass is dried on sheets in the sun for use. This powder, boiled in water, forms a very pleasant transparent jelly, and is recommended by medical men as a nutritious diet for invalids and children. The jelly is made in the following manner:—Take a dessert spoonful of the powder, and make it into a paste, then pour on half a pint of boiling water; stir it briskly, and boil it a few minutes, when it will become a smooth clear jelly; a little sugar and sherry wine to be added for debilitated persons, but for infants a drop or two of cinnamon-water or essence of caraway seeds may be added. Fresh milk, either alone or diluted with water, may be substituted for the water. For very debilitated frames, and especially for sickly children, this jelly, blended with an animal jelly, as that of the stags'-horn, affords a more nutritious diet than arrowroot alone, which may be done in the following manner:—Boil half an ounce of stags' horn shavings in a pint of water for fifteen minutes, then strain, and add two dessert-spoonsful of arrowroot powder, previously well mixed with a teacupful of boiling water. Stir them briskly together, and boil them for a few minutes.

Arsenic is the most powerful poison, and therefore for the purpose of destroying life is generally used. The solutions of mercury, copper, lead, and antimony in different acids are likewise in no great quantity active poisons. To counteract the effects of any of the mineral poisons taken into the stomach, the liver of sulphur is the most efficacious medicine, which may be administered in the following manner:—Dissolve a large tablespoonful of the liver of sulphur in a pint of warm water, and give the patient two table-spoonfuls of the solution as soon as possible, and repeat it every ten or fifteen minutes for three or four doses, or as occasion may require. If this preparation cannot be readily procured, a teaspoonful of sulphur with eight or ten grains of wormwood will afford the best substitute. Either the liver of sulphur or salt of wormwood, by uniting with the acid of corrosive sublimate of mercury and the metallic salts, decomposes them and precipitates the metal in the form of a calx, nearly or wholly inactive. It will likewise be proper to dilute plentifully with warm water, and to excite vomiting by giving with the first dose of either of the above medicines, or as soon after as possible, two scruples of ipecacuanha powder, and to hasten its operation by irritating the fauces with a feather or the finger. Oil and milk may likewise be given, with a view to blunt its acrimony. If neither liver of sulphur nor salt of wormwood can be readily procured, ten grains of pearlash or potash may be employed, or half a table-spoonful of soap lees given in a little water, or a strong solution of soap in water. In all cases of mineral poisons this method should be adopted. If the poison should be arsenic, the alkaline medicine, as the liver of sulphur, salt of wormwood, or pearlash, will very plentifully dissolve it, and hence it will be the better discharged by emetics. As in cases of mineral poisons what is to be done must be done speedily, it must be remembered the most powerful medicine for counteracting their effects is the liver of sulphur, given in a dose of twenty grains, dissolved in a glass of water, and repeated in a quarter of an hour or in the manner above mentioned; and that when this of wration cannot be obtained the salt of wormwood or soap lees, with or without flowers of sulphur, are the best substitutes for it. Miners and other workmen who are exposed to the dust and fumes of this mineral poison, and particularly those of the cobalt mines, are so soon and so violently affected by it that they live but a few years in the employment, and are subject to pulmonary affections and diseases of the abdominal viscera. In Saxony the work is only done by convicts whose punishment would otherwise have been death. When taken into the stomach in considerable quantities by mistake, or with intent to commit suicide, it first sets the teeth on edge, constricts the throat, heats the mouth, and causes spitting. Then comes on a burning heat and excruciating pain in the stomach, a vomiting of blood and matter, cold sweats, convulsions, and death.

Arterial Blood.—When the venous or dark blood (see page 386) passes through the lungs, to which organ it is sent from the right side of the heart by the pulmonary artery, it comes in contact with the air, and becomes arterial blood, carbonic acid being given off as arterialisation takes place. Should anything prevent the air from entering the lungs—as in suffocation by hanging—the blood is not arterialised, the black venous blood is sent to the brain, where it exerts a poisonous action, and if the healthy action of the lungs be not restored it is fatal. The arterial blood formed in the lungs acts as a stimulus to the brain, enabling it to perform its necessary functions, and if a healthy supply thereof is not supplied the brain ceases to generate the nervous fluid which plays so important a part in the animal economy. (See *Blood.*)

Artificial Fireworks are made by passing hydrogen gas through metallic tubes, variously disposed, and furnished with a variety of orifices through which the gas can escape. The machine to which these complicated tubes are affixed is made movable wholly or in part, and in different directions, so as to add much to the effect. The gas is inflamed at all these orifices, where it comes in contact with the atmospheric air, and burns with a still flame. A constant stream of it is supplied by pressing the bladders or bags that contain it, and that are connected with the tubes from which all the other branches shoot out. The most common explanation of the Aurora Borealis, or Northern Lights, is, that a stratum of hydrogen gas above the atmosphere of common air is lighted by the electric spark, and burns slowly, where it comes in contact with our common air. The coruscations of light observed chiefly in northern latitudes are perhaps referable to the same cause. The levity of this gas, compared with that of common air, will account for its occupying higher regions; and as it can only burn when it is in contact with the latter, the appearances we observe in the Aurora Borealis are exactly such as we should expect from such a cause.

Artificial Ivory.—Mr. Ainslie, of Stratton-ground, Westminster, some years ago received a prize of thirty guineas from the Society of Arts for the following process. It was introduced for many decorative purposes, among others as a substitute for ivory in miniature painting. Its advantages are its cheapness, the possibility of obtaining plates of any dimensions, its non-liability to warp through changes of weather, and the absence of that property of turning yellow with age which, owing to the oil contained in it, ivory possesses. Its surface is harder, has a finer grain, and gives a more brilliant effect to the colours used upon it. It is also superior to ivory in not containing animal oil, the transudation of which is apt to affect the purity of the pigments. This process is as follows:—Take a quarter of a pound of clean parchment cuttings, and put them into a two-quart pan with nearly as much water as it will hold; boil the mixture gently for four or five hours, adding water from time to time to supply the place of that driven off by evaporation; then carefully strain the liquor from the dregs through a cloth, and when cold it will form a strong jelly, which we will term size No. 1. Return the dregs of the preceding process to the pan, fill it with water, and boil again for four or five hours, and strain as before. This is size No. 2. Take three sheets of stout cartridge paper, wet them on both sides with a soft sponge and clean water, and fix them together with size No. 2. Before these are dry place them upon a smooth piece of slate, such as schoolboys use, of a size a little smaller than the paper. Turn the edges of the paper over the slate, and fasten them down. Allow them to dry gradually. Wet as before three more sheets of paper, and paste them down upon the previously prepared three sheets of paper, one at a time, as before. Cut off the parts which project beyond the edges of the slate. When the whole is perfectly dry take a small piece of slate and put it inside a piece of sand-paper, and with this rub the surface of the paper until it is of an even surface and texture all over. Then take a sheet of the very best and hardest drawing-paper you can buy, and with size No. 2 attach it to the previous sheets, cutting off the projecting edges as before. Now take a half-pint of size No. 1, melt it with a gentle heat, and stir into it three tablespoonfuls of fine plaster of Paris until the mixture is complete. Pour this out on the paper, and with a soft sponge distribute it as evenly as possible over the surface; allow it to dry slowly. When perfectly dry get the finest sand-paper, known as flour-paper, and rub it perfectly smooth, and until it is quite even and glossy. Take a few spoonfuls of size No. 1, and mix it with three-fourths its quantity of water, unite the two by gentle heat, and when the mass has cooled, so as to be in a partially gelatinous state, pour about one-third of it on the surface of plaster of Paris, and spread it evenly with the sponge; when this has dried, pour on another portion and afterwards the remainder. Lastly, rub lightly with the "flour-paper," cut away from the plate of slate, and the artificial ivory is ready for use.

Artificial Marble is made with plaster of Paris, ground glass, and milk, which when thoroughly dried can be rubbed smooth with sand-paper, and afterwards polished with emery and oil.

Asparagus, Medical Value of.—"A medical correspondent, on whose statement we can most implicitly rely," observes the *York Courant*, "informs us that the advantages of this plant are not sufficiently estimated by those who suffer from rheumatism and gout. Slight cases of rheumatism are cured in a few days by feeding on this delicious esculent; and more chronic cases are much relieved, especially if the patient carefully avoid all acids, whether in food or beverage. The Jerusalem artichoke had also a similar effect in relieving rheumatism. The heads may be eaten in the usual way, but tea made from the leaves of the stalks, and drunk three or four times a day, is a certain remedy, though not equally agreeable.

Asparagus Omelet. — Boil fifty heads of asparagus in the usual way; cut the green ends, as far as they are tender, into small pieces. Mix with them six well-beaten eggs, and put these into a small frying-pan with sufficient clarified butter to make it rather thick ; add pepper and salt, and serve with butter, sauce, and vinegar. To clarify butter, put any quantity over a clear, slow fire, and directly it is melted remove the scum, and allow it to settle. In two or three minutes pour the oiled butter through a fine sieve into a basin from its sediment.

Asphalte for Garden-Paths. —Level the ground, and give it a thin coat of coal-tar. Over this put ground clinkers, level, and sift over it dry road-sand. Repeat the operation several times, omitting the ground-clinkers and substituting coal-ashes.

Asphyxia, or stoppage of respiration. The term "asphyxia" signifies absence of pulse, but its characteristic is no breath rather than no pulse. Everything which has a tendency to interfere with the functions of respiration will cause asphyxia, whether it be mechanical or otherwise; such as pressure, which prevents the lungs from expanding or stops respiration, collections of fluid in the thorax or throat, the absence of oxygen in the air, the presence of irrespirable gases, such as carbonic acid—the gas generated when charcoal is burning and thrown off by plants (see *Choke-damp*)—ammoniacal, and muriatic acid gas, dentoxide of azote, nitrous acid gas, chlorine, &c. If exposed to the influence of air deprived of its vital elements, our first sensation would be experienced in the throat, which would give rise to an involuntary attempt to expand the chest. In a short time the sensation would be extremely agonising; consciousness would be suspended, although the instinctive efforts to breathe would continue, the face would become livid, the veins of the head swell, the eyes become suffused, and appear to start from their sockets, the fingers become bent, the nails blue; blood would perhaps gush from the ears, the sphincter muscles become relaxed. By hanging death is usually produced with great rapidity, probably because of the dislocation of the neck, although, if this dislocation be not effected, or the cord not be sufficiently well adjusted, or tight enough, to perfectly close the windpipe, the sufferer's agonies may be considerably prolonged. During the reign of Henry VI. a woman, named Suetta de Balsham, was hanged over night, and when cut down in the morning was found to be still alive. Her singular preservation is, however, supposed to have been due to an ossification of the larnyx, whereby air was not shut out from the lungs, as many similar cases due to that cause have since been recorded. In asphyxia from drowning it has been found that when a person falls into water in a state of syncope, or in a fit, being unconscious, and not struggling, he is capable of remaining longer under water than he could remain if he were struggling. This is due to the simple and well-known fact that the demand for oxygen in an animal body is in proportion to its expenditure by muscular exertions. On this principle it will be seen that the advice given by Holwell to his wretched companions in the Black Hole at Calcutta was the very best he could have imagined—viz., to be quiet and orderly, and not to exhaust their strength by useless efforts. (See *Exercise.*) "When an animal is immersed in water," observes Dr. Goodwyn, "his pulse becomes weak and frequent; he feels an anxiety about his heart, and struggles to relieve it; in these struggles he rises towards the surface and throws out a quantity of air from his lungs; after his anxiety ceases, his pulse becomes weaker, the struggles are renewed with more violence, he rises towards the surface again, throws out more air from his lungs, and makes several efforts to inspire; and in some of these efforts a quantity of water commonly passes into the mouth; his skin then becomes blue, particularly about his face and lips, his pulse gradually ceases, the sphincters are relaxed, he falls down without sensation or motion." Submersion extinguishes animal life at the latest within the space of four minutes from the time that the atmospheric air is completely excluded from the lung, but the organic functions are capable of restoration after that period. For practical directions in cases of asphyxia, see Facts and Hints about *Suspended Animation*, page 19.

Assafœtida.—This is a gum resin obtained from the roots of the *Ferula assafœtida*, a native plant of Persia. It has a strong garlic-like smell and a bitter acrid taste. It is an admirable remedy in some nervous spasmodic affections of the larger air-tubes. For this purpose you take equal parts of assafœtida, galbanum, and myrrh, and mix with sufficient confection of roses to form a mass. Beat well together, and administer in doses of from five to ten grains twice or three times a day.

Asthma.—This is a disease of the muscular fibres of the small bronchial tubes, through which air passes to the lungs, rendering respiration difficult, and so producing a loud wheezing noise. Amongst the causes are violent mental emotions, indigestion, the condition of the air, or irritation of the air-passages. It is more common in men than in women, and is often hereditary. A fit of asthma most commonly comes on early in the night, the results being coughing, a tightness of the chest, and difficulty of respiration. It chiefly attacks old persons, and is worst in summer, or in the foggy and windy weather of the winter.

Symptoms of Asthma.—Previous to a fit coming on the patient feels drowsy, apathetic, and disinclined to move for some days. Then it is best to live sparingly, take some aperient medicine, and avoid sudden transitions from heated into cold air, all irritating fumes, smoking, &c. Asthma is known from other diseases by the fit occurring suddenly after the first sleep, together with the symptoms described above. The head and chest are usually in a state of profuse perspiration, and the patient has a strong desire to sit upright and inhale cold air. During the fit the breathing becomes noisy, the eyes are distended, there is a violent gasping for breath, and the lips become blue.

Treatment of Asthma.—In the absence of a medical man, plenty of air should be admitted. If indigestion is the cause, an emetic should be given—mustard in hot water is best. A strong mustard plaister may also be applied to the chest. Burning brown paper which has been dipped in a strong solution of saltpetre, medicated cigars, and smoking a pipe of ordinary tobacco have been known to give relief. The disease is a very capricious one. Change of air is generally beneficial.

Atmosphere.—This word is derived from ἀτμὸς (*atmos*), vapour, and σφαῖρα (*sphaira*), a sphere. Of all common things it is perhaps the most common; of all important things it is most important. Yet how few know anything about it beyond the mere facts of its being devoid of taste, smell, or colour, and being unseen! Wherever we may be, whatever we may be doing, it is the unfelt, unnoticed presence of this air to which we owe our being and doing; it is in our care as we are in its care; and if it becomes impure we sicken and die. As an eloquent writer in an old number of the *Quarterly* says, "It floats around us like that grand object which the apostle John saw in his vision, 'a sea of glass like unto crystal.' So massive is it that when it begins to stir it tosses about great ships like playthings, and sweeps cities and forests like snow-flakes to destruction before it. And yet it is so mobile that we have lived years in it before we can be persuaded that it exists at all; and the great bulk of mankind never realise the truth that they are bathed in an ocean of air. Its weight is so enormous that iron shivers before it like glass, yet a soap-bubble sails through it with impunity, and the tiniest insect waves it with its wings. It ministers lavishly to all the senses. We touch it not, but it touches us; its warm south wind brings back colour to the pale face of the invalid; its cool west winds refresh the fevered brow, and make the blood mantle in our cheeks; even its north blasts brace into new vigour the hardened children of our rugged clime. The eye is indebted to it for all the magnificence of sunrise, the full brightness of mid-day, the chastened radiance of the gloaming, and the clouds that cradle the setting sun. But for it the rainbow would want its triumphal arch, and the winds would not send their fleecy messengers on errands round the heavens; the cold ether would not shed its snow-feathers on the earth, nor would drops of dew gather on the flowers. The kindly rain would never fall, hail-storm nor fog diversify the face of the sky . . . . Were there no atmosphere the evening sun would in a moment set, and without warning plunge the earth in darkness. But the air keeps a sheaf of his rays, and lets them slip but slowly through her fingers, so that the shadows of evening gather by degrees, and the flowers have time to bow their heads, and each creature space to find a place of rest and nestle to repose."

The Temperature of the Atmosphere.—This air-globe, or exterior surface above the earth, in form an oblate spheroid, in which we move and breathe, is dependent for its warmth mainly if not entirely upon the sun. The distance it is from that great luminary, and the angle at which the sunbeams fall, is sufficient to account for all the varying degrees of temperature we find in different countries, and for the changes of the seasons. But the condition of the earth's surface has also considerable influence upon the temperature of the air. Over marshy ground, or in wet seasons, the air will be comparatively cold, for water itself, whether in the form of vapour or otherwise, is extremely difficult to be heated. Hence that beautiful law of nature which provides against the air being at the same time too cold and too damp, by rendering its power to contain damp less as its temperature descends. Therefore, too, as the condition of the soil is improved, the temperature is also improved, and thus by judicious drainage many places which in old times were fruitful of disease to man, and of poor, bad crops to the agriculturist, have become abodes of health and plenty. If our globe were of the same quality of surface everywhere, the gradation of heat and climate from the tropics to the poles would be perfectly regular; but the varying effects of land and water distributed in different proportions cause relative variations in the degrees of warmth and cold, land being, as we have said, more easily heated than water. The heat of the air, however, not only depends on latitude or upon its distance from the equator, but varies with the altitude; and it is important to bear this in mind. Air expands with heat, and in expanding or growing thinner it becomes heated with greater difficulty. The same effect follows when the air becomes thin from a cause easily understood, namely, diminished pressure. We find by experiment that for every 300 feet in height above the level of the sea we must allow a degree less of mean heat (see *Heat*), which, although it seems a small quantity, is, as observant farmers can tell you, an effect of considerable importance in such matters as the ripening of crops, &c. The result of this law is, that at a certain height water can only exist as ice, and vegetation is no longer in being. But in Greenland this state of cold exists at the level of the sea, because that portion of the earth's surface is above what is called the snow-line, or line of perpetual congelation. Here again how beautiful are the merciful provisions of God in nature ! The same sun which drinks up the waters of the rivers and the plains of South America, India, and Southern Europe, melts the snows of the Andes, the Himalayas, the Alps ; and torrents are poured forth from sources where they cannot stagnate, and which are generally situated at the greatest possible distance from the sea. Then when the winter returns, and the plains and valleys are no longer parched and hard for want of water, the fountains which supplied their urgent need are mercifully closed. From what we have said it may be seen that the quantity of aqueous vapour existing in the air varies with its temperature ; but the air always contains a certain proportion of this vapour, more or less, according to the means of supply and its electrical condition. This is seen when it ascends into high and colder regions in the glorious form of clouds, many of which are masses of impalpable snow, having a temperature below the point of freezing. The ordinary temperature of the air is sixty degrees Fahrenheit.

Chemical Nature of the Atmosphere.—Atmospheric air contains various component parts or gases in certain relative proportions—namely, oxygen, nitrogen, ozone, carbonic acid gas, ammonia, and, as we have already observed, water in the state of vapour. In addition to these constantly present elements, the air is capable of holding accidental impurities consequent upon special conditions. Nitric acid is sometimes formed in the air, especially during thunder-storms. Above the sea air is found to hold common salt ; in the neighbourhood of large cities it contains the gases evolved by decay, putrefaction, &c.; and where neglect or ignorance prevails other gases may exist, the worst and most injurious of which is called sulphuretted hydrogen (see page 366), which frequently escapes from drains, sewers, and gas factories, with a smell like that of rotten eggs, and is so deadly in its nature that its presence in the air, if only to the amount of $\frac{1}{1500}$ of its bulk, will destroy small birds. Contagious diseases are largely generated by the presence of this fatal gas in the atmosphere. (See *Ventilation.*) Yet the air, despite all such powerful impurities due to accidents of locality, always preserves that balance of power amongst its elements which renders it fit for the preservation of healthy animal and vegetable life. Despite the varying influences constantly at work to alter its chemical nature, it has been shown to be in all parts of the world at all times identically the same. If it were not so, the vast quantities of carbonic acid gas evolved in large towns would soon be dominant, and the whole of their inhabitants would consequently perish. If the oxygen ceased to work with the nitrogen, the first flame created after their separation would cause such a conflagration as all the waters in the world could not extinguish. That these antagonistic and dissimilar elements work so harmoniously and yet so differently, is due to that balance of power amongst them which it seems impossible to permanently destroy. The Divine law they all obey holds them to their beneficent work. By this law the particles of one gas, though highly repulsive to each other, do not repel those differing in kind, and hence one gas acts as a vacuum with respect to another. (See our remarks on *Ventilation.*)

Pressure of the Atmosphere.—The thin, invisible, elastic material by which the earth is surrounded presses like water equally in all directions, and consequently fills all spaces not previously occupied by solid matter. This air, being compressed by its own weight, is consequently most dense nearest the earth, and least so at a certain distance above the earth, where the spring of the aërial particles, instead of being compressed by those above them, is merely contending against their own individual weight. At the height of three miles the air is twice as thin as it is at the level of the sea; that is to say, one foot of it carried up from the lower level would so enlarge under the diminished pressure existing at that height, as to occupy twice that quantity of space. At the height of fifteen miles a quantity of air which in the lower situation would be compressed into one foot, would fill a space of thirty feet. We have no practical means of ascertaining at what height above fifteen miles the atmosphere exists, but it is generally supposed that its limit is found at an elevation of fifty miles. This altitude, if regarded in relation to the diameter of the earth, would be represented round a twelve-inch globe at something less than the tenth of an inch; and the dense portion of it, that which is the region of heat and clouds, would be about as thick as the paper with which such a globe would be covered. At the level of the sea, however, and at all habitable elevations, the pressure of the air is very great. A cubic foot weighs 535·08 grains, and the weight of the whole superincumbent column and its pressure, which, as we have said, extends in every direction, are not less on every square inch of surface than fifteen pounds. To this pressure of fifteen pounds on every square inch of our bodies each of us is subject, without being at all conscious of it. It has been calculated that the body of an average man has a surface of about two thousand square inches. Therefore that body sustains unhurt a total pressure from the surrounding air of nearly fourteen tons! Consider the delicate construction of the human organs, and this will appear wonderful indeed, until you reflect that this force acts with perfect uniformity over the whole surface in every direction, *outwards* and *inwards*. Without understanding this beautiful law of Nature, we must necessarily be ignorant of various phenomena in nature, of which everybody who wishes to know and feel how great is the loving-kindness of God should know something. The pressure of the atmosphere is illustrated familiarly in the action of an ordinary pump. This consists of a hollow tube, one end of which is in water, while the other end is furnished with a valved bucket and a lever to work it. While the tube is filled with air its pressure prevents the ascent of the water; but when the air is expelled by the action of the bucket, the water, being squeezed in by the pressure of the air on the well, rises until it reaches the bucket, by which it is pumped out as the air was before it. (See *Pumps* and *Barometers*.) The same action may be seen at work in the boy's sucker.

Atomic Weight, or, as it might be called, *equivalent chemical weight*, is the term used to express the relation that subsists between the different proportions by weight in which substances unite chemically with each other. Thus water, which consists of two bodies, oxygen and hydrogen, contains these ingredients, not in a variable, but in a regularly fixed or constant proportion by weight, and each element in a different proportion. (See page 285.) Every specimen of water contains a weight of oxygen eight times greater than that of hydrogen. This fact the chemist expresses by saying that the atomic weight of oxygen is eight times greater than the atomic weight of hydrogen. He calls it *atomic* weight, because he assumes that the difference in question depends upon the fact that every ultimate particle, molecule, or atom of oxygen is eight times heavier than each similar atom of hydrogen.

Atrophy.—A gradual wasting away of the body attended with languor, impaired digestion, and want of appetite. This disease is apt to attack the young, and is generally attributable to poorness of living, to bad air, scrofula, severe evacuations, worms, the free use of alcoholic drinks, and mental anxiety and trouble. Occasionally, however, it appears when none of these causes exist. The sufferer should be put upon a wholesome, nutritive, and very digestible diet, live in pure country air, take as much exercise as can be endured without fatigue every day, and be put under a course of stomachic bitters and tonics under the direction of a medical attendant.

Australian Meat.—The persistently high price of butcher's meat has greatly increased the demand for the beef and mutton and other meats imported from Australia. This meat freed from bone is of excellent quality, and for stews, soups, hashes, pies, and puddings is very popular, although used in other ways it is less so, owing to the over-cooking it necessarily receives in the tins in which it has been previously soldered down for exportation. Recently Australian meat has been imported in a cured form, but this is not so wholesome, or so palatable. Australian meat without bone is at present sold at sevenpence to sevenpence halfpenny a pound. In the first number of the *Food Journal* (Feb., 1870) Mrs. Larkins gives her experiences in relation to a tin of Australian cooked beef. She scraped off all the surrounding fat and gravy, tied the solid meat tightly together, and, having floured, hung it to roast before a brisk fire, basting with the fat and gravy, which she had placed in the dripping-pan. In half an hour it was well browned, and she poured off the dripping, and made a rich gravy with what remained in the pan in the usual way. The result was a tender and well-flavoured joint, such as any person would enjoy a dinner from, and equal, if not superior, to second-rate English beef. Dr. Edward Smith, at the British Association, in 1872, when speaking of Australian meats, said the statements of the comparative value of this import and English meat had been greatly exaggerated. He thus remarks :—"It is said to be three times cheaper than English cooked meat, and that it costs sixpence a pound, whilst the latter costs eighteen or twenty pence per pound; but there can be no difficulty in showing that this comparison is entirely incorrect, and involves fallacies and exaggerations. It is assumed that the whole contents of the tin are meat, which is incorrect. No account is taken of the nutritive material extracted in English cooking, which is unfair, and an exaggerated statement of the cost of bone and cooking is made." He tells us the six-pound tin yields only four and a half pounds of solid meat, and the following comparison may, he assures us, be relied on as correct :—"The tin contents of Australian meat are equal, weight for weight, to raw meat. Stewed meats in both countries, if cooked in precisely the same manner, are equal to each other. The solid contents of the tin are not quite equal to the solid part of boiled meat, weight for weight. Six pounds of tin meat are equal to about four and a half pounds of English roasted meat."

Autographic Ink, or that which is suitable for transferring on to stone the writings or drawings which have been executed on paper prepared for that purpose, should possess the following properties. The ink ought to be mellow, and somewhat thicker than that used immediately on stone, so that when it is dry on the paper, it may still be sufficiently viscous to cause adherence to the stone by simple pressure. The following is the composition : — Dry soap and white wax, free from tallow, each 100 drachms; mutton suet, 30 drachms; shellac and mastic, each 50 drachms; lamp-black, 30 to 35 drachms. These materials are to be melted in the same way as for lithographic ink.

Autographic Paper. — The operation by which drawings or writings are transferred from paper to stone not only affords the means of abridging labour, but also of producing the writings and drawings in the same direction in which they have been traced, whereas when they are executed immediately on stone, they must be performed in a direction opposite to that which they are eventually to have. Thus it is necessary to draw those objects on the left which in the impression are to be on the right hand. To acquire the art of reversing subjects when written or drawn is both difficult and tedious; while, by the aid of transparent and of autographic paper, impressions may be readily obtained in the same direction as that in which the writing or drawing has been made. In order to make a transfer on to stone of a writing, a drawing in lithographic ink or in crayons, or an impression from a copper-plate, it is necessary, first, that the drawing or transcript should be on a thin and flexible substance, such as common paper; secondly, that it should be capable of being easily detached from this substance and transferred entirely on to the stone by means of pressure. But as the ink with which a drawing is traced penetrates the paper to a certain depth, and adheres to it with considerable tenacity, it would be difficult to detach them perfectly from each other if between the paper and the drawing some substance was not interposed, which, by the portion of water which it is capable of imbibing, should so far lessen their adhesion to each other, that they may be completely separated in every point. It is to effect this that the paper is prepared, by covering it with size, which may be easily written on, and on which the finest lines may be traced without blotting the paper. Various means may be found of communicating this property to paper. The following preparation has always been found to succeed, and when the operation is performed with the necessary precautions, it admits of the finest and most delicate lines being perfectly transferred without leaving the faintest trace on the paper. For this purpose it is necessary to take a strong, unsized paper, and to spread over it a size prepared of the following materials:—Starch 120, gum-arabic 40, and alum 21 drachms. A moderately thick paste is made with the starch by means of heat; into this paste is thrown the gum-arabic and the alum, which have been previously dissolved in water, and in separate vessels. The whole is mixed well together, and it is applied warm to the sheets of paper by means of a brush or a large flat hair pencil. The paper may be coloured by adding to the size a decoction of French berries, in the proportion of 10 drachms. After having dried this autographic paper, it is put into a press to flatten the sheets, and they are made smooth by placing them two at a time on a stone, and passing them under a scraper of the lithographic press. If on trying this paper it is found to have a tendency to blot, this inconvenience may be remedied by rubbing it with finely-powdered sandarac. Annexed is another recipe, which will be found equally useful, and which has the advantage of being applicable to thin paper which has been sized—it requires only that the paper be of a firm texture—namely, gum tragacanth 4 drachms, glue 4, Spanish white 8, and starch 4 drachms. The tragacanth is put into a large quantity of water to dissolve thirty-six hours before it is mixed with the other materials; the glue is to be melted over the fire in the usual manner. A paste is made with the starch, and after having, whilst warm, mixed these several ingredients, the Spanish white is to be added to them, and a layer of the sizing is to be spread over the paper as already described, taking care to agitate the mixture with the brush to the bottom of the vessel, that the Spanish white may be equally distributed throughout the liquid. There are two autographic processes which facilitate and abridge this kind of work, when it is desired to copy a fac-simile or a drawing in lines. The first of these methods is to trace, with autographic ink, any subject whatever on the transparent paper, which is free from grease and from resin, like that which in commerce is known by the name of papier végétal, and to transfer it to stone; this paper to be covered with a transparent size. This operation is difficult to execute, and requires much address, in consequence of the great tendency which this paper has to cockle or wrinkle when it is wetted. Great facilities will be found from using tissue paper impregnated with a fine white varnish and afterwards sized over. In the second process, transparent leaves formed of gelatine or fish-glue are employed, and the design is traced on them with the dry point, so as to make an incision; these traces are to be filled up with autographic ink, and then transferred.

PROCESS OF TRANSFERRING DRAWINGS TO STONE.—The drawing is made with ink on paper, both prepared in the way above described. A crayon drawing may, on an emergency, be executed autographically, but this mode of procedure is too imperfect to admit of procuring by its means neat and perfect proofs; besides it is as expeditious to draw immediately on the stone. In order to write or draw on autographic paper, a little of the ink, of which the composition is above given, is diluted with water, taking care to use only rain-water, or such as will readily dissolve the soap. The solution is facilitated by slightly warming the water in a cup, and the ink is dissolved by rubbing the end of a stick of it in the same manner as practised with Indian ink. There should be no more dissolved at a time than will be used in a day, for it does not re-dissolve so well, neither is the ink so good, particularly for delicate designs, after it has been left to dry for several days. This ink should have the consistence of cream, so that it may form very black lines upon the paper; if these lines are brown, a good impression will not be obtained. A sheet of white paper is placed under the hand while writing, in order that it may not grease the autographic paper.

Baby's Basket. — Instead of lining it with pink calico and muslin, which in a short time becomes faded finery, we would suggest two squares of white dimity neatly bound and edged with fringe, the square sufficiently large to cover the inside of the basket, and fall over the edges. By having two, when one is soiled the other is ready for use, and the basket kept, like everything else for baby's use, spotlessly clean. In each square there should be two pockets with flap covers to button over, the use of which we will presently explain. The next article is a powder-box and puff; in preparing this great care must be taken to procure the best violet powder, as little perfumed as possible; a small square of flannel, a soft and fine sponge, and a piece of the best primrose soap; fancy scented articles as a rule to be avoided, as they irritate the tender skin of a young infant, whereas the primrose thoroughly cleanses and purifies it. We must not omit a tiny sponge stitched to a piece of whalebone used to wash the inside of the little mouth night and morning with pure cold water, thereby preventing thrush, a complaint seldom seen in a healthy child, unless this precaution is neglected. I may now mention the pincushion, not one with the traditional motto, "Welcome, little stranger," but one furnished with a view to use, which must be provided with three kinds of pins: firstly, some of those little pins used by drapers for pinning ribbons; secondly, some strong white pins, about two inches long; and lastly, a box of various sized safety pins. In one pocket of the basket lining there must be placed a skein of white thread, neatly cut and put lengthways in paper; also a roll of fine soft old linen, a little soft hair brush, and a pair of scissors should be in the opposite pocket; lastly, a small box of the purest lard and a large soft towel; when with these things we place a set of little garments, we have all complete, and everything necessary for baby's comfort. We must not omit from our list of necessaries two flannel aprons for the use of nurse or mamma.

Bacon.—TO CURE.—Take a flitch or side of a pig after the backbone is taken out and the ribs cut across, and lay it upon a sloping board; then wipe it with a cloth, sprinkle with salt, the skin side uppermost. This will draw out some blood if allowed to remain for twenty-four hours. The board on which it is placed should now be wiped thoroughly dry. The flitch must now be rubbed on both sides with some salt made hot in the oven, and then the flitch must be put with the skin side downmost. The next day it must again be salted, and allowed to remain three or four weeks, being again salted during the month every week. Then wipe it very dry, and hang it up; or some people afterwards send it to be smoked. Many private families prefer to salt it in ham pickle instead of common salt. This is made by mixing 4 lbs. of common salt, 1 lb. coarse brown sugar, ½ lb. saltpetre.

Baked Trout.—Having emptied and scaled the trout, put a stuffing well seasoned into the belly, then turn it round with its tail fixed in its mouth. Put the fish in a small quantity of lard, so that it may not burn in the oven. Baste it frequently, and let it be made a fine colour. When it is done, reduce the liquor in which the trout has been baked, put in a good lump of fresh butter kneaded with flour, with a little essence of anchovies, a few fine capers, salt and pepper, if the sauce is not sufficiently seasoned. But be careful when you use anchovies not to use too much salt. Then squeeze the juice of a lemon, drain the fish, and send it up to table with the sauce under it, but without covering the fish.

Bakewell Pudding.—Take a quarter of a pound of powdered loaf sugar, and mix it with an equal quantity of clarified butter; add the well-beaten yolks of five eggs and the white of one. Mix these well together. Line a dish with puff paste; lay over it several kinds of preserves with some candied lemon in thin slices. Three parts fill the dish with the above mixture; bake in a moderately hot oven; strew over it when cold slices of sweet almond and sweet sugar, and serve cold cut into slices.

Baking Bread.—This should be done in an oven sufficiently hot to harden the sides of the cells formed artificially by the escape of carbonic acid. The more uniformly porous the bread appears after baking, the more wholesome it is. Bread rich in gluten requires increased heat in the baking in order to get rid of the excess of water. Three pounds of flour usually retain after baking one pound of water; but if alum is used in its manufacture, as it commonly is, it will hold half a pound more water. (See *Alum in Bread.*)

Baldness may be caused by fevers, by the unhealthy condition of the scalp, by excluding air from the head, as in the case of continually wearing the hat, by sitting under heating gas-lights which are too near the head, by violent colds, by physical weakness, &c. We have no faith in the various pomades, &c., which are said to restore the growth of hair, but the reader who has will find one of the best of these on page 306.

Balloons.—In consequence of hydrogen gas being so much lighter than common air, it has been applied to the purpose of forming air-balloons. A bladder or bag made of waxed canvas or oil-skin, when filled with this gas, is much lighter than the same bulk of common air, therefore rises from the ground when liberated, as naturally, and by the same law, as a cork pressed down under water rises to the top when the force is removed. The larger the balloon, the greater weight it is able to raise with it; but the higher it mounts, the less weight it is able to carry. The reason of this latter circumstance is, that the higher it gets the rarer is the air, and, consequently, the less is the difference between the specific gravity of the air in the balloon and the surrounding air. On this depends the utility of carrying ballast when it is required to mount high in the air. The more ballast your balloon is able to raise, by being made large, the higher you may ascend, for by gradually throwing out the ballast, the balloon mounts still higher in the air. When it is required to descend, the inflammable air is suffered gradually to escape from the balloon, by which means it becomes specifically heavier than the atmospheric air, and, consequently, falls gradually to the ground. The inconveniences experienced by aëronauts, when the balloon has reached the ground, in consequence of its rebounding and sometimes dragging the traveller to a considerable distance, might be obviated by contriving some means to let the whole of the gas escape as soon as the balloon has touched the ground.

Fire Balloon.—Another kind of balloon is formed by filling the bag with heated air instead of hydrogen gas, and by keeping it in the same heated state, which is done by means of the fire under the balloon having a communication with its cavity. The air in the balloon in this case being rarefied and made specifically lighter than the surrounding air, rises and carries a weight with it upon the same principle as the first kind of balloon did. The French have an interesting and funny story about the invention of this balloon, which is not commonly known, and may not therefore be out of place here. It is to this effect:—A washerwoman of the Rue aux Juifs, in the Marais, placed a petticoat on a basket-work frame, over a stove, to dry. In order to concentrate all the heat, and to prevent its escaping by the aperture at the top, she drew the strings closely together, which are used to tie it round the waist. By degrees the stuff dried, became lighter, and the stove continuing to heat and rarefy the air concentrated under the framework, the petticoat began to move, and at last rose in the air. The washerwoman was so astonished that she ran out to call her neighbours; and they, seeing it suspended in the air, were amazed. One individual, however, a simple paper-maker from Annonay, named Montgolfier, as much astonished but more sensible than the others, returned home, and without loss of time studied the work of Priestley on different kinds of atmospheres. The result was the construction of the first balloon, called Montgolfier's, of which he was the inventor. As the nautilus probably gave the idea of a sailing vessel, so also do very simple causes often produce great and unexpected results.

Banbury Cakes.—To Make.—Take ¼ lb. of butter, and beat it to a paste or cream; then mix ½ lb. mixed peel chopped very finely with the butter. Also 1 lb. currants, ¼ oz. ground cinnamon, and ¼ oz. allspice. Mix this all well together, and keep tied down in a jar until required for use. When wanted make some rather rich paste, roll it out to the thickness of half an inch, and cut it in pieces. Roll it out again until it becomes twice its former size; put some Banbury meat inside, and fold it over and pinch it up of an oval shape. Flatten it with your hand at the top. Let the join be underneath. Rub over the top some white of an egg, then dust loaf sugar over. Bake in a moderate oven.

Bandoline for the Hair.—Boil some rice flour in water until of the consistence of jelly; perfume it according to taste. Gum arabic dissolved in water, with eau de Cologne added, forms a good mixture; or white of egg beaten well with a little water and essence of lavender will be found to answer well.

Barberry Cream.—Put into a saucepan one pint of cream, ½ lb. of barberry jelly, ½ oz. of isinglass. Put on the fire, and keep stirring it until the jelly and isinglass are well melted together. Take it off the fire, sweeten it according to taste, and heat it to a froth; after which pour into a mould to set. A little cochineal to colour it may be added.

Barley.—In this country barley is chiefly used converted into malt for the purpose of brewing, although it is also extensively used as human food in the form which is known as Scotch or pearl barley. It is also used for feeding poultry, and as meal for pigs.

Barley Sugar.—Boil some loaf sugar until when you take some out on the end of a stick it will draw out into a thread, and when cold be quite brittle.

When sufficiently boiled pour in for every pound two teaspoonfuls of lemon juice and six or seven drops of the essence of lemon. Stir it up well, and boil again till, as before, it is brittle. While this is boiling, slightly oil a marble slab. On this pour the sugar. When cool cut it up into strips with a pair of scissors, and twist the sticks a little with the hand. This must be kept in a tin canister or glass bottle, and excluded from the air.

Barley-Water.—Take of pearl barley two ounces, water five pints. First wash the barley from the mealy matter that adheres to it with some cold water; then boil it a short time with half a pint of water to extract the colouring matter. Throw this away, and put the barley thus purified into five pints of boiling water, which is to be boiled down to one-half, and strained for use. Compound barley-water is an excellent pectoral drink, and is made in the following manner:—Take of barley-water prepared as above, two pints; figs sliced, two ounces; liquorice root sliced and bruised, half an ounce; raisins stoned, two ounces; distilled water, one pint. Boil to two pints, and strain. The liquors afford a very excellent diluting beverage in cases of acute diseases, the former in inflammatory fevers, and the latter in inflammatory attacks of the chest, as pleurisy and inflammation of the lungs, recent coughs, &c. As their efficacy depends on their free use, it is of consequence that they should be prepared so as to be elegant and agreeable to the palate.

Barometer, a Simple.—Take a common phial, and having inserted a stick in it, place the stick in a vice or anything that will secure it, holding the lower end firmly in the hand. Let another person pass a cord round the neck of the bottle, and saw it backwards and forwards for a few minutes quickly, until the glass is heated by the friction, when by dipping it suddenly in cold water, the part will crack; or it may be separated with a file, or by scoring it with a diamond or flint stone. Fill the bottle nearly full with water, then place your finger over the orifice, and invert it suddenly. You may now withdraw your finger, leaving the bottle suspended, neck downwards, by a bit of twine. In dry weather, the under surface of the water will be level with the neck of the bottle; in damp weather, on the contrary, a drop will appear at the mouth, and fall at long intervals, being succeeded by another and another, until the weather becomes dry again.

Barometer, Cleaning and Refilling.—Lardner's "Museum of Science," No. 44, says:—"When the mercury has been purified it is next necessary to render the tube perfectly clean on its inner surface. It generally happens that tubes exposed to the air, always more or less damp, have a film of moisture upon them. It is necessary, therefore, to expel this. After cleaning the tube by internal friction, it is warmed over the flame of a spirit-lamp from end to end, so as to evaporate any moisture which may remain upon it, and render it perfectly dry. Mercury is then poured in by means of a small funnel, until a column of about ten inches has entered. To dismiss the air that has entered with the mercury, it is heated over a spirit-lamp until it is raised to a temperature higher than that of boiling water. The air being expanded by the heat escapes from the tube. Mercury is again introduced, and again treated in the same manner until the tube is filled. In this process it is usual to heat the mercury to nearly the same temperature as that of the tube before pouring it in, otherwise the difference of temperature might crack the tube. When the tube is completely filled the open end is finally stopped with the finger, and being inverted, is plunged into the small cistern of mercury at bottom of barometer."

Bath Buns.—Put one pound of flour into a pan, and make a hole in the centre of the flour, in which pour one tablespoonful of yeast, and one cupful of milk slightly warmed. Mix these together with a little of the flour, and leave it near the fire to rise; then mix up the rest of the flour with six ounces of butter and four eggs well beaten. It must be again allowed to rise; and when well risen, which will be in about an hour, put small balls of this mixture in a well-greased tin cake-plate, two or three inches apart. This paste, being thin, will fall into the required shape. Sprinkle some loaf sugar on the top of each, and five or six carraway comfits. Lemon-peel or citron may be added if desirable. Bake in a moderately warm oven.

Bean Omelet, French.—Beat up four eggs with two table-spoonsful of grated Parmesan cheese; add pepper and salt. Put in two table-spoonsful of French beans cut small and well boiled. Melt two ounces of butter in an omelet pan, and fry as usual. Any good mild cheese will do.

Bechamel.—Mr. Ude directs this sauce to be made as follows:—Take about half a pound of butter, about three pounds of veal cut into small pieces, a quarter of a pound of ham, some trimmings of mushrooms, two small white onions, a bunch of parsley and green onions; put the whole into a stewpan, and set it on the fire until the meat be made firm. Then put three spoonsful of flour; moisten with some boiling hot thin cream and a ladle of consommé. Keep this sauce rather thin, so that whilst you reduce it the ingredients may have time to be stewed thoroughly. Season it with a little salt, and strain it through a tammy (or sieve). This sauce should retain no taste of flour to be very palatable.

Bed-rooms, Heating of.—Rooms, and especially sleeping-rooms, should on no account be unduly heated. The effect of heat in rarefying the air is well known; but, moreover, the system of the occupant becomes heated and the vessels of the skin excited, and the result is either an excessive secretion from the surface of the body, and consequent and probable injurious exhaustion, or a hot, dry, and feverish skin; and the farther consequence is increased action of the organs of circulation, undue fulness of the vessels, and undue pressure on the nervous system, with the effect of rendering the sleep either lethargic and unrefreshing, or disturbed and interrupted by the general excitability of the system. Such effects of an overheated atmosphere on the bodily conditions are sufficiently familiar. Even in the sitting-room, although, for obvious reasons, it is less marked in its degree, an overheated atmosphere commonly induces a perceptible sense of oppression in breathing, succeeded by a feeling of drowsiness, and torpor, which, if not relieved, is either followed by a deep and heavy sleep, or by restlessness and nervous irritability, to be succeeded by languor and exhaustion. Such effects must be familiar to all who have ever occupied an unduly heated room. The air of the bedroom ought, then, to be kept at as low a temperature as is consistent with the feelings and the health, and means ought always to be in operation by which a constant and sufficient change of air may be secured. In some cases the open fire-place, whether with a fire in the grate or not, may be sufficient to attain this end; and in other cases the partial opening of a window at the top, or a circular ventilator in one of the window-panes, is necessary.

Beef.—Good beef has a fine, smooth, open grain, is red in colour, and tender to the touch. The fat is white rather than yellow, and is moderate in quantity. The grain of cow-beef is closer and the fat whiter, but the lean is not so brightly red. Ox-beef is preferable to bull-beef, the flesh of the latter having a coarser and closer grain, the fat being hard and skinny, the lean of a deeper red, and the scent stronger. Bull-beef, being dry, tough, and difficult of digestion, is not often eaten. Heifer-beef, if well fed, is sometimes preferred to that of the ox. In old meat there is a horny streak running between the fat and lean of the sirloin and ribs.

In relation to the best cattle for beef, the question may properly be asked, "Which among the varieties of neat-cattle will produce the best or choicest eating beef?"

An experienced butcher observes in connection with this subject:—"I shall present the experience which has brought me in contact with all sorts and sizes, shades and colours of cattle, and not only by hundreds, but by thousands, from the poorest, toughest 'old bull,' used for jerked beef, to feed the slaves of the West Indies, to that of the choicest—the winners of many *first prizes*—which have been so elaborately prepared, both to please the palates of rich epicures and lovers of good beef, and also to gain the admiration of thousands. I place them in their order, as follows:—

"*First.*—Spayed heifer, from four to seven years old.

"*Second.*—Steer, or bullock, from four to six years old.

"*Third.* — Free martin (or barren heifer), not over eight years old.

"*Fourth.*—Ox, from five to eight years old.

"*Fifth.*—Heifer, from three to four years old.

"*Sixth.*— Cow, from three to eight years old.

"*Seventh.*—Stag, from three to eight years old.

"*Eighth.*—Bull, from two to six years old.

"In the above arrangement I have placed the spayed heifer first—from four to seven years old—as generally affording the best and choicest beef. I mean, of course, with the same breed, care, and partaking of the same feeding. My reasons for this are, that she is more docile and quiet, of a gentler disposition, not apt to run or roam so much as the common steer, or heifer, and therefore she will naturally flesh and thrive faster, while her nerves, muscles, or flesh and fat, are rendered more tender from her general quietude. I do not pretend to assert that this quiet manner of growing beef will produce that which shall be the most nutritious and wholesome, because this question must be left to scientific research. My wish here is to show that which shall prove the most profitable, tender, and well-tasted beef."

The usual colour of the above-described spayed heifer or fine steer beef, when first cut with a knife, or afterwards, when it has laid upon marble or has been placed on a dish, will be found to be quite a dark red; but five minutes after it has been exposed to the action of the air its colour becomes changed to a clear cherry red.

This beef will also have a juicy or sappy appearance, with a fine smooth grain to the touch, and in cold weather, or if it has been thoroughly cooled by the aid of ice, it should present a well-mixed or marked appearance. The fat, both outside and through the muscles, presents a clear, straw-coloured appearance; and that on the outside should entirely cover the back of the loins, and the ribs in some parts not less than half an inch. The kidney fat or suet should be large and well filled up under or inside the loin, especially the thin end; and the whole sirloin (when cut up), suet, or kidney fat down will lay nearly on a level, or in other words, the thin end should appear nearly as thick as the thick or rump end, when laid on a bench or block to be cut up.

The suet should be of a brighter shade than the meat or muscle fat, dry and hard, break or crumble easily, and at the same time show but little fibre through it. When greasy or oily, or tough, or full of tough fibre, small in quantity, is a certain indication that the animal has been improperly fed, over-driven, or brought from a great distance, and, therefore, the quality of the beef is deteriorated by rendering it more tough, dry, or tasteless. Ox and cow beef, when in good condition, will show their flesh and fat of a darker colour; that of an ox, more particularly, will have an open and coarser grain, as well as hard, tough cartilages, sinews, ligaments, and muscles, with less flesh in proportion to the quantity of bone; and if the animal has been always kept in a good fat condition, the flesh will not be nor eat so tender or so juicy or fine-flavoured as the flesh of one (not too old) which has been kept down in flesh, turned into fine pasture for a "summer's run," and then stall-fed for two or three months. The flesh will then be much more tender for eating and richer in flavour than the flesh of any animal which has always been in a flourishing condition. But still the old muscle and nerves are not replaced, but left behind, and show themselves more particularly in the pieces which are called plate, navel, and brisket pieces.

Bull-beef is the poorest eating of all beef, especially from old, poor, worn-out bulls. They are always heavy-fleshed, especially in the neck and buttock. The colour of the flesh is sometimes almost black, usually tough with a strong rank scent or flavour, especially when it is fresh killed, although during some months in the year the flesh of a fine fat young bull will be eatable, but it will never be either choice or good eating.

All animals should be killed when they are in the coolest state, or when respiration is the least active. Their flesh will then keep much longer fresh, and be more beautiful, sweet, and healthful. But when killed in a heated condition, or immediately after a hard drive, the flesh will take longer to cool through, spoil sooner, and the flesh and fat will have a feverish, dark look (caused by its being full of blood) and of course it will not be so inviting to the eye or so digestible as when better killed.

Stag-beef is generally found more fleshy than the ox or steer, of a dusky red close-grained; and unless the animal has been well fed, the flesh will be quite tough, and somewhat strongly flavoured. If, however, the stag has been altered when quite young, it will much improve the quality of the flesh. Their horns are generally thick and shorter than those of the steer, &c.

Beef, like mutton, is usually found best from November to May, from the fact that the animals producing this flesh are then generally "grain or stall-fed," although those fed, or which are fattened, on roots or grass, produce good, sweet, and tender meats; but it has not the weight, substance, or heart that is found in "stall-fed" meat. The beef, when fresh, will eat soft, tender, juicy, and sweet, but will not have the delicious flavour, solidity, firmness, or weight, or the heart or nourishment, that the stall-fed (with grain) beef has. It is often found that as soon as the salt touches "grass-fed" beef, it draws back, shrinks into a smaller compass, and changes to a darker colour, as if there was not firmness or solidity to resist the action of the salt; and when boiled, especially if salted a long time, will shrink very much, leaving it tasteless, priceless, without heart, or substance; and, when cut, of a dark colour. "Stall-fed beef," on the contrary, is like corn-fed pork, which has the appearance of (when properly cured) being firmer, brighter, plumper, or has a swelled look, as if the well-mixed fat protected the lean parts of the flesh. We seldom hear of farmers or others salting down "grass or milk-fed pork." They pen them up, and feed with as much corn generally as the animal will take for sometimes months before slaughtering; and when they are salted—I quote an old saying—"Put one pound of corn-fed pork in the pot, it comes out two," which will apply to stall-fed beef. If however, the animals (old or young) are poor, then when slaughtered, their flesh will show little or no fat on the back and through the muscles, and will also be of a darker colour, quite dry-looking, very little kidney fat or suet, and the kidney itself not well covered; and this kind of beef will be usually quite hard, dry, and not well-flavoured eating.

On account of the heating nature of

beef, persons who have an abundance of animal heat should eat it in moderation. It is excellent feeding for the hard-worked, and its fat is almost as easy of digestion as veal fat is. Beef is more nourishing and digestible when roasted than it is when boiled, and it is almost the only species of animal food with which the stomach is not easily surfeited.

THE JOINTS OF BEEF.—The hind quarters are usually considered the choice quarters, as from them are cut or taken the large and famous "baron of beef," which we English hold in the highest estimation as the crowning dish for a Christmas dinner.

BARON OF BEEF. — Dividing the baron of beef exactly through the centre of the loins or back-bone produces two *sirloins,* a name which has become extensively known and commonly associated with this choice part of the carcase. It is said that the name originated with Charles II., who jocularly knighted that part of the animal "Sir Loin."

DIVISION OF THE SIRLOIN.—We will now divide the sirloin piece into portions suitable for families who want roasting pieces, which are cut of all sizes. The thick part, containing the hip-bone, will give the largest piece, while the small end cuts two small pieces, say from eight to twelve pounds each. The best of these is shown in the middle-cut sirloin. The other part, adjoining the ribs, is usually known as the thin-end sirloin, being much like the middle-cut sirloin, but with less tender-loin, and is sometimes preferred for a small family or those who seek it for its close proximity to the prime ribs. It is also cut up into small loins or porter-house steaks. The thick part of the sirloin, by cutting off a few round-bone steaks adjoining the rump side, contains the largest part of the tender-loin, or filet-de-bœuf, which forms a large and choice piece for roasting, from twelve to twenty-five pounds in weight. This piece is usually known as the hip-sirloin. This choice part of the beef is sometimes termed the thick-end sirloin, and when it is not used for roasting it is cut into three kinds of the finest dinner steaks, all commonly called sirloin steaks, but separately, the first and best containing the largest quantity of tender-loin, and known as the "hip sirloin steak," of which there are but two or three in each sirloin. Next in order is the "flat-bone sirloin steak," of which there are about the same number as the "hip sirloin." This is followed by the same number of the "round-bone sirloin steak," which is cut up to the socket-bone or socket-piece. This latter steak makes an excellent beefsteak pie, beef-tea, or minced collops, &c., as it contains more lean than either of the preceding named steaks. The small-end sirloin, when not called for roasting, is cut into "small-loin steaks."

TENDER-LOIN, OR FILET DE BŒUF.—This most tender portion of the beef is taken from the under or kidney side of the whole sirloin, behind the suet, stretching along the loin or back-bone. It commences at and connects with the round-bone steak, extending to the thin-end sirloin, and seldom weighs above ten pounds when all taken out. It is much thicker and broader at one end, gradually tapering to the other, and measuring from sixteen to twenty inches in length. It is considered the most tender, and by many the choicest part of the animal, and therefore always commands extra price. The reason of the tenderness of this choice bit is, that it is so situated in the animal while living that the use of this flesh or muscle is little called into action, and lies well warmed and protected by the fat on one side, and on the other by the back-bone. It is found that those parts of the animal's flesh are tender which a e not brought into wear and tear by the ordinary movements of the animal, o which it would seem the back, the loin, and the rump appear to have the least straining, and therefore in those parts is found the tenderest flesh. On the contrary, the neck, legs, sides, and buttocks are brought into violent action by the physical efforts in walking, eating, lying down, stretching, rubbing, and other muscular actions. The tender-loin is not recognised by the epicure as either being the sweetest or best-flavoured meat. The cause of this will be readily understood when it is known, as already stated, that this muscle is not used as much as the other sweeter portions of the beef; hence the blood flows more sluggishly through its substance with the consequent less nervous force brought to bear upon it. We therefore find while the tender-loin possesses the attribute of tenderness, it must be recognised as being flabby or soft, or deficient in tone or firmness compared with the glowing life-giving essentials which are observable in the meat of ribs, rumps, and the top side of the sirloin and outside portions of slaughtered animals. The animal which is kept housed, especially in a small, dark pen, often breathing an impure air while fattening, will not produce well-flavoured flesh; but the meat certainly will be more tender, in consequence of the inaction from being penned up and forced into quietness, than that which is taken from the animals fattened and exercised in the free open air upon the same food. In fact, wild animals which range and fatten on the hills and mountains, always produce flesh the sweetest as well as of the highest flavour, and certainly the most healthy for human food. It would appear that the genial warmth of the sun, the pure mountain air, and the short sweet mountain grasses produce their influence in perfecting and sweetening living things, whether animal or vegetable, intended for our sustenance. The whole rump piece is usually divided into two or more pieces. The first, or that which joins on the sirloin, is called the *face-rump*, or socket piece; the other part is known by the common name of rump of beef. When this piece is divided through the centre streak of fat, cutting about half way across the dark bone on the left side of the fat, the smallest piece on the left side is called the edge-bone, or aitch-bone, and the other side the "tail-end rump" or "rump piece." From the rump of beef are also cut pieces for bouillé stewing, potted beef, fricandeau, &c., and when left whole is one of the best joints of corned beef. The buttock, cut large or full by cutting off the flank and fat, forms good pieces for soups—viz., inside piece, outside piece, and veiny piece. The first is generally preferred, although the latter is the most tender. This leaves a large leg of beef. Or the buttock can be cut into two rounds of beef, the first and second cuts. The second cut is usually smaller, and not so good as the first cut. They are used for à la mode, à la daube, bouillé stewing, and for corning. The parts remaining, being a small veiny piece, and the thick part of the leg, are used for soups also, after having been cut into pieces across the marrow or leg-bone.

Top of Sirloin. — This piece is known by some as the "thick flank," being a connection with the flank and the sirloin, a piece without bone, quite tender, and well mixed with fat; used for corning, stewing, &c. The flank is either turned on the round of beef or the fat trimmed off, when the lean parts are excellent for stewing, &c. The fore quarter being now ready is laid upon a bench or block, ribs or inside down. It is then cut down on the chuck side, close against the large prominent shoulder-bone, which is sawn through, and the shoulder-clod is cut off. The other part of the quarter is then divided, leaving the ribs and chuck in one piece, and the plate, navel, cross-rib, and brisket in the other. We next separate the two latter from the plate and navel (after counting four ribs under the cross-rib), and follow on by cutting off the brisket and separating the navel from the plate piece. There are thirteen ribs in this quarter, nine of which are cut off from the chuck, the first seven of which are called prime ribs, and are cut into the choicest roasting pieces by sub-dividing (if not sold whole) into three or more pieces. The first ribs begin from the thin-end sirloin, and are always the smallest and most suitable for a small family, for which, when required, it is usual to cut two or three ribs, first and second (or first, second, and third), called the "first-cut ribs." The next ribs, third and fourth, or representing third, fourth, and fifth, as the "middle-cut ribs" or "second-cut ribs;" and the last two, sixth and seventh, the thickest part of the prime ribs, are called "third-cut ribs." Each of these prime ribs is considered by many epicures to be the finest and best-flavoured pieces of the animal, not excepting the sirloin. These choice pieces are usually roasted, although the first and second cuts are sometimes used for rolled beef, having all the bone taken out and skewered into a round form, when it is used *à la mode*, or occasionally roasted in this form. The last of the nine ribs (eighth and ninth) are known as the first-cut chuck rib. Although it has a thin point of the shoulder-blade through it, yet it is supplied with more flesh, according with the bone, which makes it a profitable and good piece both as to price and quality. The chuck contains the last four ribs (making thirteen in all), running under the shoulder-blade, and the neck piece makes up the balance of the chuck. These chuck ribs are usually divided into pieces of one or two ribs each. The first two (tenth and eleventh) are called second-cut chuck ribs—a very juicy, sweet-eating piece of meat, not quite so tender as the first-cut chuck rib, but as well flavoured. This joint sells at a much less price per pound. The next cut, being the twelfth and thirteenth, or both ribs together, is usually known as a "chuck piece" or chuck rib. These pieces are not quite so good, but having the blade taken out (as all others should be that have it in), and a piece of nice fat or suet skewered in, makes an excellent piece to roast in the pot *à la mode*, potted beef, or bouillé for mince pies, soup, &c. When four of these chuck ribs with the neck end are left together it is known as a chuck, and ofttimes this whole piece is cut into and sold as chuck steaks, being as well mixed or marbled with fat, and are equally sweet and juicy. The balance of the chuck or rather neck piece is usually divided into three or four more pieces. The first next to the chuck is called *first-cut neck piece*, and so on. These pieces are excellent for a sweet, strengthening soup or mince pieces. The cross rib or leg of mutton piece is a profitable and good piece, very fair for a plain roast, one of the best for stewing *à la mode*, bouilli, &c. The *brisket piece* is much used by the French for bouilli soup, and a very good piece corned or salted. The *plate piece* is commonly used for corned or salted beef, and the best for pressing. Many butchers roll it, after taking all the bones out, with sugar, spice, &c., then skewer and tie it up in a round form. After being well cured it is known as the Scotch roll. It is an excellent dish when cold. The *navel piece* (or thin-end brisket) is much used for the same purposes as the plate and brisket pieces. These three pieces are used principally for salting, packing, exportation, and for shipping uses. The *shoulder clod*, or clod, when cut in pieces is principally used in soup, &c. The meat is juicy and tender, with a nice marrow bone in each piece, except the thick end, which contains a large bone, though hidden from view; this is excellent for a rich soup. The *shin of beef* is taken from off the clod. It is fit for nothing but stock for soup. When well and properly stewed, it makes a rich gelatinous soup. The *sticking piece* is also taken from the clod, but of late years is seldom taken off. It is used principally for mince pies, stews, soups, &c.

Beef, Dutch.—To make Dutch beef, the fat must be cut away from a raw buttock of beef, and brown sugar rubbed well into the lean. It is then allowed to lie two or three hours in a pan, in which it is turned two or three times. It is next salted with saltpetre and common salt, and allowed to lie a fortnight, being turned each day. It is next rolled very flat in a coarse cloth and put into a cheese-press for a day and a night, after which it is dried in a chimney. When boiled it must be put into a cloth.

Beef Gravy to Keep in Store.—Cut four pounds of coarse beef (perfectly free from fat) into small pieces; scrape and slice a carrot, chop up a good-sized onion and a head of celery; put this all into a stewpan with a thick slice of dressed ham and a couple of cloves, and add to it a pint of water. Cover down closely, and let all stew until the water is nearly exhausted, but at the same time be extremely careful that neither meat nor vegetables stick to the pan. When the meat has in this manner become brown pour in three quarts of boiling water; skim constantly, and keep the pan half-way on the hob, or the contents will boil away too fast. When the liquor is thoroughly boiled and reduced to two quarts, strain it through a fine sieve, and set it by to grow cold, that it may be thoroughly skimmed from all fat. In winter a gravy thus made will keep good for several days, and is always then ready to serve up with game or poultry.

Beef, Jerked.—Beef is preserved in the West Indies by cutting it into thin slices, dipping it in sea-water, and drying it quickly in the sun. This is called jerked beef.

Beefsteak, Origin of.—The discovery of the chief sources of human enjoyment has generally been attributed to some fabulous origin in the ancient world. The story of that feature of dinner, the beefsteak, was thus given in the Middle Ages :—"Lucius Plaucus, a Roman of rank, was ordered by the Emperor Trajan, for some offence, to act as one of the menial sacrificers to Jupiter. He resisted, but was at length dragged to the altar. There the fragments of the victim were laid upon the fire, and the unfortunate senator was forcibly compelled to turn them. In the process of roasting one of the slices slipped off the coals, and was caught by Plaucus in its fall. It burned his fingers, and he instinctively thrust them into his mouth. In that moment he had made the grand discovery that the taste of a slice thus carbonated was infinitely beyond all the old sodden cookery of Rome. A new expedient to save his dignity was suggested at the same time, and he at once evinced his obedience to the emperor by seeming to go through the sacrifices with due regularity, and his scorn of the employment by turning the whole ceremony into a matter of appetite. He swallowed every slice, deluded Trajan, defrauded Jupiter, and invented the *beefsteak.*

Beer when really good consists purely of water, malt, and hops. The more water there is used in brewing beer the better is it for quenching thirst. Strong beer is very nourishing, and is therefore often recommended as a medicine where port wine is too expensive for the patient's means. Its degree of bitterness depends upon the greater or smaller quantity of hops. Bitter beer is therefore preferable to sweet beer. Flat or sour beer produces flatulency, colic, and spasms. Those who are of dry and rigid fibres, and whose bile is good, grow fat on beer. It is said that beer-drinking people are more phlegmatic, heavy, and indolent than people whose drink is wine. Beer which contains a greater proportion of spirit than usual, in consequence of a larger quantity of grain being used in its manufacture, such as the stronger ales represent, is of a heating, inebriating nature. Beer of a light, well-fermented kind is the best beverage. Persons of a plethoric habit or corpulent should use the lighter beer. Sweet beer is generally (not always) less strengthening than bitter beer, but more nourishing. It is regarded as very wholesome. Bilious, melancholy persons should avoid beer; the weak, the lean, and the hard-working will derive from it the most benefit, providing always that it be not taken in excess, for the effects of which we may refer to page 155. Our space will not permit us to enter into the details of brewing, a subject which will be found treated in a practical way in *Cassell's Household Guide;* but we give a few recipes, which we hope will be found useful.

To Prevent Acidity in Beer.—Put into a cask containing eighteen gallons of beer a pint of ground malt in a bag. It should be suspended. Another plan is that of mixing with a quart of French brandy as much wheat or bean flour as will form a dough. Long pieces of this dough put into the bunghole, so that it may sink gently to the bottom, will not only keep the beer mellow, but increase its quality.

To Restore "Foxed" Beer.—Beer in which is seen white specks or a coat of mould, and which has a rank, unpleasant taste, due to certain mistakes in its manufacture, is called "foxed." To cure this, infuse a handful of hops and a little salt of tartar in boiling water, and when cold strain off the liquor, which is to be poured into the cask. The bunghole should then be tightly closed.

"Frosted" Beer.—Beer which has become stale and vapid, owing to the stoppage of the fermenting process by extreme cold, may be restored by re-exciting fermentation. Supposing we have a butt of such beer to deal with, we proceed as follows:—Into a pailful of fresh wort rub a handful of hops, and boil them for half an hour. This will render it intensely bitter. Then draw off a pailful of the beer, and put the bitter wort in its place. When fermentation ceases, bung it up for a month.

Flat or Sour Beer.—Draw off the beer (we suppose you are dealing with a barrel-full) into a clean, sweet cask. Boil half a pound of brown sugar in a quart of water. Add a spoonful or two of yeast before it has grown cold, and when it ferments add it to the beer. This will also remove mustiness. A little carbonate of soda will remove sourness from beer, but care must be taken not to add too much, or a dead flat effect and an alkaline taste will be the result.

Bottled Beer.—To ripen this put into the bottles as you fill them a spoonful of raw sugar, a few raisins, or a little rice.

Bottling.—The sealing-wax used over the corks of bottles is objectionable because of its brittleness. The insertion of the corkscrew causes it to crumble, and as the cork comes out of the bottle the chances are greatly in favour of the wax finding its way into it. To avoid this, a solution of gelatine and glycerine dissolved by heat may be made use of. In filling bottles with ale or porter they should be promptly corked, as otherwise they are liable to become flat or sour, and acquire a taste more or less unpleasant. Flatulency, colic, and spasms are likely, as we have already pointed out, to arise from drinking beer in this condition. It is liable to ferment, and give out sulphurous vapours, for which reason it is often dangerous to enter cellars where beer is kept in bottle. Instances have been chronicled of persons entering beer cellars being at once suffocated by these powerful vapours. Be sure the bottles are *clean*.

How Beer Grows Sour.—Beer will become sour by the absorption of the pure air or oxygen, more or less quickly, according to the greater or smaller extent of the surface exposed to its action. This is seen in the process of vinegar-making, and for this reason, when vinegar is made in a small way, the air should be freely admitted, and the cask be not more than half filled, to obtain a larger surface in proportion to quantity.

Beer, To Make.—Barley is soaked in water, and then laid in heaps some inches deep, till the grain has germinated, and the germ, or new shoot, is about two-thirds of the length of the grain. It is then dried to stop its growth, generally by artificial heat in kilns, when it is called kiln-dried; and sometimes in chambers where the air is freely admitted, when it is called air-dried malt. The malt previously screened—that is, separated from the husk or germ, or new shoot which is called its culm—and then ground, is infused in boiling water in a mash-tub. The liquor then drained off is called sweet wort. It is next boiled with hops, to give it a pleasant flavour, and is cooled as speedily as possible, to prevent its running into the acetous fermentation, and turning sour. When cooled, it is put into large tubs or vats, and brought into a vinous fermentation by the addition of a little yeast. The same circumstance takes place as to the extrication of carbonic acid gas, when beer is in a state of fermentation, as when wine is made. In both it is the vinous fermentation, and in both the result is a spirituous liquor. The barley is first made to vegetate, because it thereby acquires a greater quantity of saccharine matter, and this is the requisite ingredient in every case of vinous fermentation. As in every case of this fermentation called the spirituous or vinous, there is a spirituous liquor formed, we may always procure the spirit separate, by distilling such fermented liquor; and, according to the materials made use of, we obtain different kinds of spirits, having different flavours as well as different names.

Beer Vats.—Carbonic acid gas being formed during the process of fermentation, due care should be taken to carry it off so as to avoid its effects. Brewers' men have been killed by leaning incautiously over the beer-vat, and thus inhaling the carbonic acid. (See *Air, Vitiated.*)

Beer Soured by Lightning.—When beer is new and the process of fermentation incomplete, lightning will give such an impetus to the process as to convert the sugar into acetic acid before it has become alcohol. In old and strong beer, where the fermentation has been more complete, this does not occur. (See *Lightning.*)

Beer Finings.—Sole-skins put in beer and boiled until quite dissolved are used for beer fining. Draw off a pint of the beer, or more, according to the size of the cask, and in this dissolve a teaspoonful of the fining, pour it in through the bung-hole, and stir Leave it to settle for a day or two; if there be any chance of fermentation leave the bung out.

Beer, To Keep it Good to the Last.—John Timbs, in his "Domestic Hints," points out how beer may be made as good at last as at first, by pouring into the cask clean pebbles enough to fill the space caused by removing the beer, so as consequently to exclude the air.

Beer from Pea-shells.—Fill a boiler with green pea-shells, with water enough to cover them well. Let them simmer for three hours, and add a strong decoction of wood sage to give it a slightly bitter taste.

Bees, Practical Management of.—In the practical management of bees the formation and due arrangement of the apiary is of some importance. The prime requisites are *shelter* from the extremes of heat and cold, and *quiet*. Facing southwards, the hives should be carefully screened from the north and north-east. A group of young trees or a close-growing hedge will answer the purpose well; or advantage may be taken of a range of buildings, or a garden-wall. In availing ourselves, however, of the shelter of buildings care must be taken to keep the hives at such a distance as to be clear of the rain-drops and from the cutting winds caused by such a locality. A distance of not less than eight or ten feet should intervene between them and the screen, and of this space the half breadth next the hives should be laid with fine gravel to absorb the moisture and keep it free from weeds, grass, straws, &c. The space of ground between and in front of the hives to the extent of at least three feet should be covered in the same manner. *Quiet* is essentially necessary to their well-doing. Bees do not thrive in the near neighbourhood of incessant noise. The apiary, therefore, should be at a distance from smithies, mills, steam-engines, &c., and also from such manufactories as emit noxious smells. When circumstances will admit of it, the apiary should be placed in view of the window of the family sitting-room. This will save much trouble incurred in watching at swarming time, as well as give greater security from marauders. The hives should be elevated about fifteen inches from the ground, on a single *post* or pedestal, in preference to three or four, which is the usual number. Vermin are thus prevented by the projecting edge of the floor-board from climbing over and reaching the entrance. It may be laid down as a good rule to have the hives placed as far from one another as the extent of the apiary will admit. When standing at intervals of only two or three feet the bees are very apt to quarrel amongst themselves. They sometimes mistake their own proper domiciles when too much crowded together, especially when hurrying homewards in the working season, or hastening home to escape a shower, and the mistake is attended with fatal consequences. In feeding a weak hive a close neighbourhood is particularly dangerous; the smell of the syrup is quickly diffused over the whole colony, and pillage generally ensues. In swarming, too, when the newly-departed emigrants are discouraged by a sudden blast or change of atmosphere, and the queen hastens to return to her old abode, her ignorance of the locality—having, if a young queen, never been abroad before—renders her very apt to mistake and enter a hive where she is by no means welcome, and the swarm following her, a conflict ensues. When the apiary is situated in a garden, there will be no want of bushes and low-growing shrubs on which the bees may alight when swarming; but when it is located on a lawn or smooth level, the swarm is extremely apt to fly off altogether, or to take up its station on some high tree in the vicinity, from which it is difficult to dislodge it. A few evergreen shrubs growing in front of the hives and at a few yards distant will prevent this; or, if such an arrangement be, from particular circumstances, not expedient, the evil may be so far remedied by sticking into the ground near the apiary some branches of trees retaining their foliage about the period when the swarming may be expected. *Water* is advantageous to the operation of these insects during spring and summer. A shallow pebbly stream in the vicinity will, therefore, be most desirable, where they can drink without any danger of drowning. Its absence should be supplied by artificial means, and a shallow vessel of water placed in a secluded and quiet quarter of the apiary, having a few smooth round stones thrown into it of a size to project above the surface and afford footing to the drinkers, will answer the purpose. The neighbourhood of large sheets of water, however, or of broad rivers is injurious, as the little foragers in crossing during high winds or dashing rains perish by hundreds in a single day. Covered apiaries, or bee-houses, are common in England, and are sometimes, though rarely, met with in Scotland; they have their advantages, but are not without serious drawbacks. They afford shelter from the extremes of heat and cold, and, when properly constructed, are also a complete protection from thieves. But when the number of hives is great the expense of such structures is so considerable as to preclude entirely their being brought into common use. Besides this, their confined limits render it necessary to place the hives quite close to one another, an arrangement we have already noticed as a great evil. And finally, in operating experimentally on any particular hive the whole colony is apt to take the alarm, and to cause a degree of confusion most inconvenient to the operator. A good thick coat of oat or rye-straw, if the hives be of that material; or if of timber, a well-seasoned and painted surtout of fir-plank three-fourths of an inch in thickness, resting on the floor-board and having a vacant space of an inch between it and the hive, will be quite sufficient security against the extremes of heat and cold, while rain may be warded off by thatching the hive with a slanting roof. Hives are found of almost all shapes and sizes, and of various materials, circumstances influenced sometimes by convenience, but oftener by the taste and fancy of the owner. In France particularly, where the culture of the bee has been much attended to, the variety of hives is very great, but with few exceptions they appear to be remarkably deficient in simplicity. Straw hives of the common bell-shape, with all their imperfections, will continue in use, because they are inexpensive and easily made, because the handling of them requires little skill, and because as long as the suffocating system is persisted in they will answer the purpose well enough. It would be desirable, however, that more pains were bestowed on their form. To concentrate the heat, to retain it, and thus to accelerate the hatchings of the brood, on which so much depends, no shape is so well adapted as the globular. We would recommend, therefore, straw hives to be made in the form of a globe, having the third of its diameter cut away. Two rods or sticks of three-fourths of an inch in thickness forced through the hive at right angles to a line drawn from the entrance, and about an inch higher up than the centre, will be sufficient to support the combs. The two-storeyed straw hive is preferred by many to wooden hives on the same plan, from the persuasion that straw is a preferable material. It consists of two or more storeys, each seven inches in height and ten inches in diameter. In the upper row of straw there is a hoop of about half an inch in breadth, to which are fastened six or seven wooden spars, each one-fourth of an inch thick and an inch and a quarter broad, and half an inch apart from each other. To these bars the bees fix their combs. In order to give greater steadiness to the combs, and prevent their being broken or deranged when the hive is moved, a rod is run through the middle of it in a direction across the bars, or at right angles with them. A flat cover of straw worked of the same thickness as the hives, and twelve inches in diameter, is applied to the uppermost story, made fast to the hive with a packing-needle and thread, and carefully tested. Before it is put on, a piece of clean paper of the size of the top of the hive should be laid over the bars, the design of which is to prevent the bees from working in the intervening spaces. The Grecian hive has long been in use in the Greek islands, and is sometimes called the Candiote hive. It is in the form of a flower-pot, open at the top, and provided with a flat cover, in the same manner as the hive last described. As in the last also, a certain number of bars are fastened to the uppermost roll of straw, each designed for the formation of a comb, and when prepared for use the cover is laid above these bars, fixed at the edges by wooden pins or sewed with packthread, and having the joining thoroughly plastered with clay. This hive affords considerable facilities for forcing the bees to work in wax. It is only necessary to remove one or two of the combs, and the bees will immediately commence filling up the vacancies. In this way a portion of their honeyed stores may be abstracted without difficulty, and without having recourse to the barbarous practice of suffocation. It affords also the means of making artificial swarms. It will be observed that in consequence of the diameter of the hive gradually diminishing towards the bottom, rods inserted through the body of the hive are rendered unnecessary, the wedge-like form of the combs serving sufficiently to support them.

Bee Boxes.—The respective merits of bee boxes and straw hives have often been made the subject of discussion. Certainly those of straw have a decided superiority over those of wood in respect to their capability of maintaining an equable temperature, from the non-conducting quality of the material of which the former are constructed.

The latter are more easily kept clean; they furnish better means of defence against vermin. They are a great deal more durable, and afford a much greater facility for operating experimentally and studying the nature of their interesting inmates; and, what is always of importance in matters of rural economy, their cost, at least as regards the simpler kinds, is very little more than that of the straw hive; and, it we take their durability into account, it is actually less. But the nature of the material of which they are made rendering them easily affected by variations of the external temperature, furnishes an important and well-founded objection; for, notwithstanding all the precautions used, no practical or manageable thickness of material or wrappings of straw ropes and straw covers have been found effectual in remedying this defect. Therefore those who cultivate bees for the sake of their produce only, and who have no particular desire to study minutely their natural history, or to witness their proceedings in the interior of their dwellings, will do well to adhere to hives of straw. There is a greater variety of form and structure in the wooden hives than in those of straw, but the storeyed kinds, of various dimensions, are most generally used. It is quite immaterial of what shape these boxes are, provided the safety of the bees and the convenience of inspecting their operations and taking their honey be at all times regarded in their construction. So also to describe even a small part of what are found so varied would be at best imperfect and unsatisfactory. They may be made of a single box, or consist of a great number united. Still there is the same objection to the latter construction as that made to the too close approximation of hives of any kind. Some part of a wooden hive should at all times consist of a glass window, covered, however, on the outside with a shutter. The use of this window is to enable the master to inspect the inside, that he may judge of its fulness, and the health, activity, and swarming of its inmates. For more complete information, see *Cassell's Household Guide.*

Bellows.—Bellows act in getting up a fire by driving the air more rapidly towards the burning fuel, and consequently increasing the supply of oxygen. (See *Combustion.*)

Bilious Attacks.—These occur at intervals, the symptoms being headache, sickness, with occasional fits of shiverings, sometimes accompanied with diarrhœa, and although called bilious, it is not often that the bile has much to do with them. (See below.) This complaint is sometimes called gastric "catarrh," and this name more truly describes its nature, while it at the same time suggests its most frequent cause—namely, the prevalence of cold easterly winds or wintry rains. The patient should keep quiet, and give his stomach rest, and carefully confine himself to a light mild diet.

Bilious Constitutions.—Sallow complexions, dark hair, and angular features characterise persons of a bilious constitution. Such persons should adopt a mixed and not too stimulating diet, in which vegetable food should sometimes predominate. (See *Diet.*)

Biliousness. No secretion of the human body is more regularly performed than that of the bile, nor is any less liable to be vitiated, and many complaints are classified under the name of bilious upon very insufficient grounds. The strong cathartics, generally composed of mercury, which are so commonly taken under the supposition that they clear away the redundancy of bile, often create the very complaint they were intended to cure, and do lifelong mischief to their unfortunate victim. The biliary duct, for conveying the bile from the liver and gall-bladder, terminating in the intestines, is so formed that the bile cannot get into the stomach unless forced into it by pressure from the abdominal muscles, &c., during vomiting or by a reversion of the peristaltic motion of the intestines, the latter being of very rare occurrence. When the flow of bile to the intestines is obstructed by concretions lodging in the biliary duct, or by spasms, it is taken up by the absorbent vessels and conveyed to the mass of blood. The cornea, or white of the eye, and skin, consequently, are tinged more or less with yellow. The bile passing off by the kidneys, the urine becomes strongly impregnated with it, and the fæces being thus deprived of it, are then of a light clay colour. Taking an emetic, a common remedy for a supposed bilious attack, is an error, even when the bile is actually vomited. During the operation of the emetic, the liver being compressed by the action of the abdominal muscles, a quantity of bile is forced into the intestines, and from thence into the stomach, which on being brought up, is regarded by the patient as showing an excess of bile. If, however, the patient had taken the trouble to think that the matter he first vomited was acid, it would at once be seen that previous to the taking of an emetic there was no bile in the stomach. The emetic is in that case found to be advantageous, not in clearing away the bile, but in rousing the liver to more energetic action, and cleansing the stomach of acid and slimy matter. Symptoms which are often attributed to an excess of bile are really due to a deficiency of bile, when treatment which creates bile is of course the proper remedy. A copious secretion of bile is essential to health, for good chyle cannot be made without it. (See *Digestion.*) The fæces of people in sound health are more frequently tinged with bile than those of others who are in a different condition. The author of the articles on "Domestic Medicine" in *Cassell's Household Guide* (a gentleman of eminence in the medical profession) says, "People are very fond of attributing all sorts of symptoms to bile, and seem rather pleased than otherwise to be told that their livers are affected." Even amongst doctors it is confessed that very little is known concerning the effects of too much or too little bile, or bad bile, until the result is jaundice, which is a complaint more readily understood. The stomach or intestines are often the real offenders, when the liver receives all the blame. For biliousness the best remedy is careful dieting, the necessary information for which will be found under the head of *Diet.* Occasionally a mild purgative may be taken in the morning, such as a tea-spoonful or two of Epsom salts in cold water. (See *Epsom Salt.*)

Bills of Exchange.—These are orders in writing by which one person, the *drawer*, authorises another, the *drawee*, to pay a third person, the *acceptor*, certain sums of money, in the following form:—

Liverpool, June 5th, 1872.

£35 : 0 : 0

On demand pay Robert Browne the sum of Thirty-five Pounds for value received.

PAUL JONES.

To Peter Robinson.

If for the words *on demand* is substituted *at sight*, the bill is payable directly it has been accepted; if, instead of on demand or at sight, it is worded so many days or months after sight, it is not due until that time calculated from the date of the bill has elapsed. For Robert Browne may be substituted *the bearer*, or *Robert Browne or order.* These bills are of two kinds, inland and foreign: the former is a bill drawn in any part of the United Kingdom of Great Britain and Ireland, the islands of Man, Guernsey, Jersey, Alderney, and Sark, and any other part of Her Majesty's dominion. The latter is a bill either drawn or made payable abroad. If the bill is not paid by the day specified, the law permits interest to be charged upon the money. Three "days of grace" are allowed in the United Kingdom on bills, except those which are payable on demand. When a bill falls due on a Sunday or recognised holiday, it is payable on the previous day. Any alteration in the date after acceptance renders a bill null, and no legal action can be taken upon such a bill.

Bills of Sale.—This is an assignment of personal property as security for debt, which is rendered valid by being *registered* in the Court of Queen's Bench within twenty-one days of its execution. An affidavit must at the same time be given, descriptive of the residence and occupation of the deponent and of each attesting witness. After an expiration of five years a bill of sale has to be again registered.

Birdlime is made by boiling the middle bark of the holly for several hours in water until it is quite soft. After the water is drained off, the pulp is placed in a pit underground, when it ferments and becomes glutinous. It is then kneaded and washed through several waters; and after being left for several days to ferment and purify, it is fit for use.

Births, Registration of.—(See *Deaths.*)

Biscuits.—Plain, To Make.—To the yolk of one egg add sufficient milk to make one pound of flour into a stiff paste. Knead it smoothly, roll it out thin, cut in round shapes with a wineglass, prick it with a fork or docker, and bake in a slow oven. Biscuit dough should be kneaded as stiff as possible. If too thin, the biscuits will be thin and heavy; if too thick, they will crack round the edges.

Biscuits, Cinnamon.—Half a pound of dry flour, one pound of lump sugar, finely sifted; one pound of butter, six-pennyworth of powdered cinnamon. The whole to be mixed with a glass of brandy or rum, then rolled very thin, and baked in a quick oven.

Bitters.—Bitters are often recommended as tonics, for increasing appetite, aiding digestion, and giving vigour to the system. Bitters, however, when pure differ in their essence. A few, such as gentian and quassia, are found to be comparatively inactive, and some, such as aloes and marsh trefoil, are purgative. Hops are astringent and narcotic. Some are diuretic, and many, such as opium, ignatia, amara, tobacco, and nux vomica, are highly deleterious. The bitter contained in porter is very great; but, instead of being taken from hops, it is sometimes obtained from such noxious substitutes as opium, tobacco, &c., when its effect on particular constitutions is likely to be often highly injurious, and in some cases very dangerous. These bitters are more cheaply obtained, and it is for this reason that some of the smaller brewers, who are not too conscientious in the way in which they compete one with another, use them in the place of hops. The following bitters are excellent for their stomachic virtues. They strengthen the digestive power, create an appetite, and give to relaxed muscular fibres new energy :—Take half an ounce of gentian root, one ounce of Peruvian bark, two drachms of orange-peel, and one drachm of cinnamon. Let these ingredients macerate in white wine for a fortnight, after which they may be added to a couple of bottles of white wine. A wineglassful of this mixture taken occasionally will be found beneficial in very many cases.

Black Beetles and Cockroaches.—Sliceings or parings of cucumber strewn about a kitchen in which these abound at night, is the best mode of getting rid of them. The remedy has the advantage of being perfectly innoxious, and can therefore be used with safety. A good poison for beetles is made with amorphous phosphorus made into a paste with lard. The red wafer commonly sold for killing beetles is made from a paste formed with red lead, flour, and water. This is rolled out thin, spread on a hot iron, dried, and cut into the size and shape desired.

Black Draught.—To Prepare.—Take of senna, two ounces; boiling water, one pint and a quarter; mixture of senna and Epsom salts, of each three quarters of an ounce.

Another Way.—Senna, eight ounces; boiling water, four and a half pints; Epsom salts, one pound; tincture of senna, three quarters of a pint; treacle and colouring, each two ounces. The above may be greatly improved by the addition of a little tincture of cloves, which prevents griping, usual with the senna mixture. One wine-glassful is sufficient for a dose.

Blacking.—Fine blacking may be made by taking one quart of sour beer or porter (the latter is best), eight ounces of ivory black, three ounces of molasses, one ounce of powdered sugar candy, or of loaf sugar, half an ounce of powdered gum arabic, half an ounce of oil of vitriol, and one ounce of sweet oil. Having warmed the beer, dissolve in it the gum arabic, mix the molasses with the vitriol and sweet oil —the vitriol is to give the polishing quality, and the oil is to prevent the vitriol from injuring the leather. Add by degrees the ivory black, rubbing the mixture smoothly together, and seeing that no lumps are left in it. The form recommended by Dr. Ure consists of ivory black two pounds, treacle one pound, olive oil four ounces, well mix together. To this four ounces of strong sulphuric acid are to be added. When the acid has ceased to act on the ivory black, five ounces of vinegar, half an ounce of sulphate of iron dissolved in five ounces of water, and three-quarters of an ounce of gum arabic are to be added. As the use of sulphuric acid in blacking has a tendency to rot the leather, we give a recipe for preparing blacking without employing it. Take treacle, one pound; ivory black, one pound and a quarter; rape, sperm, or olive oil, two ounces; and make them into a paste wfth strong vinegar. Liquid blacking, which is applied wet and dries with a glossy surface, and does not require any rubbing, is made by adding a strong solution of gum arabic to any ordinary blacking. A good and cheap form for water-proof blacking for harness is thus prepared: —Take of bees'-wax one pound, soft soap six ounces, ivory black four ounces, Prussian blue one ounce, linseed oil two ounces, oil of turpentine half a pint. The wax is to be melted, and mixed with the soap, then the colours, after having been finely powdered, are to be ground on a slab with the linseed oil, and added to the wax, soap, and turpentine. In using this waterproof varnish, only a small quantity should be used at a time, and carefully spread over the leather. It is then to be polished with a soft brush or rubber. A few directions about the proper manner of cleaning boots and shoes may not be out of place. Remove very carefully, while wet if possible, all the dirt with a wooden knife, and never use a steel knife for this purpose, as there is danger of injuring the stitches and leather. Then brush off the remainder of the dirt with a hard brush. If this is not well done, the leather will not polish. Care must also be taken that the boots are quite dry, otherwise they will not shine when blacked. Too much blacking must not be put on at a time, for if the blacking dries into the leather before they are polished the leather will look brown. It is also better to clean the boots on a boot-tree. The blacking should be always stirred up with a stick before applying it to the brush, and the vessel containing it should be kept well corked, as blacking is injured by exposure to the air.

Blacking for Stoves.—Take half a pound of black lead finely powdered, and (to make it stick) mix with it the whites of three eggs well beaten, then dilute it with sour beer or porter, till it becomes about as thin as shoe-blacking. Having stirred it well, set it over hot coals, and let it simmer for twenty minutes. When cold, pour it into a jar, cork it tightly, and keep it for use. It must be rubbed on the stove with a soft brush, and then polished off quickly with a clean hard brush as you would a boot. It should be put on when the stove is cold, first removing the ashes, and then wiping off all the dust with a cloth. Till it is quite dry do not sweep the hearth, or replenish the fire.

Black Reviver.—Take of galls, half a pound; logwood, one pound; copperas, four ounces. Boil together in half a gallon of water for three or four hours until it is reduced to three pints, which can be drained from it.

Black Tracing Paper.—This is made by coating a sheet of paper with a mixture of soap, lampblack, and a little water. When dry, the superfluous pigment is removed by wiping the surface of the paper with a cloth.

Black Veils.—It is considered strange that the skin of the negro inhabitants of tropical climates should be black; because, as that colour absorbs heat more rapidly than any other, it is generally looked upon as the worst possible to preserve the skin from the effects of the sun. Still, this idea is not borne out by the use of black veils, which are worn by many in preference to white or green, even in the hottest weather. An eminent physician made some interesting experiments on this point, and deduced the fact, that whilst the skin is blistered by exposure to the sun's rays, when covered only by a thin white linen, no injury occurs when black crape is worn. Accordingly, as the black colour acts by converting the radiant heat of the sun into sensible heat, it in reality prevents the scorching quality of the rays, whilst the increase of sensible heat is neutralised by the corresponding increase of perspiration which naturally takes place. This theory accounts for the fact that black veils worn by ladies exposed to the sun, will have the very desirable effect of protecting the skin from its burning rays, and avoiding by that means the propagation of freckles, to which many ladies are subject from the effects of exposure to its influence.

Bladders.—To clean these for use, put a little chloride of lime into water, aud soak them in this for twenty-four hours; after which remove the extraneous matter, rinse them thoroughly in clean water, and dry them.

Blancmange.—Dissolve in a teacupful of water two ounces of isinglass on the hob. Blanch about half an ounce of sweet and bitter almonds, and pound these in a mortar. Put these with the isinglass, also three pints of cream or milk, two spoonfuls of orange flower water, and enough loaf sugar to sweeten to taste. Boil all together, strain through a fine hair or lawn sieve, allow it to stand until cold, and take away any scum that may arise, and boil up again. If not thick enough, add more isinglass. Stir up with two glassfuls of sherry wine, and pour into a mould. A little ratafia may be added if not sufficiently flavoured, or a glass of noyeau if preferred.

Bleaching Straw.—The customary mode of bleaching straw for ornamental use has been to stow it in a cask with burning brimstone; but there is a readier method, if judiciously applied :—Take a solution of muriatic acid, and saturate it with potash until the effervescence subsides. Dip the straw in the solution. Again, the oxygenated muriate of lime, which may be had at any chemist's shop, dissolved in water, will bleach straw without the least diminution of its inflexibility.

Bleeding from the Nose.—Any determination of blood to the head easily ruptures the net-work of delicate blood-vessels spread over the internal surface of the nostrils, covered only with a thin tegument. Great heat, violent exertion, a blow, and postures of the body which send the blood to the head, are all likely to occasion bleeding from the nose. It sometimes comes on without any previous warning, but at other times its coming will be preceded by pains in the head, accompanied by heaviness, flushings of the face, itching in the nostrils, together with costiveness, or shivering. It should not be suddenly stopped in persons who are healthy and strong; but where weakness exists, and the discharge of blood is at all large, it will be as well to get into cool air, in a somewhat erect position, with the head reclining a little back, to drink freely of cold water, and apply ice as nearly as possible in contact with the bleeding surface.

Bleeding Pigs, Horses, Oxen, and Sheep.—The operation of bleeding is generally performed in the horse and ox by opening the jugular vein, which runs along the hollow in the neck, above the windpipe; either fleam or lancet may be used. Sheep are bled by opening, with a lancet, the vein at the inner canthus of the eye, about two inches from the corner of the orbit. The vein inside the knee, or inside the thigh, may be punctured instead. Pigs may be bled in the two last-named places, or by puncturing the roof of the mouth a short distance behind the corner teeth. The pulse may be felt in the horse at the edge of the lower jaw, where the sub-maxillary artery crosses the bone; in the ox, by placing the finger between the dew-claws of the fore-legs; in sheep, pigs, and small animals of any kind, by placing the hand firmly over the region of the heart, immediately behind the shoulder on the left side.

Blinds for Windows. — The fastening of window-blinds to rollers with tacks is a bad plan. In the event of rain beating in upon the upper part of the window, the tacks rust, and cause iron-mould to appear on the blind. The best plan is to have the roller carefully pierced quite through with a small gimlet, in about six places, equally distant from each other, so that a large needle and coarse thread can pass through the hole. The blind is then to be sewn to the roller, when not only will it be kept free from iron-mould, but it will be retained in its position with greater facility than by the means of tacks, and will not be subject to the accidents incidental to a tacked blind.

Blistered Feet.—Soaping the inside of the stocking before setting out for a long walk, making a thick lather, will prevent the feet from blistering. Of course when hard walking is concerned, good well-fitting, well-greased boots should be selected, and a raw egg broken into them before putting them on softens the leather to a great extent. When you have been some hours on the road, and the feet begin to be chafed, change your stockings, or turn them inside out. Should the blister be formed, mix a little tallow from your bedroom candle with spirit, on going to bed, in the palm of your hand, and rub the feet with it. In the morning the blister will have gone.

Block Tin Dish Covers.—Wash these in clean warm water. Rub the inside of the cover with soft rags moistened with fine whiting; then take a soft cloth, and go over the outside with a little sweet oil. Next rub it all over with fine whiting powdered and sifted and put on dry. Afterwards finish with a clean dry cloth. Block-tin dish covers cleaned in this way with whiting and sweet oil will preserve their polish and continue to look new, provided they are always wiped dry as soon as they are brought from table, and steam or other damp is not allowed to remain on them. Common articles of block-tin, such as kettles, saucepans, &c., may be cleaned with whitening and water only. You may clean pewter in the same way.

Blood.—For the process by which blood is formed we must refer our readers to the article on *Digestion*, and for that by which it is renewed and purified to our papers on *Respiration* and *Air*. The blood, of which all the organs and tissues of the body are composed, is as essential to the formation of the hardest bones as to the most delicate membrane. Its duty is to carry on a process of constant renovation in the presence of the constant heat-generating process of combustion or decomposition. It is the blood which originates that most active, irresistible, and important of the body's fluids, the gastric juice. It gives the necessary stimulus to the great organic systems, more especially the nervous and sanguiferous, and otherwise plays the most vitally important parts in every function of the animal economy. Every one who has seen blood flowing from a wound knows that it is warm, of a viscid consistency, and has a saltish taste. When first seen it appears a fluid, and to the uneducated eye seems to be perfectly homogeneous; but a short exposure to the atmosphere converts it into a solid; and chemical analysis proves that, so far from being homogeneous, its composition is of a more curiously complicated nature than that of any other thing in nature. It is red in colour, but is not always so. The insect's blood is colourless. In the caterpillar it is of a greenish colour. In the internal vessels of the frog it is of a yellowish tint. In the higher class of animals it is chiefly red. The blood of fish is red only in the vital organs—viz., the heart, the liver, and the branchia or gills—but in the muscular or main part of the body it is colourless. Even in man there are parts of the body in which the blood-vessels are so minute, as in some of the coats of the eye, in the tendons and aponeuroses of muscles, that they reject the red portion and receive only the white. The colour of the blood is deeper in some animals than it is in others. It is, for instance, deeper in the hare than it is in the rabbit. To enter at length into so complicated a subject as the constituent principles of the blood would demand a volume, and we must therefore confine our description to a brief analysis. Blood has a peculiar urinous smell which is recognised by every one who has ever been near an animal being slaughtered. It contains fibrine, gelatine, the red colouring matter; albumen, iron, sulphur, soda, and water in certain proportions. In every thousandth part, according to M. Le Cann, there are—

Water	786·590
Fibrine	3·565
Albumen	69·415
Colouring matter	119·626
Crystallisable fatty matter	4·300
Oily matter	2·270
Extractive matter soluble in alcohol and in water	1·920
Albumen combined with soda	2·010
Chloruret of sodium and potassium, alkaline phosphate, sulphate, and subcarbonates	7·304
Subcarbonate of lime and magnesia, phosphate of lime, magnesia, and iron, peroxide of iron	1·414
Loss	2·586
	1·000·000

After its exposure to air outside the body it separates into two parts—the clot, which is solid and contains the earth from which the bones are formed, and a clear yellowish transparent fluid, the albuminous serum, or liquid part of the blood, containing the colouring principle, and in which floats the fibrine, long white elastic threads. The proportion of the serum to the *crassamentum*, or clot, differs greatly in different species of animals, and also varies according to the state of the system. It has been held to indicate very accurately the degrees of strength or ferocity, or weakness or gentleness of the animal to which it belongs. In the blood of carnivora the serum is much smaller in quantity than it is in the sheep, the hare, and other animals of their kind. Certain diseases increase its quantity. It is the fluid which is poured out into the different cavities in dropsy, and some inflammatory diseases decrease its quantity. It contains alkali in the uncombined condition, and holds in solution various earthy and neutral salts, which are found nearly always in the same proportion under all circumstances. It is difficult to conceive how the iron, sulphur, and the elementary forms of calcareous earth are generated in the blood, since they are not introduced through the medium of food. It is supposed that the nerves of the heart are stimulated by the saline matter contained in the serum, by which the muscular fibres are contracted. The serum aids the organs of secretion in their work, and contributes to the process of digestion. By the application of heat the serum becomes separated into albumen, and a fluid that remains uncoagulated, and is called the serosity of the blood. Under the microscope the fibrine appears to consist of small globules, arranged in strings. Blood is quite tasteless, and is insoluble in both hot and cold water. When evaporated to dryness and exposed to a red heat in the air it burns away, leaving a small remnant of ash, which is found to consist of constituents identical with those we find in the ashes of our principal articles of food, and which are more or less abundant in vegetables, according to their nutritive power. (See *Diet.*)

Coagulation of the Blood.—The clotting or coagulation of blood is a matter so common and so within the range of every-day experience that not one person in a hundred thinks of it as what it actually is, namely, one of the most wonderful and mysterious of nature's varied phenomena. Chemical experiments have demonstrated that this process is entirely independent of mere physical agents. The fibrine, a substance resembling muscular fibre, is that on which the coagulation of the blood depends. Although when removed from the living being a few minutes suffices to convert the blood into a state of solidity or coagulation which is its death, yet we of course know that while it is in circulation within its living vessels it must be extremely fluid. It could not circulate through the tapering arteries and minute veins if it were not so. If it were to lose this quality of fluidity, and approach the solid state, all the actions of the animal economy would cease at once. And yet its power of solidifying is so essential, that without it all its other properties would be useless, inasmuch as upon this quality the construction of the solid textures entirely depends. To preserve the nice balance between fluidity and solidity is the duty of the process of circulation, but not entirely. The contrivance by which a substance endowed with antagonistic properties acts thus harmoniously far surpasses the most ingenious of man's boasted inventions. Remove blood from the living body, preserve it at its native temperature, and by any mechanical means let it circulate continuously in a dead tube with just that rapidity it has in the living vessels, and it will coagulate none the less surely. The great principle of life is no longer in it. Yet when in its natural state the blood moves slowly, it has a tendency to thicken, so that if the circulation is impeded for any considerable time, it is exceedingly apt to become solid, and thus plug the channel. To preserve the blood active in circulation by a judicious degree of exercise, is therefore of no small importance. It has also been shown, by obtaining blood without bringing it into contact with the air *in vacuo,* that the air plays no part in its coagulation. This is also shown by the fact that a blow on the surface of the body causes the blood to coagulate. But blood coagulated or clotted within the living vessel is in a state very different from that it is in when removed therefrom. When a wound is healing, the red particles of the blood which escape into the cellular tissue surrounding the wound are taken away by the absorbent vessels, and an adhesive matter, fibrine, gradually organised, is left behind, which glues together the edges of the wound. Partly by a process of elongation of the minute blood-vessels, and partly by the origin of new arteries and veins formed within the effused substance, the breach is supplied with blood, and becomes a part of the living body, endowed with all the means of performing its appropriate functions. This process is called healing by adhesion, and it depends essentially upon this marvellous property of coagulation. In its absence no loss of substance could be reproduced, no part of an injured organ could be repaired, surgical operations would invariably kill, and every wound opening a blood-vessel would prove fatal. It has been shown by experiments that cold is not necessary to coagulate the blood. The temperature of the blood in the living body of a fish is about 60°. Removed from the body, and brought into a temperature ten degrees higher, it instantly coagulates. We see, therefore, that neither rest, exposure to the atmosphere, nor cold are essential to this curious process of coagulation, yet observation and experiment alike agree in demonstrating that rest, the action of the atmosphere, and cold, each promote it to a considerable degree.

Venous Blood.—This is the blood

which exists in the systemic veins (those belonging to the body), in the right auricle (that compartment which receives the blood), and in the ventricle of the heart (that which propels it forward into an artery), and in the pulmonary artery (that belonging to the lungs). It is of a purple colour. (See page 386.)

ARTERIAL BLOOD.—This is of a bright red colour, and is confined to the left auricle and ventricle of the heart and systemic arteries, and the pulmonary veins, or veins of the lungs. (See p. 27.)

CIRCULATION OF THE BLOOD.—The mode by which the vital fluid is distributed to and from every part of the body is called the circulation. For this purpose a large number of different complex organs are created. The most important of these organs we call the heart, the presence of which implies the existence of organisations more perfect and richly endowed than others in which it does not exist. The heart is, however, not essential to the circulation, since in inferior organisation we see that it is dispensed with. The simplest form of a heart can be seen in the common earth-worm, in which the communicating branches which run between the abdominal and dorsal vessels exhibit heart-shaped dilations which contract with peculiar energy. This apparatus conveys the nutritive fluid to all parts of the body, and keeps it constantly circulating through all the organs. But while engaged in thus supplying the system this fluid becomes deteriorated, and can only be renovated by supplies of atmospheric air. For this purpose some animals are provided with gills, and others with lungs. To convey the blood to the lungs for this purpose an additional artery, called the pulmonary, becomes necessary. (The vessel which conveys fluid to the various parts of the body is always called an artery; that by which the fluid returns after it has thus circulated is called a vein.) It will be seen that the pulmonary artery must always have its place between the heart and the organs of respiration, or the lungs; while the primitive artery, now called, to distinguish it from the pulmonary artery, the aorta, must have its place between the organ of respiration and the general system of the body, in order to receive the putrefied and renovated blood and carry it through the system. This structure of the circulating apparatus is seen in the fish. From fishes to reptiles and upwards to man all the modifications of this apparatus have relation to the pulmonic portions, and arise out of the necessity of adapting the heart, etc., to the mode of respiration peculiar to each species of animal. In man and in all the higher animals the heart is double, one circulating the blood through the lungs, and therefore called the pulmonic; the other for circulating it through the body, and therefore called the systemic. The heart of a man is the most powerful and the most untiring of muscles. It pumps out the blood which passes into it with a force which has been estimated at equal to that which would suffice to raise fourteen sacks of coals to the top of the Monument at London Bridge. The heart is placed a little to the left of the chest, the cavity of which is occupied by the lungs, one on the right and one on the left, in contact with the heart, which is held firmly in its place by a membranous bag called the pericardium. The action of the heart requiring free space to work without a chance of interruption is thus carefully enclosed, preserved, and guarded. The vessels belonging to the circulating apparatus are called arteries, veins, and lymphatics, the latter being appendages to the veins, but conveying only chyle and lymph, while they transmit to the former vessels the fluids which keep them supplied. Each cavity of the heart may contain from two to three ounces of blood. In one hour the heart contracts four thousand times, and consequently passes through the heart in that space of time not less than seven hundred pounds of blood. It has been well observed, that "we cannot be sufficiently grateful that all our vital motions are involuntary and independent of our care. We should have enough to do had we to keep our hearts beating and our stomach at work." This wonderful machine, the heart, pumping the blood through our system unceasingly by day and by night for threescore years and ten at the rate of a hundred thousand strokes during every twenty-four hours, never exhibits signs of fatigue and exhaustion so long as the system is properly supplied and its apparatus preserved unimpaired. The heart, alternately dilating and contracting with a power thus wonderful, is a hollow muscle, the contractibility of which depends on the muscular fibres of which it is chiefly composed, and the elasticity of which restores it to its first condition when the restraining or contractile force is no longer in operation. When the blood enters the cavities of the heart, that muscle contracts. The elastic power facilitates the reception of blood into the heart. The contractile power ejects it. The elastic power opens the auricle, a vessel formed by the dilation of veins called the superior and inferior vena cava, which convey the blood from the brain and from the lower parts of the body. The contractile power closes the ventricle, which is larger than the auricle, and has thicker and stronger walls. As the left auricle contracts the left ventricle dilates, and as the left ventricle dilates, the aorta contracts. From the right auricle blood is propelled into the right ventricle, and from the right ventricle it is conveyed by the pulmonic artery into the lungs. From the lungs it is returned by the four pulmonic veins into the left auricle. From the left auricle it is propelled into the left ventricle, and thence to every part of the body by means of the aorta. When the right ventricle contracts, the blood would be propelled backward as well as forward, if it were not for the presence of a valve which the blood presses close to the side of the heart so long as it takes its proper course, and which it closes when it is propelled backward towards the auricle by which it was transmitted. This valve has in itself the property of generating as much or as little power as may be necessary to its effective action, a property to which no other mechanism affords any parallel. Valves exist between the right auricle and ventricle, at the mouth of the pulmonary artery, just between the left auricle and ventricle, and also at the mouth of the aorta. When the ear is applied to the human chest above the heart a dull and somewhat prolonged sound is heard, which precedes and accompanies the swelling of the heart against the chest. This dull sound is immediately succeeded by a shorter and sharper sound and by a pause, after which the whole process is repeated. The duller sound and stronger impulse are ascribed to the contraction of the ventricles, and the sharper sound and feebler impulse to that of the auricles. (See *Sweats*, *Wasting*.)

Blood as Food.—In pointing out the great waste of materials suitable for eating, Professor Panum, of Copenhagen, devoted some time to demonstrating the amount of nutritious matter contained in blood, fitting it for use as food. Mr. Nielsen, of that city, has also been endeavouring to solve the problem of using blood in various forms of a kind rendering it suitable for food, and at the same time capable of preservation, viz.:—(1) As sausages, puddings, cakes (being mixed with fat, meal, sugar, salt, a few spices), to serve as a much cheaper compensation for meat, and intended more especially for the use of the poorer classes; (2) as blood-chocolate, more especially suitable to be used in hospitals, and otherwise in medical practice, in which latter form it has been recommended by Professor Panum, at a meeting of physicians at Copenhagen, and is now being employed at the hospitals of Copenhagen, the attention of physicians being directed to its effects. In these different forms it would be suitable for the victualling of vessels on long voyages, of besieged towns and fortresses, and, especially in the chocolate form, of soldiers on long marches, travellers in uncivilised tracts, &c. Animal blood, however, must be considered as nourishment of a very coarse and poor kind. The blood of the cow and ox is sometimes used for sausages and black puddings, although hog's blood is preferred as sweeter and more palatable. Some fat of the same beast is usually mixed with it. Salt, pepper, and sweet herbs are also generally added to improve the flavour.

"**Blooming.**"—When a painting newly varnished assumes the whitish, clouded appearance called "blooming," due probably to the presence of watery moisture either on the surface of the painting or in the varnish, the best way of removing it is by first rubbing it with a piece of soft sponge moistened with hot rectified oil of turpentine (camphine), then smoothing it very lightly and carefully with a large soft brush, and lastly, placing it in the sunshine, or some warm, dry place, free from floating dust. This process is one which should be carried out with great care, especially if the picture is of value.

Blowing out a Candle.—If this be done by blowing in an upward direction, the wick will not smoulder away, and the next time it is wanted will be found sufficiently long to ignite readily.

Boiling.—From a culinary point of view, the process of boiling is a most important one. Without a knowledge of certain simple scientific principles, it may be so conducted as to rob the meat subjected to it of its most nourishing and wholesome properties. Meat boiled too long or fast, as every housewife knows, is thereby rendered hard and indigestible. Most people also know that meat when boiled in hard water is more tender and juicy than it is when soft water is employed. It is perhaps as well known that by too rapid boiling the inside of the meat is not done before the exterior is overdone; but it is not as well known that if the albumen is removed from meat, as it is when we place it in cold water (the plan commonly recommended), the flesh is thereby less adapted for nutrition. All the sapid and odorous qualities of the meat are then transferred, together with the albumen, to the cold water, and it no longer contains those elements of flesh which it is the business of our digestive and circulating functions to reconvert into flesh for the preservation and repair of our bodies. The larger the quantity of water in which the meat is boiled the more complete is the removal of these soluble elements. (See our articles on *Blood*, *Digestion*, and *Diet.*) Bernays says:—"The smell and taste of *roast* meat arise from the soluble constituents of the juice which have undergone a slight change under the influence of a higher temperature. Meat which has been rendered quite tasteless by boiling with water acquired the taste and peculiarities of roasted flesh when moistened and warmed with a cold water infusion of raw meat which has been evaporated till it has acquired a dark brown colour. From all the different kinds of flesh we obtain by the aid of cold water the whole of the albumen present in them in a soluble form. Muscular fibre is everywhere surrounded by a liquid containing it, and the *tenderness* of the meat (see *Roasting*) is dependent upon the quantity present. In young animals the quantity of albumen is great; in old ones it is small." For the above reasons the same author recommends the cook who is anxious to put good, wholesome, and *really* well-cooked food on the table, should first introduce it into boiling water. This coagulates the albumen (see *Food*) from the surface inwards, so that the water is excluded from the interior of the meat, and the juices remain unaffected by it. After the meat has been in water kept at the boiling-point about five minutes (the time usually required for coagulating the albumen) cold water is added, and the temperature thereby reduced to about 165°, and kept at this temperature for some time. Meat boiled in this way retains all those qualities on which its greatest value as food depends. Of course when the nutriment is sought rather in the soup than in the meat, cold water will be best. About twenty minutes to half an hour per pound of meat is the time required for boiling. The fire most suitable for boiling is one of cinders and coal mixed. The scum which rises to the surface of the water in which meat is boiling should be from time to time removed, as otherwise it will injure the appearance of your joint by sinking and adhering to it. In boiling fish which retains the skin, cold water is generally used with a little salt added to it. In boiling, the length of time required is determined according to the bulk and solidity of the joint, the nature of the fire (see *Fuel*, &c.), the time being reckoned from when the water began to boil. All the time water is boiling it retains the same temperature. This is fully explained on page 133, under the head of *Convection of Heat*. The stronger the fire the sooner the water boils, but a large fire under water which has already boiled is a mere waste of fuel, the superabundant heat having no effect whatever upon the heat of the water. By bearing this fact in mind you will know how to save fuel. But the mischief goes farther; not only is there a lamentable waste of fuel, but the food itself is injured, insomuch as those parts of the meat which please the organs of taste are carried off by the steam of violent boiling. By bearing this hint in mind you will know how to preserve the flavour of good meat.

When green vegetables—such as cabbage, &c.—are boiled in a covered vessel they become yellow, while on the other hand potatoes are best when the lid of the pan is kept closed.

Boiling Salted Meat.—A well-known American writer says:—"I was once informed by an old patron how he and his wife learned to cook corned beef. He said, having to furnish a hasty meal for himself and his men, he decided upon cooking a piece of corned beef. He procured a good-sized piece, and it was late before it began to boil. Having to watch the pot himself, after a hard day's work, he resolved to leave a slow fire under the pot, and have a nap, thinking he would be sure to wake up before it was done. When he awoke he found that his beef must have simmered slowly until the fire went out, perhaps some seven or eight hours. Expecting to find it in pieces, or else soggy and tasteless, he took the meat from the pot, and finding it almost cold, cut and tasted it. It was the most delicious piece of corned beef ever eaten, and so thought all who tasted it. Since that time," he adds, "my corned beef, hams, tongues, or any kind of salted meat intended for boiling, is put over the fire early and left to slowly boil or simmer a long time, and after it is done the pot is lifted off the fire, when the meat is allowed to cool in the pot from twenty minutes to half an hour. Following this plan we always have specially good boiled meat, and so say all our friends who sit at my table and partake of it."

Bologna Sausage. — To one pound of lean beef or veal, one pound of bacon, rather fat, one pound of beef suet, one pound of lean pork. Chop up very small all together, with a handful of sage leaves and a few sweet herbs, season to taste with salt and pepper, and put it into a large, clean gut. Put it into a saucepan of boiling water, and prick it over to prevent bursting. Boil for an hour.

Bones, Caries of the.—This disease proceeds from the action of mercury or arsenic, or may be due to the denudation of the bones, which are transformed into pus. If this is the result of erosion of the bone by the larva of an insect, the victim suffers intolerable pain. Where mercury or arsenic is the cause, the disorganisation of the bony tissue proceeds without pain, but with frightful rapidity.

Bones, Softening of the.—This is due to the development of an acid which prevents the proper deposit of calcareous matter in the osseous tissue. This is also known as rickets.

Book Edges. — These may be

tinged with Judson dyes, any one of a variety of bright colours.

Books, Sizes of.—

	Pages.		Leaves.		Sheet
Folio Books consist of	4	or	2	=	1
Quarto, or 4to ...	8	,,	4	=	1
Octavo, or 8vo ...	16	,,	8	=	1
Duodecimo, or 12mo ...	24	,,	12	=	1
Octodecimo, or 18mo ...	36	,,	18	=	1

Books, Worms in.—There is a little insect called *Aglossa pinguinalis*, which deposits its larvæ in books in the autumn, mostly in leaves nearest the cover. These slowly produce a kind of mite, doing very much mischief. The small wood-boring beetles are the most destructive, as they mostly get into the binding of the book. The best preventive for this is the use of mineral salts, to which most insects have the greatest dislike. Alum and vitriol should be mixed with the paste used in covering the books for binding. It is a common practice with book-binders to use starch instead of flour; also to powder the covers and the book-shelves with powdered alum and pepper; and two or three times a year to rub the covers with a piece of cloth that has been steeped in a solution of powdered alum and dried.

Boots and Shoes.—In buying boots and shoes, remember first, if it be in the spring, that the tradesman is very likely to recommend you to purchase some of his winter stock; and if it be the end of the autumn, that he probably has some of his summer stock which he is anxious to get rid of. Remember also if you are not rich, that seams and elaborate machine-stitching mean the expenditure of time, which of course must be paid for, but that the boot will wear none the longer for such decorative additions; indeed, the simpler the make of the boot the more likely is it to wear well and last long. Very few of the so-called boot and shoe makers make boots, consequently they can say very little about their quality with any degree of certainty, and of this be sure that really good sound leather carefully sorted from the inferior parts of the hides will always command the best prices. Avoid scrupulously the "alarming sacrifice" and "selling-off" shops, where low-priced and inferior boots are usually the entire stock-in-trade. Clumped soles afford extra protection for the feet in winter, but ordinary thick soles will avail for all the ordinary requirements of winter boots. In addition to these facts and hints, when you are selecting boots and shoes, due consideration must be given to the situation they are to be worn in. The article which is adapted for town pavements would be quite unsuitable for traversing fields and country roads. As a general rule it should be borne in mind that the lighter the article, so that it possesses the necessary strength, the better. See that the sole is of the width of the foot, and the upper leather soft. It is well, too, to provide boots and shoes for a considerable time before they are wanted, as they improve much by laying by for some months; and also to avoid ordering any to be made in frosty weather, when the waxed thread does not work freely, and the joint is, consequently, not so strong. Those who can afford it, and have much walking, should provide several pairs of shoes for constant use, and wear them in daily succession, so that they may be allowed to dry thoroughly after each day's wear without exposure to the fire. Persons who tread heavily suffer inconvenience from cutting the upper leather, owing to its pressure against the edge of the sole; and we have seen this done in a single day's wear, and the necessity of pieceing resorted to. The remedy for this is to desire your shoemaker to be particular in paring down the sharp edge of what is styled the whelt, and if this is not sufficient, the better plan will be to have the upper front leather of buckskin, which being tough will not cut like calf-skin. Those who are subject to colds should have cork socks or matted horsehair to exclude the damp. We append some hints on corns. We have no corns on our hands. How is this? Because we wear no tight shoes on them. But, as it is desirable we should have shoes on our feet, let us take care that these fit nicely and easily, in order to avoid having corns. If people always took care to have well-fitting, *easy* shoes, they would remain free from corns. Shoes must not be too large, nor large enough for the feet to slip about in them. They should fit and be easy. The fashionable boot and shoe of the present day has one radical fault. It is, we will admit, elegant, strong, and enduring, but, as a general rule, it is too short. Let a person lay his foot down on a sheet of paper, and mark its length; then let him allow a full inch for the forward pressure caused by the high heel, and let his boots be made according to that measure. This is what Nature demands. But Fashion first puts on a stocking so short that the toes are curled up in the soft web; then comes a boot, broad enough, perhaps, but so deficient in length that it presses against the end of the foot; and what is the result? Enlarged, cramped, suffering joints, and a mincing gait, where each step is calculated, and elasticity impossible. A foot can endure a narrow boot far better than a short one, for the additional length at the end gives room for expansion in the proper direction; and, to a cultivated eye, a long slender foot is far more beautiful than a short, broad one. The high heels now so much worn by ladies absolutely require an extra length in the boot. They are coquettish appendages, belonging to the era of powdered hair, black patches, and hooped skirts. But, besides being dangerous, they necessitate more or less of that painful attitude, the Grecian bend, which is nothing more than Nature's effort to preserve an equilibrium. Although the French heel is not seen among the sterner sex, their boots have a fault quite as important—the soles are too narrow. In a short walk no difficulty is experienced, but several hours' exercise is sure to bring discomfort. An American paper stated that in the early hours of the Southern rebellion, when the gallant Seventh Regiment of New York volunteered for the defence of the capital, a day's march found them completely exhausted. Their courage was unflinching, their ardour glowing, their strength and health perfect; but—the soles of their boots were too narrow, and each step became a torment. They lay along the roadside; they captured a locomotive, and crowded themselves on to the platform cars; they marched barefoot; and they made raids into the neighbouring villages, and carried off the largest brogans they could find. The difficulty was soon remedied, but there were about a thousand pairs of city boots lying along the road that day, mementoes of that gallant journey which has since been so often described, both in prose and verse—the March of the Seventh. We now give a few hints on the principles of adaptation as applied to the coverings for our feet. Boots for both men and women are more generally becoming than slippers. They give a trim, firm outline to the foot, and convey an impression of elasticity and strength, whereas a slipper betrays all its defects, and is a hazardous experiment unless the foot is faultless. Even then fashion often disfigures it with huge bows and rosettes, which, although they may look piquant in front, are hideous monstrosities in profile view, and should be banished from civilised society. The most unbecoming *chaussure* is that species of embroidered slipper which young ladies are in the habit of presenting to their gentleman friends—marvels of industry and clumsiness, hard to get on, uncomfortable when on, and almost impossible to get off. We say no more. Every man who reads these lines understands the subject, and if he is a ladies' favourite, his closet is full of ungainly slipper trophies which he never wears, preferring the prosaic morocco to all the beaded canvas in the world; and if the heel-piece is gone, so much the better.

Gutta-percha Soles.—Make the sole of the boot perfectly clean and dry, scratch it with an awl or a fork until it becomes rough, warm it before the fire, and spread over it with a hot iron, or poker, some of the "solution" sold for this purpose, or, in the absence of this, place some of the thin parings of the gutta-percha on the soles, holding it to the fire, and spreading it as before. When this has been repeated two or three times, and all is well covered, warm the gutta-percha sole and the sole of the boot at the same time, until both become soft and sticky; place the sole on the boot, and press it down carefully, beginning at the toe, so as to press out the air and make it adhere closely. Nothing more remains to be done than, as soon as it has become hard, to pare the edges with a sharp knife, and trim off as may be necessary. All the parings and old pieces should be saved, as gutta percha is not injured by use, and may be sold to the manufacturer in order to be restored and made up again.

BOOTS, TO MAKE THEM WATERPROOF.—Melt four ounces of spermaceti in an earthen vessel over a slow fire; add to this eight drachms of india-rubber cut into pieces, which will also dissolve with heat; then add tallow ten ounces, lard three ounces, amber varnish five ounces. Mix together, and it is ready for immediate use. If boots or gaiters receive two or three coats of the above mixture with a blacking-brush, it will give them a fine polish, and render them waterproof.

BOOTS — SOLES, WATERPROOFING FOR.—Get some common tar, make it very warm, and brush it over the soles of the boots; then put the boots near the fire to absorb the tar. This should be done two or three times over. The upper leather need not be touched with the tar. This process makes the soles very durable, and impervious to moisture.

Borage.—Used in colouring broth, and for other culinary purposes, for which we do not, however, recommend it, as it is difficult of digestion.

Borax Gargle.—This is very useful when children have the thrush, and is prepared in the following way:—One drachm of borax, three and a half of rose water, half an ounce of honey of roses. Mix these well together.

Bottles, how to Pack them.—Line the compartments into which the bottles are to be packed with thin sheets of cork. The bottles should be square, and should fit tight enough to require pushing into their places. The advantages of this plan are evident, and should be generally adopted. Cork is light, inexpensive, will stand all climates, gives to pressure, is easily glued, and can be procured almost everywhere.

Bottles, to Clean.—If the bottle has a deposit on it arising from hard water being left in it, rinsing out with dilute hydrochloric acid will immediately dissolve off the carbonate or sulphate of lime of which the crust consists, whereas it would require long-continued hard rubbing to effect the same mechanically. There are some other effectual methods, mechanical and chemical. A mixture of shot and sand with a little water is excellent for cleaning (see page 250). Bristle brushes, sold under the rather odd name of "sash tools," are very useful, and should be always at hand. In cleaning by chemical means nothing is comparable with a mixture of bichromate solution and sulphuric acid. In some cases, however, especially where salts of iron are to be removed, *binoxalate of potash* is excellent. Be sure to remove all the shot.

Box and Tray for the House-maid.—This is a simple contrivance, which conduces to cleanliness, and ensures the articles required in cleaning grates and fire-irons being kept in their places. The box is about two feet long, a foot and a half wide, and two feet and a half deep. The lower portion is intended as a receptacle for the ashes, and the upper part consists of a tray which lifts in and out, and is divided into partitions for brushes, black-lead, sand-paper, &c. When the grate has been cleaned, the cinders, together with the implements and materials that have been used in cleaning, can be conveyed away in this at once. The price of this article is about 5s.

Brains as Food.—When taken as food brains should always be eaten with condiments, such as pepper, vinegar, sage, and other dry herbs, such food being glutinous and clammy in its nature.

Braising.—Cooking by heat, applied both above and below. This is usually done in a pan made for the purpose, and called a braising pan.

Brandy.—Used in moderation, brandy acts as a powerful tonic, cordial, and antispasmodic. It is also very useful in gangrenous affections. In spasmodic cholera it is frequently administered with opium, and is found to be very beneficial.

Brass, to Clean.—Dissolve in a pint of soft water an ounce of oxalic acid (which being poisonous should be well taken care of, and kept in a bottle labelled "Poison.") Always shake it well before using it. Rub it on the brass with a flannel, and then take another piece to polish it. Use this solution twice a week, and next day have ready some pulverised rotten-stone, sifted through a muslin bag, and mixed with oil of turpentine so as to be liquid. Rub this on with a leather, let it rest ten minutes, and then wipe it off with a cloth. Brass cleaned in this manner looks particularly well. In using the oxalic acid, great care must be taken that none of the liquid gets into the eyes when used for rubbing. Should this by any accident happen, immediately get a bowl full to the brim of cold water, and hold the eyes open in it till the pain abates; or, better still, use an eye-glass such as is sold for bathing weak eyes in. Repeat at intervals during the day. To remove the stain of oxalic acid from a dress, rub the spot with a sponge dipped in hartshorn diluted with a little water. This will cause it almost immediately to disappear.

To Clean Stair-Rods.—Pulverise some rotten-stone, mix with it some sweet oil, then with a woollen cloth rub it well on each rod. Polish with a soft leather, on which rub a little dry rotten-stone finely powdered.

Brass, to Clean.—Another Way.—Rub some bichromate of potassa fine, pour over it about twice the bulk of sulphuric acid, and mix this with an equal quantity of water. Wash immediately in plenty of water, wipe it, rub perfectly dry, and polish with powdered rotten-stone. The dirtiest brass may be cleaned readily enough with this. Be careful to keep the mixture from your hands.

Brawn.—The horny part of young brawn is to be preferred to the old, the rind of which will be hard. Oxford brawn is considered the best. To cure brawn, split and well clean a hog's head, into which rub salt plentifully. Let it drain twenty-four hours. Then place over it two ounces of saltpetre, and the same quantity of common salt, and place it in a pan with just sufficient water to cover it. After two days wash it well, and boil it until the bones and gristle can be removed with perfect ease. When you have removed these carefully, take the skin from the head and tongue, and chop up the whole into pieces of about an inch long. Season with pepper, sage, and salt, well mixed. Then press the meat into the skin of the head. Boil in a quart of the liquor two ounces of salt and a pint of vinegar, and when cold pour it over the head. The ears and feet may be used also. The pickle must be frequently re-boiled. If the head is too fat, add a little lean pork.

Bread and Parsley Fritters.—Pour as much boiling water on six ounces of bread without crust as will suffice to render it soft, and cover it with a plate. In about an hour take a fork and well mash it, removing any pieces that have not softened. Add half an ounce of parsley chopped fine, and four eggs well beaten, season with pepper and salt, fry it in fritters, and serve with brown sauce. (See page 71.)

Bread as Food.—Good bread is very wholesome and nourishing food when partaken of in moderation, but if eaten too freely or exclusively as a meal it produces viscidity or slime, obstructs the intestines, and lays the foundation of habitual costiveness. Fermented bread is cooling and antiseptic. New bread is always difficult of digestion; and stale bread, for many reasons, is preferable. Persons troubled with flatulency and indigestion should scrupulously avoid new bread. It is not necessary to eat bread with every kind of diet; but it is most useful when taken with articles containing a large proportion of nourishment in a small bulk, as it then gives the stomach a proper degree of expansion.

Bread, Fermented. — Bread which has undergone a process of fermentation set up by the addition of the yeast before being baked, has the properties of the flour somewhat altered. It is made light and porous by the escape of carbonic acid gas, in the way our article on *Fermentation* explains, and is better fitted for eating. To equalise and increase the tendency which flour and water acquire when mixed to ferment, yeast or leaven is added to it. This changes the sugar in the way we have shown; for, although sugar itself does not contain alcohol, yet it may be converted into it (see *Alcohol*) by the process of fermentation, which is one by which the elements of a compound undergo a new arrangement.

Bread Making.—To make bread, put seven pounds of flour into a deep pan so as to leave it hollow in the middle. Into this pour gradually a quart of warm water, a large teaspoonful of salt, and half a gill of yeast. Knead it with both hands well and thoroughly, adding from time to time a little more warm water. When you have obtained a softish, but not too soft dough, shake over it a little flour, and place it before the fire for about five hours. It must then be kneaded again, covered over, set to rise again, made into loaves and baked in a clear quick oven for rather more than an hour. In summer the water used should be lukewarm, but in winter it may be warmer. The flour should be good in quality, but for the purposes of both nutrition and digestion, that in which a portion of the bran remains is preferable. The finer kinds of white bread have been proved by repeated experiments to be very inferior as food to the cheaper kinds of bread. The best yeast is that which is procured from good home-brewed ale. It must be remembered in making bread that its goodness will depend mainly upon the kneading, which requires both strength and experience. It is commonly believed that compact or close bread is more nutritious than the porous kind. This is a mistake, for the bread which by its lightness has the larger volume, is more readily acted upon by the digestive juices, to which it presents the greater surface. (See *Digestion.*) For this reason, the bread which is so made as to develop best the component parts of the flour is most digestive. In making inferior bread potatoes are frequently used. If they are used too largely the bread is very apt to turn sour. On the Continent, a regular porous consistence in bread is held to be indispensable; and foreign bread is generally lighter than that which is made in England. Having a much greater surface exposed by the form in which the loaves are made, the bread "rises" better, and the loaves are baked more equally. A Frenchman is pleased to see his bread make *beaux yeux* ("handsome eyes"); but an Englishman would be apt to call bread of this kind spongy, for, as a rule, he prefers it "slack baked," and in the cubic mass, although such bread is by no means too wholesome or digestible. In the *Dictionnaire de l'Economie Menagère*, it is said that flour may be spoiled (*altérée*), first, by damp; second, by insects, such as the weevil, the mite, &c., the latter of which eat up the glutinous or nourishing ingredient, and leave little behind but starch; third, by sand, from using too soft, unsound, or badly-placed mill-stones. The latter cause is, however, not likely to exist in England. Flour may be, and often is, adulterated. (See *Adulteration of Food.*) Up to a certain point these adulterations do little harm, over that, the bread made from it becomes grey-coloured, doughy, and hard of digestion. (See *Bread as Food.*) The yeast must be fresh and good. If stale, an acid fermentation takes place, and if it is too thin the bread is imperfectly fermented, and consequently heavy. (See *Brewers' Yeast.*)

MAIZE BREAD is made with an equal quantity of maize meal and wheaten flour, without which it is very heavy and indigestible.

PARSNIP BREAD.—Bread has been made of four parts parsnips and five parts whole flour. Those who have used it state that it is very wholesome, eats remarkably well, and is nutritious.

RYE BREAD.—This is an excellent dark brown bread of an agreeable flavour, superior to that of maize, and much cheaper than wheaten bread. It is made in the way above described. In Germany it is the only bread consumed by the peasantry, who are as healthy a population as any to be found in Europe. It has been strongly recommended to those who follow sedentary pursuits.

Bread Pudding with Onion. — Mix half a pound of bread-crumbs with a teaspoonful of sage, two ounces of onion, and pepper and salt, with three quarters of a pint of milk. Add two eggs well beaten, and bake rather quickly.

Bread, Sour.—When made in the ordinary way, bread sometimes becomes sour through the formation of acetic acid or vinegar, and the acid of milk, called lactic acid. Good home-made bread, kept from the air in closely-covered pans, and in a cool place, ought to keep sufficiently fresh for a week. Bakers are apt to carry the fermentation of their bread too far, to obtain a large and white loaf, almost indeed to the acetous stage. Bread of this kind soon turns sour.

Bread, Unfermented.—Of this biscuit is the most familiar example. A physician, writing on the subject of bread making, in a pamphlet which attracted considerable attention from a scientific point of view, recommended for white bread the following proportions :—Of flour three pounds avoirdupois; bicarbonate of soda nine drachms; hydrochloric acid (specific gravity 1·16) eleven and three quarter fluid drachms; and about twenty-five ounces of water. This prescription is recommended to avoid the waste occasioned by the alcoholic fermentation produced by the use of yeast, and it is based upon the fact that when carbonate of soda is mixed in the proper proportion with spirits of salt, chloride of sodium (common salt) is formed, and, the carbonic acid being set free, expands the dough so as to convert it into bread. The soda must, however, be well mixed with the flour, because those parts which escape its presence will not rise. The better plan is to sift the soda over the dough through a small sieve with one hand while stirring it with the other. The acid should then be added to the proportion of water, and mixed as quickly as possible with the meal, a *wooden* spoon being used for the purpose. The bread should be put into a quick oven without loss of time.

Bread, Wheaten.—The nutritious grain from which we manufacture bread is usually wheat dried and ground into the condition in which it is known as flour. (See *Flour.*) In its pure condition it consists of starch, or farina, and gluten, chiefly of the former. Starch is the most abundant product of the vegetable world. It is composed of carbon twelve parts, hydrogen ten parts, and the same of oxygen. Starch, like sugar, into which it is convertible, is a great fat-producing element. The superabundant starch and sugar which enter into the composition of the food which animals eat in the summer, not being needed to support animal combustion or vital heat, is, therefore, converted into fat, which in winter, when more warmth is needed and food scarce, goes to support the animal system (see page 187). The gluten is a nitrogenised adhesive substance, of a very nutritive character. The average percentage of starch in wheat flour is 39 to 77. The percentage composition of the gluten and albumen, which is also a component part of wheat (see page 10), is, according to Dr. Bernay, as follows :—

Carbon	53·0
Hydrogen	7·0
Nitrogen	16·0
Oxygen	22·0
Phosphorus	0·4
Sulphur	1·6
	100·0

Including all the nitrogenised substances we have referred to as gluten. When bread is made in the ordinary way, the yeast changes the sugar contained in the wheat into alcohol and carbonic acid gas. (See *Fermentation.*) In the process of baking the starch is converted into dextrin, which is the more digestible f the two.

Bream. — Although inferior in quality as food, this river fish has the recommendation of being more easy of digestion than the carp, although in this respect it is inferior in quality to the perch and other fish.

Breast of Lamb with Green Peas.—Braise the whole of the breast; when it is done, take out the small bones, flatten it between two dishes, and let it cool. Next cut it into the size of small chops, and warm it in some of the liquor in which the breast has been braised. Lastly, drain and glaze it, and cover it with the peas in the following manner :—Take some very fine peas, which cover with water with a little fresh butter, drain them, then place them over a slow fire, with a small slice of ham, and a bunch of parsley, and green onions. When they are nearly done, take out the ham, the parsley, and the onions, reduce the liquor to the proper consistence, add the gravy from the breast of lamb, and thicken it with a tea-spoonful of flour. Reduce it and season it with salt and pepper. The sauce must be very short. A breast of mutton may be cooked in the same way.

Brewers' Yeast, a Substitute for.—Take a quarter of an ounce of hops, boil them for twenty minutes in two quarts of water, let the mixture stand till it is about the warmth of new milk, stir in a pint of flour, then a pint of barm or brewers' yeast the same way as it is put in the dough for making bread. Let it stand to ferment, then bottle it in stone bottles and tie the corks down with a string. It should be put to rise in the flour a night before you bake, and in cool weather keep it warm as you would with any other leaven. The above is a valuable recipe, forming an excellent substitute for brewers' yeast,

Britannia Metal.— Powder as fine as possible half a pound of whiting, and sift it well; then mix with it a wineglassful of sweet oil and a tablespoonful of soft soap, or a piece of yellow soap melted in soft water. Add to this mixture sufficient rum, whisky, or spirits of wine, to make it the consistence of cream. Dip into it a soft sponge or flannel, and rub it quickly and evenly on the article; wipe it off with an old linen cloth, and polish it by rubbing with a leather.

UNWHOLESOMENESS IN THE USE OF BRITANNIA METAL.—This is frequently manufactured with so large a portion of copper that tea and coffee pots of this metal have been known to give the liquid contained in them so strong a taste and smell of copper, as to render the drinking of it almost equal to the swallowing of poison. When an article of Britannia metal is found to contain too much copper, the use of it should be immediately discontinued. Hints for detecting copper will be found under the head of *Adulterations.*

BRITANNIA METAL, TO CLEAN.— The following is a recipe from one of the first manufacturers of the article. Whatever the article requiring cleaning, whether tea-pot or dish-cover, it should first be rubbed very gently with a flannel dipped in fresh sweet oil (no fishy or lamp oil), wash it in warm suds, wipe it dry with a very soft cloth, and polish it with a wash-leather and carefully powdered whiting. Thus treated, Britannia metal will retain its brilliancy for years. All white metal dish-covers may be cleaned with advantage to their appearance in this manner.

Broiling.—The gridiron used for this purpose ought to be kept scrupulously clean and the top bright. Before it is used well rub the bars with a piece of clean fat to prevent them from marking the meat laid upon them. The gridiron should be hot before the steak is placed upon it. When the meat begins to grow brown turn it, first allowing any gravy that may have oozed out to run into the hot dish prepared for its reception. The fire should be very clear and bright. While the meat is broiling it should be turned quickly, and when it is done it should be put into a hot dish with a slice of butter between each steak, which should also be sprinkled with pepper and salt; cover, and carry hot to the table. In an old book published in 1665 we find the following rhyme on this subject:—

"And now as there is naught on the fire that is spoiling,
We'll just give you two or three hints upon broiling;
How oft you must turn a beefsteak and how seldom
A good mutton chop for to have 'em both well done;
And for skill in such cookery your credit 'twill fetch up,
If your broils are well seasoned with good mushroom ketchup."

BROILING STEAKS.—The following little story may awaken emulation, showing as it does how virtue even in broiling is its own reward:—In the early part of the nineteenth century, when travelling by the stage-coaches was the fashion, American travellers going to the eastern cities and towns, Boston, New Haven, &c., and those who travelled much, were always anxious to reach New Haven to enjoy a good broiled *beefsteak*. A man by the name of Butler kept a public-house in this town, in Chapel Street, and about this time was famous for his delicious steaks, which he always cooked or attended to himself. You would find him with his white cap and apron on before a heap of live coals in front of a great wide old-fashioned chimney, having a long handle attached to a large double-hinged gridiron, and a fine steak fastened up in it, so that he could keep the steak turning first on the one side then on the other, that not a drop of the rich gravy should escape. When done, it was dished and placed steaming hot before the hungry travellers, who never failed to do ample justice to the efforts of the cook, who thus contrived to build a reputation as well as a fortune by success in the fine art of broiling a beefsteak. The rules adopted by the celebrated "Beefsteak Club," organised in 1734, were the following:—

"HOW TO COOK A BEEFSTEAK.

"Pound well your meat until its fibres break;
Be sure that next you have to broil the steak,
Good coal in plenty; nor a moment leave,
But turn it over this way, and then that;
The lean should be quite rare—not so the fat.
The platter now and then the juice receive,
Put on your butter—place it on your meat—
Salt, pepper, turn it over, serve, and eat."

BROILING MUTTON AND PORK CHOPS.—Select a loin chop, cut about an inch thick, with the skin and part of the fat removed. Prepare your gridiron, and proceed in the way described above, taking special care to keep the fat from falling into the fire, as this would cause it to blaze up, and your chop would consequently be smoked. Pork chops require longer broiling. When they are done add a little good gravy to them, and strew over them a little finely powdered sage. (See also *Cooking*.)

Bronzing. — Böttger gives a simple bronzing process, applicable to porcelain, stoneware, and composition picture and looking-glass frames. The articles are first done over with a thin solution of water-glass, by the aid of a soft brush. Bronze powder is then dusted on, and any excess not adherent s knocked off by a few gentle taps.

The article is next heated, to dry the silicate, and the bronze becomes firmly attached. Probably, in the case of porcelain, biscuit, or stoneware, some chemical union of the silicate will take place, but in other cases the water-glass will only tend to make the bronze powder adhere to the surface. After the heating, the bronze may be polished or burnished with agate tools. (See *Burnishing.*)

Broths.—The decoction of animal and vegetable substances which we call broths, if made in proper proportions and without fat, are wholesome and nutritive. Unless taken in very small quantities a little bread ought always to be eaten with broths. For weak stomachs the lighter broths are best, and of these none are better perhaps than mutton broth. Some absurd ideas are extant amongst old-fashioned housewives about broth diluting, and consequently weakening, the gastric juice. By referring to our remarks on *Food* and *Digestion* the readers will see the absurdity of such a urious notion.

Brown Bread.—The best brown bread is made from flour less finely ground, usually called "seconds." The commoner kind is made from a mixture of wheat, barley, and rye flour, in varying proportions. In making brown bread a larger quantity of yeast is used, with less water and more kneading. To make unfermented brown bread, take three pounds of wheat meal, ten drachms of carbonate of soda, thirteen fluid drachms of hydrochloric acid (specific gravity 1·16), and twenty-eight fluid ounces of water. It is quite true, as has been often said, that while a man may be starved by being fed upon the best white bread, so little nourishment will it afford, he may live and thrive upon brown bread, so much more digestible and nourishing is it.

Brown Paper.—By means of this a very warm covering may be secured at little cost. Sheets of brown paper thoroughly soaked and dried, and then enclosed within quilted counterpanes, will keep in heat and exclude draughts in a way which only those who have tried it can understand.

Brown Sauce.—Melt two ounces of butter in a small saucepan, and add one ounce of flour, stirring until it is of a brown colour. Then add sufficient boiling water to render it of a cream-like consistency, and season with salt and pepper.

Brown Soup.—Cut into small pieces the following vegetables:—One pound of turnips, the same of carrots, half a pound of celery, and six ounces of onions. Put these into a pan with four ounces of butter, and let them stew, with occasional stirring, till brown. Boil one pint and a half of peas, and add them with the water, adding sufficient of the latter (boiling) to make the entire quantity about three quarts. Add half a pound of toasted bread, season with black peppercorns, Jamaica pepper, and salt. Boil gently for three or four hours, then rub it through a coarse sieve, and return it to the pan. When it boils it is ready for table.

ANOTHER WAY.—Slice and fry in butter half-a-dozen carrots, with the same quantity of turnips, four potatoes, four onions, and three roots of celery. Put them into a pan with five quarts of boiling water. Let them stew four or five hours, then strain through a sieve, season with pepper and salt, boil and serve.

Browning Gun-barrels.—This may be done by moistening the barrel with dilute muriatic acid.

Brushes. — Hair and clothes brushes may be cleaned by putting a tablespoonful of pearlash into a pint of boiling water. Fasten a piece of sponge to the end of a stick, dip it into the solution, and wash the brush with it, carefully pressing it in among the bristles. Next pour over it some clean warm water, then drain it, wipe it with a cloth, and dry it before a fire.

Bubble and Squeak.—Any remains of salt beef or pork may be dressed in this old but good and economical fashion. Cut the meat when cold in thin slices, to the weight of about one pound, including, if possible, from two to three ounces of fat; then take one or two savoy cabbages, according to size, which, when boiled and chopped, ought to weigh about two pounds; cut each cabbage in four, throw a few of the green outside leaves away, as likewise the stalk; put about a gallon of water in an iron saucepan; when boiling add the cabbage, and let it remain about twenty minutes, or until tender; drain them well, and chop them up rather fine; then add three ounces of either butter or dripping in the frying-pan, which put on the fire; when hot put in your slices of meat, which semi-fry of a nice brownish colour on both sides; take them out, put them on a dish, keep them warm; then put the cabbage in the pan with the fat and a tea-spoonful of salt, the same quantity of pepper; stir round till hot throughout; put on the dish, lay the meat over, and serve. If no cabbage, any greens will do, first boiled, drained, chopped, and fried. Boiled carrots and turnips previously cooked and chopped may be added to the cabbage.—*Soyer.*

Bubbles of Gas made to issue from water, which take fire with a brilliant flame.—Put a piece of the phosphuret of lime of the size of a pea into a wine-glass half filled with water; the phosphuret will fall to pieces, and bubbles of gas will rise up to the surface of the water, which take fire with a brilliant flame and snapping noise when they come into contact with the air; each bubble of gas as it explodes, if the air be calm, is succeeded by a horizontal ring of dense smoke, which mounts up to the ceiling with an undulatory motion, and gradually enlarges in diameter as it ascends. The residue of the phosphuret of lime, when taken out of the water and suffered to dry, inflames by pouring on it a little muriatic acid. The bottle containing the phosphuret of lime should never be left open, for the contact of air soon renders it unfit for use.

Bugs.—Female bugs lay their eggs four times a year—namely, in March, May, July, and September, at each season laying fifty eggs; in other words, producing 200 young in the space of a year. At the age of eleven weeks the young bugs have arrived at maturity, and are ready to become parents in their turn. With this data, the following calculations may be made:—Suppose one female bug is allowed to enter a house just before laying-time in spring, it will produce fifty young in March, of which twenty-five may be females. In May, the twenty-six females—that is including the mother—will produce 1,300 young. Take 750 of these as females, we have in July 35,000 young; take 15,750 of these as females, along with the former 750, that will be 16,500 females, which in September will bring forth 825,000 young; take 412,500 of these as females, along with the former 16,500 females, that will make 429,000, which in the ensuing March will produce 21,450,000. Add to these the 429,025 males not reckoned, there is a total of 21,909,025, or very nearly twenty-two millions of bugs, all from a single parent in the course of twelve months. If a knowledge of this fact will not induce activity in extirpating the first bug which makes its appearance in a dwelling, we do not know what will. Some hints for the destruction of these domestic pests will be found on page 241.

Bulbous Roots Grown in Water.—It is a common thing to see hyacinth glassses with the plant inverted in them, the flower appearing expanded in the water where the roots usually are, and the bulbs and roots being contained in a small pot of soil and resting on the surface of the glass. This is not shown with much effect in water glasses of the ordinary size, but when glasses are made twice or thrice the usual size, the effect is more striking, though it is merely the same thing on a larger scale. Sometimes a glass appears with one inverted plant, its flowers fully expanded in water, and another plant directly over it, growing erect, with its flowers fully expanded in the open air, the bulbs and roots of both plants being in the same pot, or in two pots placed bottom to bottom. By what means are the blossoms made to expand in water? They are first made to expand in air in one of two ways: first by the common mode of growing hyacinths in pots, and, when the flower is expanded, introducing it into the glass and filling it up with water; and secondly, by inverting the pot over the top of the glass, and tying it in that position after the bulb is planted, so that the plant may grow into the glass, in which, of course, there is no water. A necessary precaution, according to this last mode, is to keep the glass, and of course the bulb and the pot in which it grows, in a horizontal position near the light, and to turn them as often as the hyacinth appears to be growing to one side. With regard to growing hyacinths in water glasses, it is commonly thought to be necessary to change the water whenever it appears to become muddy; but though this is frequently done in England it is as frequently omitted in Holland, and the Dutch florists say they perceive no advantages from the practice.

Burn Salve.—Simmer together till quite melted—stirring them well—a piece of Burgundy pitch the size of a hickory nut, a piece of yellow beeswax of equal size, and a gill of sweet oil. When cool, spread some of the salve on a soft linen rag, and fasten it on a scald or burn, which, while the salve is preparing, should be kept wet with sweet oil.

In all cases of burns or scalds it is of great importance that you should at once cover or envelope the injured part in wadding, the cotton side placed next the burn; then apply a second and a third piece, each one larger than the other; finally secure the whole by a turn or two of a bandage very lightly passed round or over the part. When there is no wadding at hand, the part should be covered with soft wool or cotton, flour, violet powder, chalk, magnesia, or any substance that will at once exclude the air from the injured part, laying soft linen rags, two or three times doubled, over all, and then securing the whole with a bandage or handkerchief. We beg to impress on the memory of all who read this article, for the sake of information, that any scald or burn may, if instantly covered with wadding, wool, cotton, lint, or any dry harmless powder, be safely left to Nature. In no case should the dressing first applied be removed, till all inflammation has subsided and the new cuticle has begun to form. In some severe cases one or more blisters are frequently produced; in no instance, however, are these to be broken, but enveloped at once, like ordinary burns, and excluded from the air, as expeditiously as possible.

Burnishing.—To burnish an article is to polish it by removing the small eminences or roughnesses upon its surface, and the instrument by which it is performed is denominated the burnisher. This mode of polishing is the most expeditious, and gives the greatest lustre to the polished body. It is made use of by gold and silver smiths, cutlers, locksmiths, and most of the workmen in gold and silver, copper, iron, or steel. It removes the marks left by the emery, putty-powder, or other polishing materials, and gives to the burnished articles a black lustre resembling that of looking-glass. The burnisher is an instrument the form and construction of which is extremely variable, according to the respective trades; and it must be ever adapted to the various kinds of work in the same art. In general, as this tool is only intended to efface inequalities, whatever substance the burnisher is made of is of little consequence to the article burnished, provided only that it be of a harder substance than that article. We shall first describe the art of burnishing silver articles, and afterwards point out the variety of modes in which the burnisher is used in other arts. When silver articles have received their last fashion from the silversmith's hands, that is to say, when they have been worked, soldered, repaired, or adjusted, they are sent to the burnisher, who has the care of finishing them. He must begin by clearing off any kind of dirt which their surfaces had contracted whilst making, as that would entirely spoil the perfection of the burnishing. For this purpose the workman takes pumice-stone powder, and with a brush, made very wet in strong soap-suds, he rubs rather hard the various parts of his work—even those parts which are to remain dull, and which, nevertheless, receive a beautiful white appearance. He then wipes it with an old linen cloth, and proceeds to the burnishing. The burnishers used for this purpose are of two kinds, some of steel, others of hard stone. They are either curved or straight, rounded or pointed, and made so as to suit the projecting parts or the hollows of the piece. Stone burnishers are made of blood-stone (hematite), cut, and either rounded with the grindstone or rubbed, so that they present at the bottom a very blunt edge, or sometimes a rounded surface. These are polished with emery, like steel burnishers, and are finished by being rubbed upon a leather covered with *crocus martis*. The stone is mounted in a wooden handle, and firmly fixed by means of a copper ferule, which encircles both the stone and the wood. The best bloodstones are those which contain the most iron, and which, when polished, present a steel colour. The operation of burnishing is very simple. It is only requisite to take hold of the tool very near to the ferule or the stone, and lean very hard with it on those parts which are to be burnished, causing it to glide by a backward and forward movement without taking it off the piece. When it is requisite that the hand should pass over a large surface at once, without losing its point of support on the work-bench, the workman, in taking hold of the burnisher, must be careful to place it just underneath his little finger. By this means the work is done quicker, and the tool is more solidly fixed in the hand. During the whole process the tool must be continually moistened with black soap-suds. The water with which it is frequently wetted causes it to glide more easily over the work, prevents it from heating, and facilitates its action. The black soap, containing more alkali than the common soap, acts with greater strength in cleansing off any greasiness which might still remain on the surface. It also more readily detaches the spots which would spoil the beauty of the burnishing. In consequence of the friction the burnisher soon loses its bite, and slips over the surface of the article as if it were oily. In order to restore its action it must be rubbed from time to time on the leather. The leather is fixed on a piece of hard wood, with shallow furrows along it. There are generally two leathers, one made of sole leather, and the other of buff leather. The first is impregnated with a little oil and *crocus martis*, and is particularly used for the bloodstone burnishers; the other has only a little putty-powder scattered in the furrows, and is intended exclusively for rubbing steel burnishers, as they are not as hard as the bloodstone. Bloodstone being very hard, the workman uses it whenever he can in preference to the steel burnisher. It is therefore only on small articles, and in difficult places, that the steel burnishers are used, as they, by their variety of form, are adapted to all kinds of work. But in general the bloodstone greatly reduces the labour. When the articles, on account of their minuteness, or from any other cause, cannot be conveniently held in the hand, they are fixed in a convenient frame on the bench: but, under all circumstances, the workman must be very careful to manage the burnisher so as to leave untouched those parts of the work which are intended to remain dull. When, in burnishing any article which is plated or lined with silver, he perceives any place where the layer of precious metal is removed, he restores it by silvering those places with a composition, supplied by the silverer, which he applies with a brush, rubbing the parts well, and wiping it afterwards with an old linen cloth. The burnishing being finished, it only remains to remove the soap-suds which still adhere to the surface of the work. This is effected by rubbing it with a piece of old linen cloth, which preserves to it all its polish, and gives so great a lustre that the eye can scarcely bear to look upon it. But when the workman has a great number of small pieces to finish, he prefers throwing them into soap-suds and drying them afterwards with sawdust, which is most expeditious. The burnishers of articles which are not silver follow nearly the same process as that above described. We shall briefly notice the variations to be observed in each case. The burnishing of gold leaf, or silver, on wood is performed with burnishers made of wolves' or dogs' teeth, or agates, mounted in iron or wooden handles. When they burnish gold, applied on other metals, they dip the bloodstone burnisher into vinegar, this burnisher being solely used for that purpose; but when they burnish leaf-gold on prepared surfaces of wood they are very careful to keep the stone, or tooth, perfectly dry. The burnisher used by leather-gilders is a hard polished stone, mounted in a wooden handle. This is to sleek or smooth the leather. The ordinary engraver's burnisher is a blade of steel, made thin at one end to put into a small handle, which serves to hold it by. The part in the middle of the blade is rounded on the convex side, and is also a little curved. The rounded part must be well polished, and the tool be very hard. They use this burnisher to give the last polish to such parts of copper or steel plates as may have been accidentally scratched or specked, where false lines are to be removed, and also to lighten in a small degree such parts as have been too deeply etched or graved. In clock-making they burnish those pieces or parts which on account of their size or form cannot be conveniently polished. The burnishers are of various forms and sizes. They are all made of cast steel, very hard, and well polished. Some are formed like the sage-leaf files, others like common files. The first are used to burnish screws and pieces of brass; the others are used for flat pieces. The clockmakers have also very flat small ones of this kind to burnish their pivots; they are called *pivot burnishers*. The burnishing of pewter articles is done after the work has been turned, or finished off with a scraper. The burnishers are of different kinds, for burnishing articles either by hand or in the lathe. They are all of steel, and while in use are rubbed with putty powder on leather, and moistened with soap-suds. The burnishing of cutlery is executed by hand or vice burnishers. They are all made of fine steel, hardened and well polished. The first kind has nothing at all particular in its construction; but the vice-burnishers are formed and mounted in a very different manner. On a long piece of wood, placed horizontally in the vice, is fixed another piece as long, but bent in the form of a bow. The concavity of it is turned downwards. These two pieces are riveted at one of their extremities by a pin and a hook, which allows the pieces to move freely around this point as a centre. The burnisher is fixed in the middle of this bent piece, and it is made more or less projecting by the greater or lesser length which is given to its base. The movable piece of wood, at the extremity opposite to the hook, is furnished with a handle, which serves the workman as a lever. This position allows the burnisher to rest with greater force against the article to be burnished, which is placed on a fixed piece of wood. They give to the burnisher either the form of the face of a round-headed hammer, well polished, to burnish those pieces which are plane or convex, or the form of two cones, opposed at their summits, with their bases rounded, to burnish those pieces which are concave or ring-shaped. The burnishing of the edges of books is performed with a wolf's or dog's tooth, or a steel burnisher. For this purpose they place the books in a screw press, with boards on each side of them, and other boards distributed between each volume. They first rub the edges well with the tooth to give them a lustre. After sprinkling or staining, and when the edges have become dry, they first burnish the front; then, turning the press, they burnish the edges at the top and bottom of the volume. They burnish the gilt edges in the same manner, after having applied the gold, but observe, in gilding, to lay the gold first upon the front and allow it to dry, and on no account to commence burnishing until t is dry.

Butter.—To make salt butter fresh, put a pound of it into a wooden bowl, with a quart of water. Work it well with a wooden spoon or with your hand for twenty minutes, then pour away the water, and wash it well in seven or eight different waters. Add a very little salt, and make it into pats.

To Preserve Butter.—Boil the butter in a roomy vessel until the scum rises, and skim it off as it comes to the surface. When the butter remains in the form of a clear oil-like fluid, carefully pour it off so as to leave impurities at the bottom. The settlings may be used at once, but the clarified butter will keep.

To Test the Freshness of Butter, plunge a knife into it, and if when drawn out and smelt, there is anything rancid or unpleasant about it, you will be sure to discover it. Good fresh butter ought to smell like a nosegay, and be of one colour all through. Good butter is by no means plentiful.

Butter as Food.—Butter eaten in excess is likely to weaken the stomach, destroy the appetite, and provoke nausea. Those who have weak digestive powers should use it sparingly. Judiciously used it is nourishing, pectoral, and digestible, opens the body, and is of a dissolving nature. Old butter is less wholesome than new.

Buttered Eggs. — Melt one ounce of butter in a basin placed in boiling water; add two table-spoonsful of milk, and the same of cream, with white pepper and salt. To these add six eggs well beaten, and stir well together till properly thickened, without allowing them to boil. Make some toast, cut it into small squares, butter and place it over the bottom of the dish, and pour on the buttered eggs.

Butter-making. — I venture to place before you (says a correspondent of the *Grocer*) the information obligingly given to me by the owners of a small dairy situate in a village within forty miles of London. My object in applying to them was, that I knew by personal experience that their dairy produce was celebrated for the good qualities of its butter, cream, and milk —that they were all eagerly sought after in the neighbourhood, and commanded high prices. The number of cows kept rarely if ever exceeded five. Such being the case, I felt assured that the means for the treatment of their produce could only be such as would be within the command of the majority of small cow-keepers. I will state what I heard in as few and plain words as I can, beginning with the housing and feeding. In the winter the cows are kept in a well-littered yard, with sheds for shelter in severe weather. Their food consists of mangold-wurzel, oil-cake, and meadow hay, given in sufficient quantities to keep them in good condition; to half-feed them is considered an extravagant waste of their produce. Their first change in the spring consists of cut tares brought into the yard; the oil-cake is then discontinued, but a little hay is given until the grass is sufficiently plentiful to turn them into the meadows. If these meadows are near home, the cows are brought there to be milked; if the distance is a mile or more, the man generally takes his milk-cans there in a cart, milking the cows in the field. The milk, when brought to the dairy, is strained through a fine hair sieve into tins. These are round in form, about 22in. across the top, 14in. at the bottom, and 6in. in depth, measuring the slanting sides; they have two handles for the convenience of moving them. They should be filled only to within about 2in. of the top. The milk is allowed to stand for twelve hours, and is then taken to a copper filled with hot water. The copper is such as are generally to be found in all small wash-houses. The tin is then placed in the opening of the copper, with the bottom of the tin in the water, and there it remains until the milk is scalded, but must not be boiled. I am unable to give the degrees of heat, they not having an instrument to ascertain this. By practice they can tell when the milk is hot enough; the cream then generally presents a rough appearance. It is then taken back to the dairy, and remains there from twelve to twenty-four hours before it is skimmed. An old-fashioned square churn, turned by a handle, is the one in use, and the time of churning seldom exceeds a quarter of an hour, unless the weather be cold, and then it will perhaps be an hour. In some instances, when the butter comes so quickly, the buttermilk is quite thick, and will repay the time for re-churning. The butter is never made up by the hands. Wooden slices are always used for this purpose, and the most rigid cleanliness is practised in every respect. The milk scalded in this way produces more and a richer cream than if left in the general way, and is quite thick when taken from the milk. The milk also treated in this manner will keep sweet twelve hours longer, and is much sought after by the housekeepers in the village. The butter is sold in its fresh state, and meets a ready sale, and commands the highest price in the neighbourhood. I should state that in size the pans are made so as to suit the top of the copper. I think you will now see that my object is not to give you an expensive mode of treatment in a small dairy, but to point out a simple plan that is within the reach of the majority of cowkeepers. There may be a few small mistakes made in the first attempts, but a little care will soon overcome them. I do not say this is a perfect plan; but if this simple statement has no other effect, it will, I hope, induce some one, for the public good, to point out a better. I can speak from experience of the good qualities of all the articles I have mentioned—say butter, cream, and milk.

Butter-milk.—When made of sweet cream this is very delicious, and has the credit of being particularly wholesome. When sour, it is considered more light, and it is sometimes recommended in consumptive cases. It is occasionally used for cakes and rice puddings.

Cabbage Jelly.—A tasty little dish, and by some persons esteemed more wholesome than cabbage simply boiled. Boil cabbage in the usual way, and squeeze in a colander till quite dry. Then chop small. Add a little butter, pepper, and salt. Press the whole very closely into an earthenware mould and bake for an hour, either in a side oven or in front of the fire.

Cabbages, Keeping in Winter.—Cabbages and other vegetables buried in a cellar under sand or earth may be kept through the winter.

Cabbages, to keep Fresh.—When the cabbages are cut, leave about two or three inches of stalk, the pith of which is to be hollowed out, taking care not to cut or bruise the rind; tie the cabbage up by their stalks and then fill the hollow with fresh water daily. They will keep thus for several months.

Cake Diet-bread.—Dried flour, a quarter of a pound; loaf sugar, pounded, half a pound; lemon or almond flavouring, eight drops; four eggs; heat for half an hour, bake in a deep tin or cake mould, previously buttered, and lay a buttered paper on the top.

Calculus.—This is a precipitated hard deposit from the liquids of the body in various organs, such as the gall-bladder, the lungs, kidneys, &c.

Calf's-foot Jelly.—A palatable, easily-digested article, frequently given as food to persons of weak digestion or in feeble health. It is made by long boiling from the feet and knee-joints of the calf, and usually has added to it sugar and wine or oil and spices. (See *Veal.*)

Calf's Head Pie, an excellent dish either cold or hot (Benson E. Hill's receipt).—Boil a calf's head till the meat is tender; remove it from the bones as whole as possible; take out the eyes, and slice the tongue; line a large pie-dish with paste; put in the meat, the tongue at the top; sprinkle a very little pepper and salt over the meat, pour in half a pint of the liquor in which the head was boiled, cover with a thick crust, and bake for an hour in a quick oven. Meantime, put the bones of the head into two quarts of the liquor, with a tea-spoonful of powdered mace, half a salt-spoonful of cayenne pepper, and an onion chopped small; reduce this by boiling to a pint. Beat up the brains with some sage-leaves chopped fine, half a nutmeg grated, and an egg; and fry them in little cakes till they are of a light brown; keep them warm in the oven; strain off the gravy, and add two table-spoonsful of mushroom catchup, two glasses of port wine, a bit of butter rolled in flour. Have ready also half a dozen hard-boiled eggs. When the pie has been baked the proper time, take off the top crust, and add the hard yolks and brain cakes, and pour the sauce into the dish quite hot; fasten the top crust with eggs before sending to table.

Calisthenics (or Gymnastics).—This term implies exercises specially adapted for the proper and equal development of the muscular powers. Indulged in judiciously, such exercises are of the greatest importance to the establishment of a sound constitution in a healthy body. They strengthen the organs, improve the circulation, increase the secretive actions, promote the carrying away of effete materials, and render the body far less sensitive to all those influences by which diseases are so extensively generated. Such exercises have also great influence as curative agents in cases of deformity, and in those of certain diseases.

Calomel, to test if Pure.—The specific gravity of calomel is a very good test to distinguish it from chalk and other white powders, as it is much heavier than either of them; but the best test is to put a small quantity of ammonia into a mortar, and rub some of the powder into it, or by shaking it in a phial with some lime water. In either case, if the calomel is pure, it will become intensely black.

Calumba.—A root which is used in medicine as a mild tonic and stomachic.

Cambridge Drink.—This consists of equal quantities of home-brewed ale and soda-water, and forms a very refreshing and pleasant drink.

Camera Lucida. — This very compact and elegant instrument for drawing objects in perspective, called the camera lucida, is an instrument having two plane reflectors fixed at certain angles. The objects intended to be delineated are seen reflected from the second mirror, as though they were on the same plane as that whereon the paper is placed which is to contain the drawing. These plane reflectors may be either common mirrors with a silver coating at the back of each, or two contiguous faces of a glass prism, in which latter case the image will be produced by what is called prismatic reflection. In either case the most convenient position in which the reflecting surface can be arranged will be such as will cause the rays proceeding directly from the object and falling as incident rays upon the first surface, after reflection from thence to the second, to emerge from that second reflecting surface in angles of 90 degrees with the direction of the original incident rays; for in these circumstances vertical objects may be projected upon a horizontal plane, and the instrument will be adapted to drawing upon a horizontal surface. Now, if two plain mirrors are used, the incident rays upon the first will make right angles with the emergent rays from the second, when those mirrors are fixed so as to make angles of either 45 or 135 degrees from each other. In this case the mirror which receives the rays from the object may be entirely silvered at its back, but the second mirror is only to have a sufficient portion silvered to reflect the image of the proposed object to the eye, and thus allow the paper on which the drawing is to be made to be seen either through an opening of the silvering, or past the edges of the same by one portion of the eye, while the double reflected object is seen in the silvering by the other portion of the same eye. When prismatic reflection is employed the prism must not be triangular, as usually constructed, but quadrangular, and the two reflecting surfaces (to produce an angle of 90 degrees between the first and the second emergent rays) must make an angle of 135 degrees, while the opposite angle must be one of 90 degrees, and the other two angles may be either respectively equal or unequal at pleasure; then one of the faces which made right angles with each other is to be turned towards the objects to be delineated, and the rays, after passing through that surface and reflection from the two next faces, will emerge from the fourth under the proposed angle. The mirrors or other reflecting surfaces are mounted on a proper frame, and supported at a suitable distance from the paper intended to receive the drawing, and when necessary either a double concave or a double convex glass may be fixed in the frame and properly adjusted to produce distinct vision when the apparatus is used by short-sighted or long-sighted persons respectively. These concave and convex glasses may conveniently be made of twelve inches focal length. The instrument must then be supported at the distance of twelve inches from the paper, a distance which is convenient enough in other respects.

Camomile Tea. — Take five drachms of camomile flowers and a pint of boiling water; macerate for ten minutes in a loosely covered vessel, and then strain. When cold it may be taken as a light tonic, and it will also be found useful in dyspepsia and hysteria. Taken warm it acts as a gentle emetic.

Camphor.—This is an essential oil which retains its solidity at an elevated temperature, and possesses anti-putrid and vermifuge virtues of a high order, for which reason it is frequently recommended to preserve furs from moths, and, when put in water, to preserve meat fresh. Camphor evaporates like other essences, and like them absorbs oxygen from the atmosphere. After keeping for some time, only the least volatile portions remain, and these at last crumble into an impalpable powder. M. Raspail, of Paris, claimed great importance for camphor as a remedial agent, and lauded its efficacy as really marvellous. To dress wounds and sores with it is in common use amongst many families of our acquaintance. The Japan camphor is the best of the various kinds sold, but this is very scarce. To get it good—so much of an inferior and useless kind is in the market—the purchasers should obtain it from Apothecaries' Hall. The genuine double refined camphor is compact, presents a fibrous break, and effloresces in the air. Camphor powder has been recommended for dissipating cramps and pains in the stomach and intestines, and for stopping diarrhœa.

Camphor, to Pulverise. — Camphor is difficult to dissolve, but if first broken in small pieces and sprinkled with spirits of wine, it may be easily pulverised in a mortar.

Camphor Balls.—Melt together two ounces of lard, two ounces of white wax, powdered camphor half an ounce. Very useful for chapped hands.

Camphorated Chalk. — To three ounces of prepared chalk put one ounce of the above pulverised camphor. Mix it well together, and put it into a well-stoppered bottle.

Camphorated Spirit. — Dissolve two ounces of camphor in a pint of spirits of wine. This is useful for chilblains, rheumatism, &c.

Camphor Pomatum.—This is used for dressing wounds, &c., and is thus prepared, according to a receipt given by M. Raspail :—Take of fresh hogs'-lard, 3¼ oz., grated camphor 1 oz. Put the hog's lard in a large cup, and place this in a saucepan lined with porcelain, and containing water to the depth of about two inches. Heat over the fire until the hogs' lard is thoroughly melted and presents the appearance of oil; add now, gradually, the camphor powder, and stir with a small stick or glass rod, until the camphor is thoroughly incorporated with the lard, and the mass looks perfectly limpid, which will require about two or three minutes. Remove the saucepan from the fire, let the mixture stand a few minutes, and then pour it gently into another cup, taking care to leave the sediment behind. Put the cup with the pomatum in the cellar, or in some other cool place. The pomatum prepared in this manner is as white as snow, and perfectly smooth. Should you have no grated camphor at hand, you may substitute for this ingredient two ounces of camphorated spirits of wine. In that case you will, of course, bear in mind the facility with which alcohol catches fire, and add this ingredient to the melted fat with proper caution, The pomatum must, moreover, be left in the water-bath for at least ten minutes, to let the alcohol evaporate; should a portion of the alcohol still remain, this may be got rid of by decantation and draining.

Canard aux Pois.—This is M. Ude's receipt for preparing the following much-esteemed dish:—Stew a young duck for three-quarters of an hour; then take it up and serve it with some green peas. If the duck is large it should be cut into four or five pieces, namely, the breast, the two wings, which otherwise are called fillets, and two legs and the back. Pare all the members properly, and make the sauce in the following way: Take two quarts of very fine fresh green peas; put them into a pan with clean water and two ounces of fresh butter; mix up the butter with the peas, drain the peas by taking them out of the water with your hand, otherwise the dirt would go with them into the colander; let them dry; next put into a stewpan half a pound of the breast of bacon cut into squares of an inch, and a very small piece of fresh butter. Fry the bacon of a nice colour, then drain the fat and put in the peas to cook gently. When they are all very green put half a spoonful of flour to them, and moisten with boiling water. Add the members of the duck, with some salt and a little pepper, a very small bit of sugar, and a bundle of parsley and green onions. When the duck is done serve the members covered with the peas, and take great care to skim off the fat and reduce the gravy.

Cancer.—A cancer usually makes its appearance as a small, hard, indolent, and nearly invisible tumour, its name being derived from its displaying large blue veins stretching out somewhat like the claws of a crab. Everyone knows how terribly malignant this disease is. Progressing from its first stage, sooner or later the cancer becomes inflamed, and slight shooting pains are felt, which gradually become more frequent, and end in being continuous. The cutaneous veins become turgid, and to the touch appear knotty and irregular. In time, the tumour becomes an ulcer, and discharges matter of a thin acrid nature and an offensive smell, which corrodes the surrounding parts. The shooting pains also become intensely painful, and from the destruction of the vessels there is sometimes a considerable discharge of blood. This disease rarely occurs in the female till after the cessation of the menses, and it has been observed that unmarried and barren women are more subject to it, next to those mothers who have not suckled their children, and the least so are those women who have borne children and suckled them with their own milk. With respect to the causes of cancer, a variety of opinions have been maintained by practitioners of eminence. Some contend that it arises from a general disorder of the system, and others that it is in its infancy entirely local, and that the constitution is contaminated by an absorption of the veins from the open cancer. It is often excited by blows and accidents, and therefore more frequently occurs in the parts of the body most exposed to them, as the breast and lips. An eminent authority attributes cancer to the action of a salt, which he terms septic poison; another to the excessive use of ardent spirits; another thinks seturnus or cancer is an independent life, and that the tumour is a congeries of hydatids. An eminent physician in Dublin, in a late treatise on cancer, is also of opinion that it possesses a vitality independent ot the system in which it grows; that it is, in fact, a parasitical animal, not introduced from without, but produced by what he terms the congeries of the organic particles, in a manner similar to the generation of the fungus of the bark of decaying trees, by a kind of spontaneous or equivocal generation, and not by vital reproduction. Instead, however, of considering, as the first-mentioned practitioner stated, the cysts that are observed in cancer as the parasitic animal, the latter maintains that it is the firm white ligamentous bands interspersed among the cysts, and extending like roots into the neighbouring substance (which are considered by most anatomists as merely condensed cellular substance), that make the essential part of cancerous tumours, wherever situated, and this appears to be the more rational hypothesis.

Candles. — The inferior candles (tallow candles) which require snuffing and give a feeble light, due to imperfect combustion, contain stearic acid and glycerine. It is the latter which smells so unpleasantly when a common tallow candle is blown out. These are fast going out in the presence of modern improvements. Tallow candles (dips) are made by dipping the wicks into hot tallow. Mould candles are made in tubes or moulds. Stearic acid candles burn best because they contain the fatty acid alone. Composite candles, consisting partly of stearic acid and partly of tallow, which do not require snuffing, are an improvement upon the old dip candles, but are inferior to the stearic acid candles, which are, however, much more expensive. Paraffine makes a very superior candle. Spermaceti candles burn well, give as much light as tallow candles, and do not smell.

Candles, Keeping.—These are always best after keeping for a time—say twelve months—therefore it is necessary to lay in a stock; and those made in winter-time are hardest and firmest. This is also applicable to soap, which should be cut into large squares and placed on a shelf in the open air to dry thoroughly and slowly, as if dried too quickly it cracks and breaks when in the water. For washing coarse clothes soft soap is the best, and will go farther than the hard. (See *Soap*.)

Canker.—A foul, offensive ulcer of a virulent kind, which appears on the inside of the lips and cheeks of young children, and spreads rapidly. Its appearance is generally due to improper food, unwholesome air, or dirtiness. If it does not receive proper treatment the child afflicted with it gradually becomes weaker, and at last dies.

Capacity for Heat (see *Heat*). —According to the power that different bodies possess of absorbing heat is their capacity for heat; thus, we say that water has a greater capacity for heat than mercury, and iron than tin. The consequence of this is, that different bodies exposed to one degree of heat require different times to be raised an equal number of degrees; thus, if we expose the same quantity of mercury and of water to the same heat, the former will be heated long before the water, because it requires a less quantity of heat to raise it. In chemical experiments, whenever there is a change of capacity without a change of temperature, there is sure to be a sudden evolution of heat, or absorption of it, producing cold. Thus, on mixing rectified spirits and water, and still more on mixing sulphuric acid and water, a very sensible degree of heat is evolved, because the mixture has less capacity for heat than the two separately. So the heat produced when fluids become solid, and the cold when they become vapours, as mentioned elsewhere, is explained by the solid having a less and the vapour a greater capacity for heat than the fluid. All the heat afforded by combustion of inflammable bodies is given out in consequence of the result of combustion, as the ashes, smoke, &c., having a less capacity for heat than the combustible body and the air that has been consumed. There is another law of heat that requires to be mentioned, viz., that it passes more readily through one substance than another; and this quality in the substance to transmit it is termed its conducting power. If you hold a glass tube and a piece of wire with your hand in the flame of a candle, you will soon be made sensible that the wire is the best conductor. Air, when confined, is a bad conductor, and this is the reason why all porous bodies are so. (See page 130.) Wool, by admitting and confining particles of air in its interstices, is a very warm covering for the animals that bear it, and a warm clothing for man. Double windows and double doors make the warmest rooms in cold climates, and the coolest in warm climates; for the air enclosed between them, being a worse conductor than either wood or stone, prevents the egress of heat in the cold and its ingress in the warm climates. For the same reason partitions made with lath and plaster, with an intermediate space, make the rooms in this climate warmer than wainscot partitions. In hot-houses not only the walls but the sashes should be double, to retain the heat most effectually. Snow, being a light, porous body, is a bad conductor of heat, and on this account is of infinite service in preserving vegetation; for, let the air be ever so cold, ground well covered with snow is seldom reduced below the temperature of 30°. This fact will account for the instances on record of animals being preserved alive under snow for extraordinarily long periods of time. (See *Heat* and *Conductors of Heat.*)

Capillaire.—Boil in three pints of water five pounds of lump-sugar and one ounce of the herb capillaire. Skim this frequently, and continue the boiling until the syrup becomes thick. Filter through a jelly bag, add five drops of neroli, and when cold, bottle. It is used in cold water as a beverage, and also to flavour punch and other mixtures.

Capillary Attraction.—Perhaps the most simple and best-known illustration of this is seen when the end of a piece of sugar is dipped into the tea, which straightway rises to the top of it. It is by capillary attraction that damp rises in unhealthy houses with ill-built walls, and it hints to us that we should stay the progress of damp as near the foundations as we can. The plan of covering the first course of bricks above ground with sheet lead is said to effectually prevent the ascension of damp.

Capsicum.—This is the hot, pungent, and stimulating fruit of a plant that consists of numerous species, and from which we obtain chillies and cayenne pepper, from which is made chilli vinegar. It creates an agreeable warmth in the stomach, and promotes digestion.

Caramel.—Sugar boiled until the water has evaporated, and formed into devices for colouring gravies, decorating cakes, &c.

Caraway Brandy.—This is an excellent stomachic, which is made in the following way:—Dissolve six ounces of loaf-sugar in one quart of brandy, and sprinkle on the top one ounce of whole caraway seeds. After standing about a week or ten days in the jar, strain off and bottle.

Carbolic Acid.—A trace of carbolic acid prevents decomposition in albumen, gelatine, glue, and similar substances, and will also effectually preserve from any tendency to fermentation paste of wheat, flour, or starch; and it effects this without in any way altering the qualities of the material, or, like corrosive sublimate, and similar agents formerly used for preserving paste, introducing anything injurious to photographs. If a few drops of a 10-grain solution of carbolic acid be added to paste or glue when prepared for use, no fear of change or putrefaction need be entertained, as it at once destroys the germs upon which fermentation and decomposition depend. If glue be used, it should be tested at the outset for acidity, and a little ammonia be added if any trace of acid be present. Most samples of glue and gelatine in the market are more or less acid.

Carbon is the name given by chemists to the pure part of charcoal. It is present in almost all combustible bodies, and is itself completely combustible. Carbon is not decomposable, and therefore ranks among the chemical elements. The most interesting compound of which it forms the base is its union with oxygen, when it forms the carbonic acid gas, or fixed air.

Carp.—This fresh-water fish is easy of digestion, and is tolerably good and nourishing food. For the table they should be well fed, and not too young.

Carron Oil.—This is a mixture of lime-water with linseed oil, equal parts, which is frequently used for the cure of scalds or burns.

Carrot Fritters.—Take a boiled carrot, mash it, add two tablespoonfuls of cream, two ounces of bread crumbs, and two eggs well beaten; fry in fritters, and serve with brown sauce. (See page 71.)

Carrot Pie.—Fill a dish with half-boiled carrots in slices, add a little water, season with pepper and salt, cover with paste, and bake. This is a favourite dish with vegetarians.

Carrot Pudding.—Half a pound of flour, half a pound of suet chopped very fine, half a pound of currants, the same of raisins, and half a pound of grated carrot.

Carrot Soup. — Take eight largish carrots, a large turnip and onion, two roots of celery, of which use only the white portion, and six ounces of the crumb of bread, with two ounces of butter, and half a pint of cream. Boil three quarts of water, in which must be dissolved a piece of soda about the size of a small nut. Into this put the vegetables, sliced, and the bread, with a little cayenne pepper and mace. When the vegetables have boiled soft, remove, and after rubbing them through a sieve, replace them, and while boiling, stir in the cream. It should then be of the consistence of cream, and should be allowed to simmer.

Carving is quite a modern art, for forks have not been introduced in Europe many centuries. The first were brought to England from Italy by Coryat, an English traveller, in 1611. In the days of our Saxon ancestors, joints of meat, poultry, and game were brought to table on the spits on which they were cooked, and handed round to the company by the serving men on their knees. Each person cut what he pleased from the joint, using a knife which he carried at his girdle for the purpose, and tearing and conveying the pieces to his mouth with his fingers. The invention of forks is ascribed to the Italians, who used them in the fifteenth century. Other European nations fed out of the same dish, the gentlemen cutting off pieces of meat for the ladies first, and all using their fingers. The first forks were two-pronged, much like our carvers. In 1653 it had become an elegant habit to use a fork, but the roughness of the general manners at a period ignorant of forks and of the art of carving may be gleaned from the instructions given in etiquette in a little work published at the date above named, and entitled, "The Accomplished Lady's Rich Closet of Rarities," in which it seems necessary to warn her against a demeanour only likely to be found amongst the very lowest members of society in our days, as the following extract shows:—"A gentlewoman being at table, abroad or at home, must observe to keep her body straighte, and not lean by any means upon her elbowes; nor by ravenous gesture discover a voracious appetite; talke not when you have meat in your mouthe, and do not smacke like a pig, nor eat spoone-meat so hot that the tears stand in your eyes. It is very uncourtly to drink so large a draught that your breath is almost gone, and you are forced to blow strongly to recover yourself; throwing doune your liquor as into a funnel is an action fitter for a juggler than a gentlewoman. In carving at your own table, distribute the best pieces first, and it will appear very decent and comely to use a fork, so touch no piece of meat without it." Twenty years later than this, the Highlanders in Scotland cut the joints of food brought to table with the daggers they wore at their sides. Even at the present day in France, which takes the lead in so many elegancies, carving is an unknown art amongst the mass of the middle classes. If a leg of mutton is brought to table, the master of the house grasps the joint in his left hand by the knuckle, and holds it up from the dish, cutting off junks of meat with a knife, commencing from the knuckle end, but without system. When about enough for the family or company has been severed from the joint, the rough-hewn lumps of mutton are transferred to a large meat dish, a fork placed at the edge, and the dish handed round by the servant. Veal and boiled beef are cut carelessly into lumps with a knife and fork, and handed round in the same way. And yet refined manners at table have been admired by the *élite* of all ages. Even the poet Ovid, so long ago as the Roman era, advised those who sought to gain the affections and others to be careful in their ways at table. He instructs his readers—

"Your meat genteelly with your fingers raise,
And, as in eating there's a certain grace,
Beware with greasy hands lest you besmear
your face."

We, who have the assistance of forks, and can readily obtain instruction in the daintiest and most economical methods of cutting the food brought to table, should blush to be behind-hand with the ancients, as there is not only in "eating," but also in carving, "a certain grace" which is most desirable. Lord Chesterfield, in one of his famous letters, says :—"A man who tells you gravely that he cannot carve may as well tell you that he cannot feed himself. It is both as necessary and as easy;" and Dr. Richardson says you may judge a man's conscience by his carving. For the following practical hints and illustrations we are indebted to a useful work, of which we have spoken favourably on another page, namely, *Cassell's Household Guide.*

CARVING, HINTS ON.—It has been said that "a poet is born, not made;" and so it is to a great extent with the carver. The skill to carve well depends on certain qualities that are gifts in the possessor—a true eye, a steady and skilful hand. Still, even those who do not possess a natural aptitude, acquire the art by care and perseverance sufficiently to enable them to acquit themselves without awkwardness, or the risk of wasting and spoiling what they attempt to carve, though they may not be able ever to attain to that almost magical dexterity with which some people appear to be gifted; and even those who possess this natural skill will find it useless, unless they take care to discover the best and most advantageous modes of cutting the viands brought to table. There are many persons who fancy that as long as a joint is cut up, it matters little how it is done; they would, by travestying the words of Shakespeare, "stand not upon the order of their cutting, but cut at once," and have a notion that all attempts at choice carving are contemptible—mere extravagances of fancy, or epicurean self-indulgence. But no greater mistake was ever made. Not only is it true that meat is twice as nice if neatly divided, but also a joint properly carved will go nearly twice as

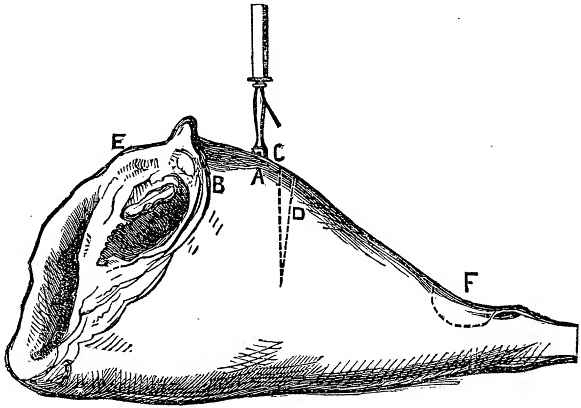

Fig. 1.

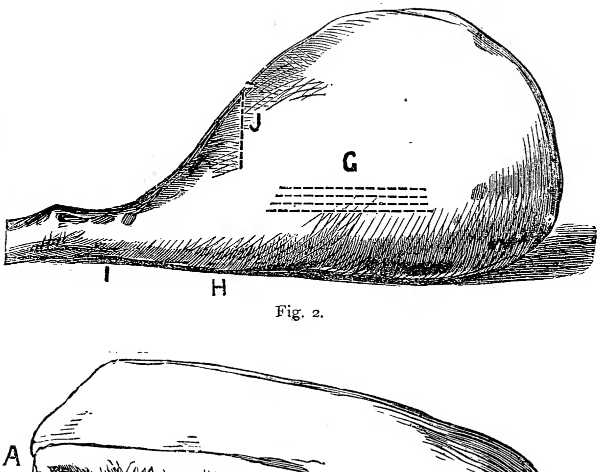

Fig. 2.

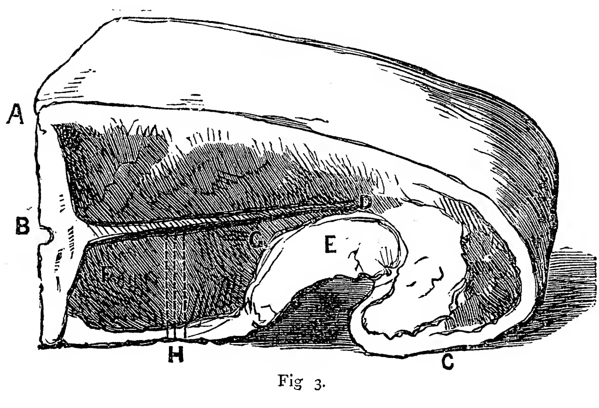

Fig 3.

far as another of similar size and weight clumsily cut up; and every careful housewife and true economist will do her best to master the art of carving as soon as possible. Not only will she be taking the best means to avoid waste, but she will also get the credit of keeping a well-provided table; for even where there is but little to serve, if it is well cooked, well carved, well served, and neatly put on the table, a single dish is preferable to a profusion ill prepared. Even in so small a matter as cutting a slice of bread, a loaf always cut straight and even goes much farther than one hacked and hewn irregularly, or in all directions, and it is palatable to the last piece, so that there is no excuse for leaving odds and ends. Every good housewife should make a rule in this matter, to which she should, expressing her wishes in a courteous and gentle manner, compel every member of the household and every visitor to adhere—that is, to begin at the top of the loaf, and take off the two sides equally, and in evenly-cut pieces. Nothing is more disagreeable than to come to table, and be served with a loaf of bread after some careless slattern has hacked it about in all directions.

LEG OF MUTTON.—This joint is the most frequent staple of the family dinner, and yet is very often badly cut. The leg of mutton comes to table as shown in the illustration, Fig. 1. Take the carving-fork as usual in your left hand, and plant it firmly in the joint, as shown by A in Fig. 1, placing it rather over to the other side of the joint, and drawing the leg over towards you on the dish about one third, which brings the position of the fork from A to B. Cut straight down across the joint at the line marked C, not *quite* to the bone. Make the second cut a little on the slant, as shown in D, and take the piece out. Continue cutting from each side slantingly as the line marked D either from the thick or the knuckle end, according to the taste of the person to be helped. A very small piece of fat should be given with each slice of meat to those who like it. The knuckle, if any one asks for it, is first cut off in a lump, as shown by the circular line at F, and afterwards in slices. Mutton should be cut thick, but it should not be cut to the bone; the slices in the centre should not penetrate as far as the circular kernel of fat found there, and called the "pope's eye," which it is generally considered best to leave for hashing. But some persons consider the pope's eye a delicacy; in that case it is sliced out in a lump with a circular cut, similar to that used to remove the knuckle, but twice as large. The pope's eye should be cut out entire, with a handsome piece of meat round it. The back of a leg of mutton is not generally cut until cold, when it is best sliced lengthways, as shown in Fig. 2; the meat is still cut thick, but not quite so thick as in the cuts previously described. Cold mutton should be served with mashed potatoes and pickles, and the remains hashed, as there is much left on the bone that does not cut up well hot or cold. There is a part called the "cramp bone" in a leg of mutton, which may be removed by a circular cut from H to I in Fig. 2; it is usually relished cold. Fig. 2 shows the joint when turned three parts over, held by the fork, as previously described, and the dotted line at J indicates the direction of the first cut.

SIRLOIN OF BEEF.—This joint, which is the best roasting part of the beef, is served with tufts of horse-radish on the top. A sirloin should be cut with one good firm stroke from end to end of the joint, at the upper portion, making the cut very clean and even from A B to C, Fig. 3. Then disengage it from the bone by a horizontal cut exactly to the bone, B to D, using the tip of the knife. Bad carving bears the hand away to the rind of the beef, eventually, after many cuts, peeling it back to the other side, leaving a portion of the best of the meat adhering rigidly to the bone. Every slice should be clean and even, and the sirloin should cut fairly to the very end. Most persons cut the under side whilst hot, not reckoning it so good cold; but this is a matter of taste, and so is the mode of carving it. The best way is first of all to remove the fat, E, which chops up well to make puddings, if not eaten at table. Then the under part can be cut, as already described, from end to end, F to G, or downwards, as shown by the marks at H. Roast ribs of beef are cut in the same manner as the upper portion of a sirloin. Each person should be asked if he prefers his meat well done or with the gravy in it (*i.e.*, under-done), and if fat is desired. The outer cuts of roast beef are of course the most cooked, the inner ones the reverse.

ROAST FOWLS are by no means an uncommon dish, and one is often requested to carve a fowl, who, from want of practice, is obliged to blush and refuse. As sideboard carving is not yet sufficiently general to render the challenge impossible, we recommend every one of our readers to master so really simple a thing; for nothing makes a person look more stupid than a bashful refusal to perform such a little service for host or hostess upon occasion. It looks as though one would eat his dinner at another's expense, but would not even put out a hand to assist. Poultry-carvers are placed to divide fowls; the poultry knife is short and thick, and pointed and sharp at the top. The great art in dividing all kinds of birds is to hit the joint at once, else there is an awkward fumbling about, cut after cut made, and a stupid delay. To take off the leg, which should be the first joint removed, thrust the fork into the breast at A, in Fig. 4. Take one careful glance at your bird before you touch it with the knife; in this glance ascertain where the joint is likely to be, relative to the width of the leg and the width of the body. Strike the knife to the joint; feel for the centre of it, where the joint is united; send in the tip of the knife upright; press it down straight; and then, with the weight of the hand, turn the knife over, as shown in Fig. 4. Instantly the joint cracks, and is severed. Now cut it off from the side, taking a nice slice of meat with it, according to the line indicated from A to C, in Fig. 5. Having removed one of the legs, take off the wing on the same side in a similar manner. A good-sized piece of meat is taken off from the side of the breast with the wing, and is almost of triangular shape; it is shown by the dotted line from G to F, and from F to H. Remove the leg and wing from the other side, and then take the "merry-thought" off the breast. This is done by inserting the knife under the point of the breast-bone at I, in Fig. 5, and sweeping it round at each side by a circular cut from I to M. Afterwards separate the remainder of the breast from the back by cutting it right through the small rib bones at the straight line, from end to end of the fowl, marked J K in Fig. 5. This last piece of the breast is generally helped entire. Now only the back remains. Turn it over on the dish with the outside upward; plant the knife upright in the centre of it, hold it firmly, place the fork under the portion to the left of the knife, and raise it from the dish at right angles till the bone snaps; then cut right through, and help the two halves separately. The wings are deemed the most choice portions of the fowl, and are usually served first. In Fig. 5 a little round is noticeable just in the bend of the wing; this is the gizzard in one wing, and the liver in the other. The liver wing is generally most esteemed. When carving a fowl, it is usual to ask which is preferred, the liver or the gizzard wing.

SALMON.—A slice of salmon has a pleasing appearance when properly brought to table. Salmon should be served on a napkin, and it is often garnished with sprigs of fennel or slices of lemon. A silver or plated slice or knife, Fig. 6, is used for this, as for other kinds of fish, because steel spoils the flavour of fish. The knife needs to

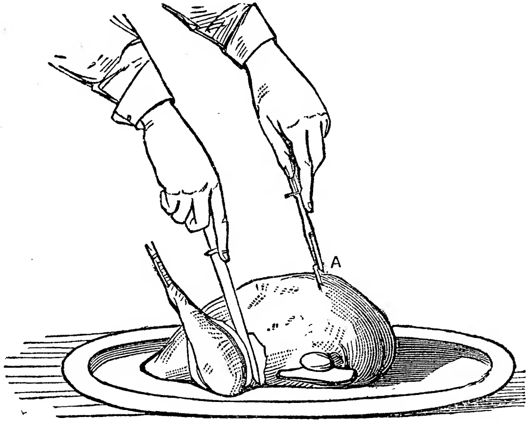

Fig. 4.

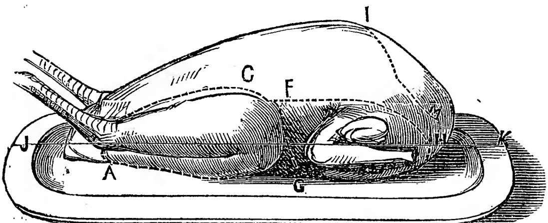

Fig. 5.

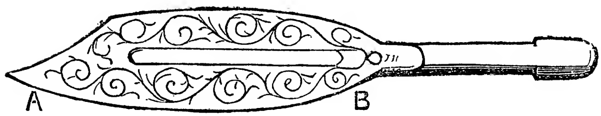

Fig. 6.

be broad to divide the flakes without breaking them. A fish-knife has a sharp curved point to disengage the fish from the bones, and is perforated with holes to allow any water retained about the fish to run off. A fork is not used in helping fish. With the blade of the fish-knife, A to B, in Fig. 6, cut through the salmon from end to end, close to the backbone, at the line marked A in Fig. 7. If the fish is large, it will be necessary to make one or more cuts parallel with A. These are again divided across into square pieces, as shown at B. This part of the salmon, which is the prime, is called the "thick." With each slice of the thick, cut also one of the "thin," or belly, which is cut down in smaller slices, as shown from E to F in the illustration. When the upper portion is consumed, remove the centre bone with the fish-slice to the side of the dish. Cut the remainder as before, taking care not to damage the napkin on which it is laid. Each piece of fish is served from the dish to the plate on the flat of the silver slice. The centre of the salmon, towards the shoulders, and the centre cuts are reckoned the best.

HARE.—A hare is considered a difficult dish to carve, for unless very young the bones are hard to divide. In some cases the cook removes the backbone from the hare, especially if it is old, and when this is done the process of carving is of course in a very considerable degree facilitated. The head should be set to the left of the carver. If the hare is not very young, cut thin slices the length of the back from G to H, Fig. 8. Next remove the shoulders by inserting the knife between the shoulder and the side at the dotted line J, feel the joint, cut down through it with some strength, and treat it as the leg of a fowl is treated, only more vigorously. None of the adjoining meat is cut off with the shoulders or legs of a hare. Having removed the shoulders, insert the knife at the dotted line at K and take off the leg. Treat the other side in the same manner. The head is cut off by inserting the point of the knife at M, which must be fitted into a niche between the vertebræ of the neck, and taking a circular stroke from M to N, when the backbone has been divided through. Cut the lower from the upper jaw through the line O to P, then place the point of the knife upright at Q, and split and cut open the head at the line visible in the centre of the skull from the nose to the ears. Many persons like the brain, ears, and cheeks. If the hare is young, cut off the shoulders, legs, and head, before touching the back, and then, instead of taking off slices, cut the back across the narrow way in several pieces at the lines marked R R R R. This is done by planting the knife upright, feeling for the niche between the bones, and splitting the back. The ribs are cut right through on either side lengthways, and separate pieces served. The back of a hare is considered the best, and the leg the next most choice part. The shoulders are not usually coveted, as they are apt to be dry. Nevertheless some like them, and they are wholesome, and prudent carvers will find a use for them. Serve a little seasoning and one of the forcemeat balls with each piece.

RABBIT.—A rabbit, roast or boiled, is carved precisely as the young hare is, the back being cut across in small pieces after the shoulders, legs, and head have been removed. The head is cut up last. Every part of the rabbit is good. The back is considered the choice help, especially the centre piece. The shoulder is preferred to the leg. For rabbit pie, cut up the animal in the same way. If roast, serve the forcemeat balls and seasoning with the meat; if boiled, a little onion sauce. The kidney is considered a delicacy. Each one may be cut in half and served separately; and, though not much to look at, it will suffice for a relish, which is all that can be expected.

TURKEY. — A turkey generally appears on the board at Christmas, if

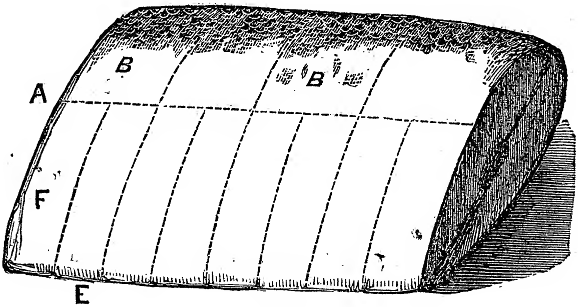

Fig. 7.

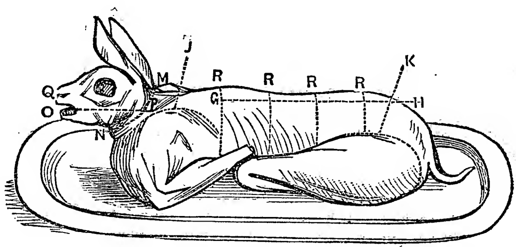

Fig. 8.

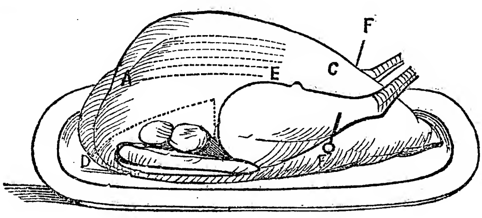

Fig. 9.

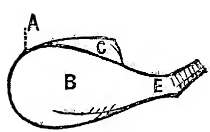

Fig. 10.

at no other time. It requires more skill to carve a turkey than any other bird, excepting a goose, and on the carver's operations will depend how far the bird will go in point of economy. The breast is reckoned the best, and the wing next in preference. Gentlemen are often partial to the drumstick, the slender part of the leg. Commence by cutting slices from the breast on each side, as shown by the lines at A in Fig. 9. If seasoned with herbs, the seasoning will be found in doing this; a little of it is served with every portion of the bird. If truffles or mushrooms have been used in stuffing, open the "apron," as it is called, by cutting a slit at C, and taking out the seasoning in slices; next remove the wings at the dotted line D, precisely in the same way as from a fowl. Draw out the silver skewer, F, and take off the leg at the joint by inserting the knife between the leg and the side of the body at E, and parting the joint, which it requires some strength to do, without cutting off any meat with it. When separated, the leg appears as shown in Fig. 10. There is a joint at the dotted line A, which must be severed, and the two pieces served separately. B is the drumstick, E the scaled leg of the bird, which is part of the drumstick; C is called the cushion. The drumstick is often reserved till the bird is cold, and then grilled for breakfast. The rest must be carved as you would a fowl, dividing the breast, and cutting the back in half.

CALF'S HEAD is a very delicate and by no means an uncommon dish, but it is noteworthy that it is far more economical if carved in the manner we are about to describe, than any other way. Commence by making long slices from end to end of the cheek, cutting quite through, so as to feel the bone throughout the entire stroke, according to the dotted lines from A to B in Fig. 11. With each of these slices serve a cut of what is called the throat sweet-bread, which lies at the fleshy part of the neck end. Cut also slices at D, which are gelatinous and delicate, and serve small pieces with the meat; this greatly economises the joint. A little of the tongue is usually placed on each plate, and about a spoonful of the brains. The tongue is served on a separate dish, surrounded by the brains, and is cut across, the narrow way, in rather thin slices. Some persons like the eye. It is removed by a circular cut, marked by dots at E. First put the knife in slanting at F, inserting the point at that part of the dotted line, and driving it in to the *centre* under the eye; then wheel the hand round, keeping the circle of the dotted line with the blade of the knife, the point still in the centre. The eye will come out entire, cone-shaped at the under part, when the circle is completed by the knife. There are some gelatinous pieces round the eye, which are generally considered very desirable. The lower jaw must next be removed by cutting through at the dotted line from G to H, to do which successfully the dish must be turned. Many persons consider the palate a dainty, and it should always be offered at table to the guests or members of the family. It is found under the head, of course, lining that part which forms the roof of the mouth. Calf's head is somewhat difficult to carve at first, although the difficulty quickly disappears. A little careful consideration given to the position of the bones will soon direct you how to proceed.

SHOULDER OF MUTTON, although costing less per pound, is not reckoned by some managers to be so economical a joint as a leg. Still there are many persons who hold a contrary opinion, and a shoulder of mutton is a very frequent joint on a family dinner-table. The palatableness of the meat served from a shoulder depends much more than does that from a leg on the skill of the carver, and it is also a joint which may be made to go much further by skilful cutting. Commence by thrusting in the fork at G in Fig. 12, firmly. Raise and half turn the shoulder over and upwards, holding it in this

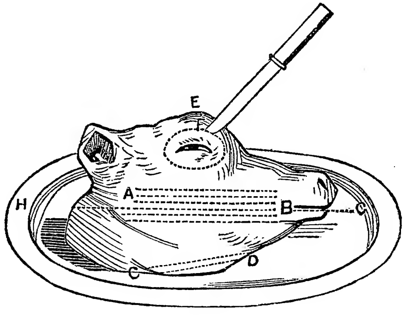

Fig. 11.

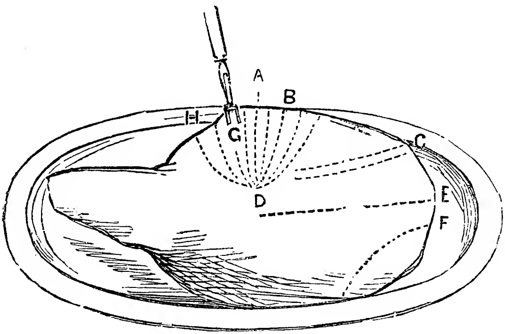

Fig. 12.

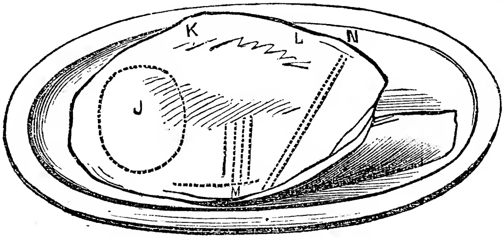

Fig. 13.

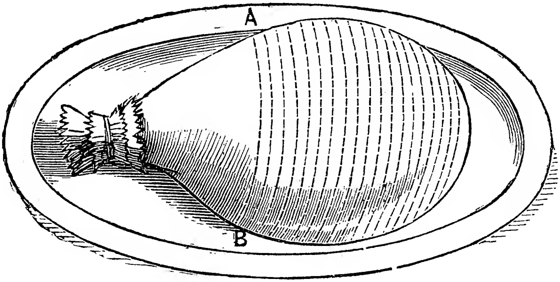

Fig. 14.

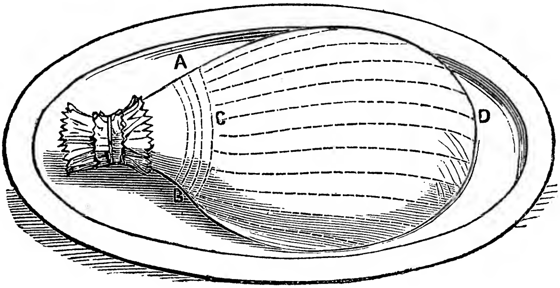

Fig. 15.

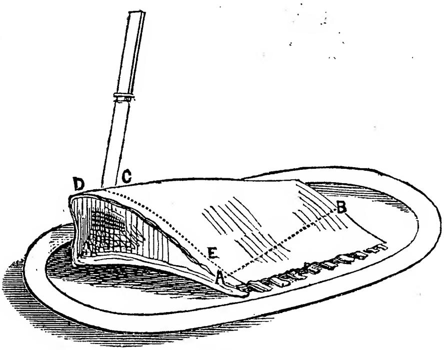

Fig. 16.

position by means of the fork; slash lightly in with the knife at A, but do not cut quite down to the bone; the meat now flies open, leaving a gap, as if a thick slice had been removed. Cut a few slices thickly at the lines marked B, and then at the knuckle side at those marked H, making both slope so as to meet at D. Persons to be helped should always be asked whether they prefer the knuckle end or the thick end. The cut on the blade-bone, marked C, is usually reserved till the joint is cold, and so is that at E. The circular cut F removes the fat, a slice of which should be proffered with each piece of lean. Very many people think the most delicate cuts are to be found underneath the joint, which parts are represented in Fig. 13. The cut at J is a thin slice of brown meat, followed by other slices cut in succession. From K to L, long slices can be removed, by cutting through to the bone. The long lines at N, and the short ones at M, indicate the situation of similar cuts. Taste varies so much in regard to which are the nicest cuts on a shoulder of mutton, that individuals should always be consulted before helping. Every part of a shoulder of mutton should be carved in thin slices except the first cuts, and even those are not made so thick as they are in a leg. The blade-bone is, in our opinion, the choicest cut of all (that marked C in Fig. 12), and may be eaten hot, if the remainder of the shoulder is hashed instead of bringing it to table cold; it is the better way to hash it, for the meat is insipid cold. A shoulder of lamb is treated similarly; so is a shoulder of veal, which is sent to table with the under part turned to the carver, who commences by serving the knuckle, and then cuts as the under part of a shoulder of mutton is cut, afterwards turning the joint and carving the upper part, according to Fig. 12.

HAM.—A ham is one of those dishes which one is constantly requested to dispense, even when not occupying the important post of carver. It is usual to commence cutting beyond the knuckle, but not quite in the centre, just where the ham begins to grow thicker, and to cut it across, leaning downwards, so as gradually to encroach upon the fat, till the slice slopes very much from the fat to the bone. Slice after slice is cut off in this way till the ham is finished. The thinner the meat can be cut, the better it is considered. It may be remarked that the ham is brought to table with that part uppermost which in a leg of mutton is called the back. A trimming is always to be put on round the knuckle. In the diagram, Fig. 14, the first cut of the ham is shown from A to B. It is to be observed that the slices are not cut through to the bone, but rather shaved off the ham, always bearing towards the fat. There is another method of serving this joint, which some people who like the hock prefer. This is managed by taking off several thin slices at A to B, in Fig. 15, and carving the rest of the ham lengthwise from D to C, also thin.

NECK OF MUTTON.—First divide the short bones from the long, by cutting quite through them, across the joint, at the dotted line A to B, Fig. 16. Then insert the knife at C, plunge it down, feel the joint, press it in, turn it over, as you do the leg of a fowl, to snap it, and then cut the chop off. Cut one of the small bones and serve with each chop. It is usual to cut two chops and add two small bones to each helping, not previously severing them, but removing them from the joint together. If loin and neck of mutton are not very well jointed before they are cooked, they can never be properly carved at table, and there is a great deal of waste in consequence. Butchers must be instructed to separate the bones well. The cook also should further divide them, before dressing.

LOIN OF MUTTON is generally cut through between every two chops, which are served together.

NECK OF VEAL.—A neck of veal cannot be treated like a neck of mutton, for the chops it yields are far too large to serve entire. Therefore, first divide the small bones by cutting through (Fig. 17, from A to B), as with the neck of mutton; and then take off slanting slices from D to C, from the bones, cutting down to them.

LOIN OF VEAL.—With a loin of veal a slice of toast is sent to table, on a small dish. Turn over the loin, and cut out the kidney, with the surrounding fat, and place it upon the toast on the dish. Then turn back the veal to its former position, and cut off slices from D to C, Fig. 17.

PHEASANT.—A pheasant and a partridge are birds not rare on any country table, and partridges especially are plentiful enough in London to be easily obtained by all classes during the season. The skewers must first be taken from the pheasant. The legs are to be then removed in the same way as those of a fowl. The wings are next to be taken off, also as in carving a fowl, observing only that very little of the breast is served with them. The breast affords several delicate slices, which are considered the best part. The wings are preferred next, and then the merrythought; game-eaters like the legs. The rest of the bird is carved like a fowl. A pheasant always comes to table with the head on one side, and a large bunch of the liver on the other (Fig. 18). It is usual to leave the tail on when plucking it, or to tie it up and skewer it on afterwards, and send it to table with the bird.

PARTRIDGES.—Cut off the leg and wing together, after removing the skewers, as shown from A to B in Fig. 18. Treat the other side the same. The piece consisting of a leg and wing thus cut off is to be served whole, and not divided. Separate the breast from the back, as in carving a fowl, by cutting through the small side-bones. The breast makes one plate, and the back is given with either of the other three, but cannot be served alone. Another way of serving partridge is to split the bird in two through the breast and back, Fig. 19, and place the halves on separate plates. Although the methods of carving a partridge are two, as we have already described, it must be observed that special circumstances must decide in which way a particular bird shall be divided and allotted. There are differences in the size and condition of birds brought at one and the same time to table. There are differences also in the proportion of the rations, which a judicious carver will know under all circumstances how to arrange for. But there is one rule which may be laid down with tolerable propriety, and it is to help a gentleman to half a bird. When gentlemen only are at table, the second method of carving partridges is always followed.

GOOSE.—A goose (Fig. 20) is a very awkward bird to carve, because the joints are difficult to separate. The carving of an old goose is certainly a tough job enough, and is very apt, unless carefully managed, to endanger the cleanliness of the table linen. However, if the bird be young there is no very great difficulty likely to occur, and to attain the art of carving a goose nicely is very desirable, for it is a bird that literally goes twice as far when ably cut up as when awkwardly served. To commence, insert the fork a little on one side of the breast, and cut off thin slices from end to end of the bird at the dotted lines marked from A to B, treating both sides alike. It is usual to stuff geese with sage and onions, but as many people object to the flavour of these, each person should be asked whether or no he desires "seasoning"—which is preferable to the term stuffing—and the carver should help a little, along with the meat, to those who like it. The seasoning, or stuffing, is found by cutting open what is called the "apron," at C, from C to E, at the dotted line. Next take off the wings and legs, as in a fowl, inserting the knife at F for the wing, feeling the joint, pressing it down very firmly, and when the knife is felt in the centre of the joint, turning it over outwards with some strength. As soon as it snaps apart, cut forward with one

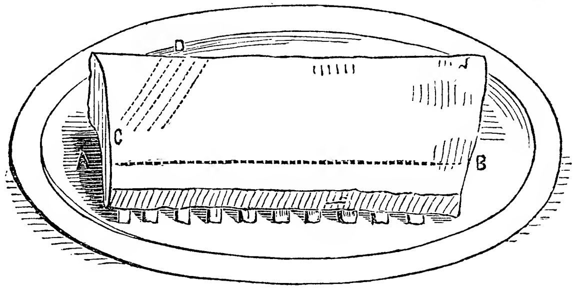

Fig. 17.

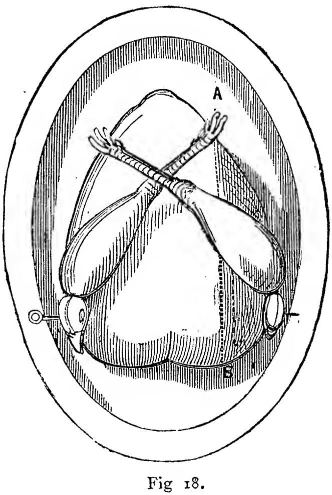

Fig 18.

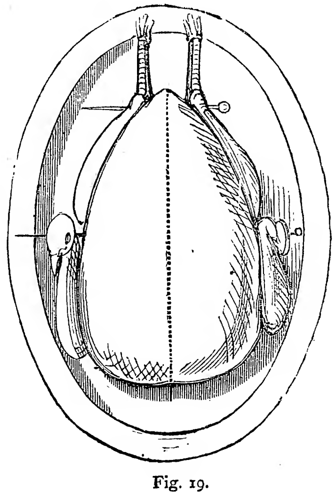

Fig. 19.

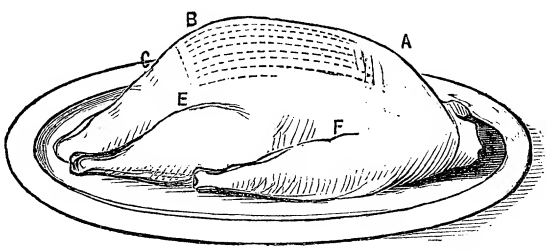

Fig. 20.

slice, and take the wing completely off. The knife is inserted at F for removing the leg. Cut the leg in half again, and serve the pieces separately, perhaps with a slice or two of the breast, according to the size of the bird and the consequent sufficiency or otherwise of the portion tendered. The breast and back are then cut in half through the side bones, as in a fowl, the breast-bone removed, and the back served whole. It is seldom necessary to cut up a goose entirely the first day. In that case the carving can be finished in the kitchen, previous to making a hash of the bird. Many people who are not particular about the look of the bird always make a practice of having it cut up before coming to table.

SUCKING PIG.—A sucking-pig is a very common dish in the country. Unless the family is very small, it is usual to serve two, which are placed on one dish, the heads previously cut off and laid at the ends, as is shown in Fig. 23. Turn the pig upright with the fork, and hold it so. To take off the leg, set the knife in upright at A, Fig. 22, and divide the joint, and then cut it off. Make a slanting slice under the shoulder, as shown at B, and cut boldly through the joint when you meet it. Cut right through the back and ribs in slanting strokes at C C C. The ear and the jaw are considered delicacies. The ears are sent to table already cut off, and will be observed garnishing the dish in Fig. 23.

A SADDLE OF MUTTON.—A saddle of mutton is a dish not unfrequently set on table where there is a large family, or on festive occasions, for it is a particularly handsome joint. It is simply two entire loins undivided, and is considered by many people to be the choicest part of the meat. A saddle of mutton is sent to table in two different ways—either with the tail dressed whole, or with it split in half, each half curled diverse ways over one of the kidneys, and fastened in that position by means of a very small skewer. This fashion our illustration, Fig. 21, represents. Carve thin slices from end to end of the centre of the saddle, beginning a little distance from the tail, as shown in the dotted lines from A to B. Cut quite down to the bone. Make three or four slices, each with a single movement of the hand, drawing the knife quietly along the joint, feeling the bone with the point. In making the last slice, slope the knife slightly to the right side, and cut right through all the previous slices, completely detaching them. The slanting slices from C to D, and the cross ones from E to F, may then be taken, and furnish a palatable mixture of fat and lean. Each guest should be consulted as to whether he or she desires the kidney, and when the answer is obtained in the affirmative, a slice of the kidney is to be served with the meat. Saddle of mutton is not cut so thin as beef, but moderately thick.

FORE QUARTER OF LAMB.—This joint is open to much the same remarks as a saddle of mutton, being esteemed fit for a guest dish, and also suitable for a numerous party. But it requires quite different carving. It is simply a breast and shoulder in one. When placed on table the carver's first duty is to remove the shoulder, which is not at all difficult. The fork is inserted at A, Fig. 24; the dish is so placed that F is next you, I points directly to the other side of the table, J is on your right hand, and K on your left. Then, with your fork at A, take the knife, hold it at B, and boldly slice away right round to C, raising the shoulder, as you cut it from the breast, and as it severs in the process, with the fork. Go on cutting from C to D, and D to E. You keep your knife with the point as far down as shown in the illustration, and take a circular cut, as shown by the dotted line, and by this means the shoulder will be quite cut off when you have completed the circle, or at best a slight cut will quite sever it. The moment this is done take a lemon or Seville orange, cut in half and sprinkled with salt and pepper, and placed in a plate ready, and squeeze it under the shoulder, which you support still by the

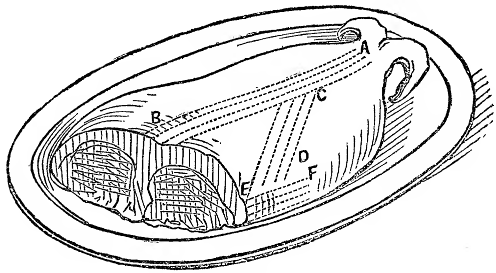

Fig. 21.

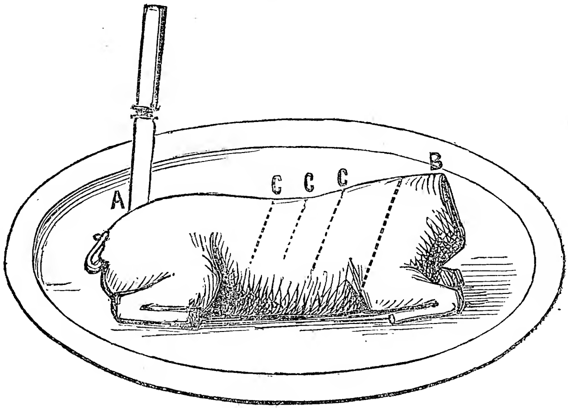

Fig. 22

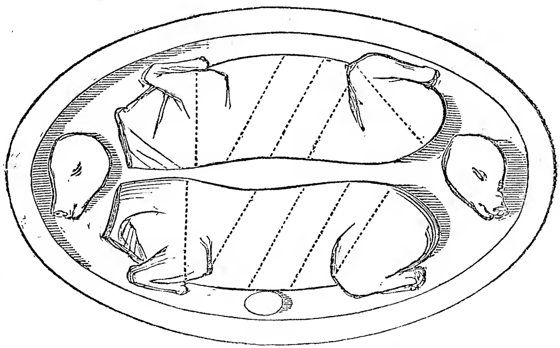
Fig. 23.

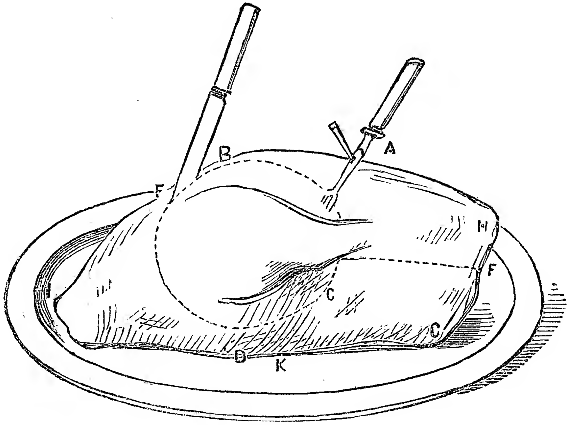

Fig. 24

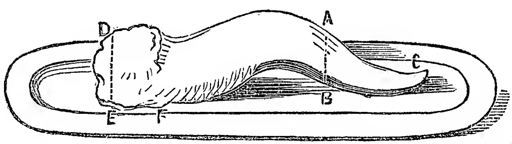

Fig. 25.

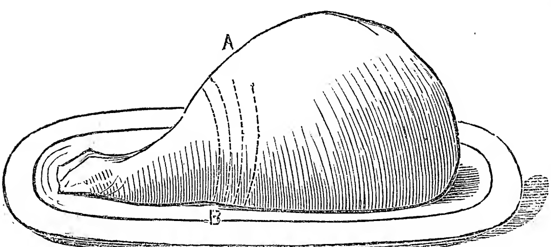

Fig. 26.

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fork, an inch or so above the breast, sloping and touching it on the lower side; put in a slice of butter, and let the shoulder rest on the breast, removing the fork. Allow a couple of minutes to melt the butter. Meanwhile a fresh hot dish is brought. Transfer the shoulder to this, and send it to the other end of the table, or to some other person to be served as a separate joint. The breast is now carved as a breast, and the shoulder as a shoulder, in the ordinary way.

A LEG OF PORK.—Pork is a favourite dish with very many, and a leg of pork frequently appears on the family board, though it is not generally esteemed a dish for a formal occasion. It must be placed on the table with the back upwards, and the crackling taken off in a large coat before any attempt is made to cut the meat. Unless the joint is sufficiently cooked, it will not be easy to displace the hard and savoury skin. Cut the joint in rather thick slices across the back at the dotted lines marked A to B in Fig. 26. Slices of the crackling —which, if properly scored before cooking, are easily made by placing the point of the knife in the cuts, and snapping it asunder—should be tendered with each serving of meat, if desired.

TONGUE.—Tongue should be helped in very thin, even slices. It is first cut through downwards, a little way from the tip, where a good thicknsss is attained, at the line marked from A to B, Fig. 25. With each serving cut a slice from the root, D to E, and a little of the fat and kernels which will be found underneath, between E and F. The tip, C, is by many considered a delicacy.

BACON, when it is a large piece, is generally cut the narrow way, very thin indeed, straight down from the top to the dish, like the cut in the tongue, but beginning from the very end of the bacon, not serving the first slice, but laying that aside on the dish. Small pieces of bacon are usually cut lengthways.

WHITING.—Whiting are correctly brought to table fried in egg and breadcrumbs, with the tail in the mouth, secured by means of a tiny wooden skewer. These are served whole, one to each guest, who must be careful at once to remove the wooden skewer.

PIKE.—Pike are split open if baked, and as few bones as possible served with each piece.

COD.—Cod deserves a place of honour next to turbot, if we observe precedence amongst the dishes. A cod's head and shoulders is a noble dish, and a very wholesome one, Fig. 29. First sever the slices that are already partly cut, and marked by five A's to the five corresponding B's. At least cut as many of them as you have friends to supply. Then sever them completely by a transverse stroke of the fish-knife from D to C. A little of the light gelatinous substance, called sounds, should be served to each person. This will be found at E, just inside the fish under the backbone. Care must be observed not tc break the flakes in serving the fish.

FLAT FISH.—A turbot, a large plaice, a brill, and a John-dory, are in all cases carved in the same manner. The use of the fish-slice will now be needed. First of all long cuts are made from end to end of the fish, as marked in Fig. 28, A to B. Cut the fish quite down to the bone. Then make a number of slices from C to D, shown by dotted lines. A steel knife must next be used, and sever completely through the bones at every cut made when it is necessary. Resign it again, and, resuming the fish-slice, cut quite through the other side down to the napkin on which the fish is laid, and serve the pieces, bones and all. A little of the parsley, which will be observed lying on the fish and round the dish, must be laid on each plate. The bones are regarded as dainties. When flat fish are too small to serve in this way they are cut in three across the short way, shown at the dotted lines C to D, in Fig. 28, which represents a sole. The centre-piece is considered the best. Smaller soles are cut only in half, and very small ones, and flounders, served whole.

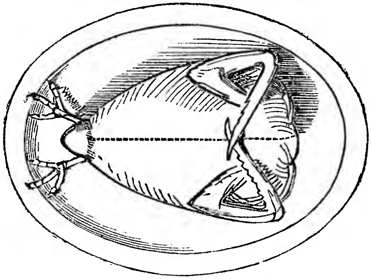


Fig 27.

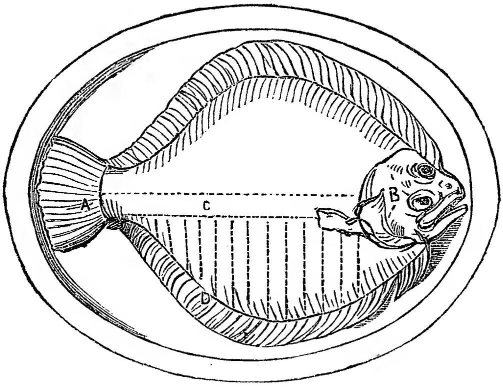


Fig. 28.

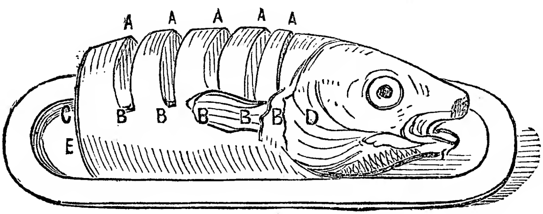


Fig 29.

PIGEONS, &c. — Pigeons, when roasted, afford a delicious and savoury though but a slight dish. Cut each pigeon in half exactly through the middle, as shown by the line from A to B, in Fig. 27. It is easier to cut a pigeon in half when laid flat on its back upon the dish, going boldly quite through the breast with sufficient weight of hand to divide the bones at once. Other birds, when about the size of the pigeon, may be carved in a similar way, by simple division. Small birds, such as snipes, landrails, wheat-ears, and larks, are served whole. A great deal, however, depends on the size of the birds.

MACKEREL. — To carve mackerel, divide them down the bone from head to tail, taking the slice of meat entirely off the upper side of the bone. Cut this slice in half before removing it, and serve the pieces separately, the upper being esteemed preferable to the tail end. Then put the bone aside, and cut the other portion in half also. The fish-slice, or a silver knife, must be used.

PILCHARDS, HERRINGS, SMELTS, WHITEBAIT, SPRATS.—All such small fish as these are served whole; the very small ones several at a time. Eels and conger-eels are divided before they are cooked. If stewed, they are served with a spoon; and when fried, with a slice.

LOIN OF PORK is served by simply cutting off the chops as a loin of mutton is cut, only there is no top part to remove. If the pork is not well scored before dressing, it can never be properly managed at table.

AITCH-BONE OF BEEF is the only joint which now remains to be mentioned: this is simply cut from end to end of the joint in thin slices, serving fat with the lean. A single, though rather thick, slice is cut off first from the centre of the top of the joint, and laid aside in the dish till it becomes cold. The gravy will be found in the succeeding slices.

ROUND OF BEEF, which is generally salted, is cut in thin slices the entire size of the meat; a little of the fat cut thicker, and a trifle on the slant, is placed on each slice of the lean. Carrots are usually ranged round the dish cut in short pieces. One or two of these are also placed on every plate.

RIBS OF BEEF ROLLED are carved in the same way as the round of beef, with this exception, that there is no fat to cut separately; the fat is streaked with the lean. Neither are carrots served up, as ribs of beef is a roast joint. There is gravy in the dish, which should be served over each slice of meat, and if there is any garnishing of horse-radish, a little may be gathered up between the carving-knife and fork, and, if desired, furnished to the guests.

Caseine.—(See *Food* and *Blood.*)

Caseous Food.—(See *Diet.*)—By this term is understood milk and various kinds of cheese.

Casserole.—A rice crust formed like a pie, and when baked filled with a mince or *purée* of game, or with a *blanquette* of white meat.

Catalepsy.—A curious disease, which appears in a sudden deprivation of consciousness and muscular power, which usually gives no warning of its approach, and lasts from a few minutes to hours, and even days. It is seldom succeeded by any derangement of the system. While the fit lasts the patient's countenance is florid, the eyelids remain open, and the eyes are fixed on some object. Although there is no sensation the patient will swallow with avidity, and the limbs can be readily moved by others, although the patient has no power over them. There is sometimes a grinding of the teeth, usually indicating the presence of worms, to which this disease has been traced, and a flow of tears. The fit terminates suddenly by sighing. This disease is of rare occurrence, and so little understood that its actual existence has been denied; but it is, doubtless, a real disease, and is probably due to some impediment in the functions of the nerves subservient to voluntary motion.

It is usually attributed to intense fear or anxiety of mind, a terrible outburst of anger, severe mental labour, or causes of a similar kind. During the attack the body should be kept warm, and the circulation stimulated by gentle friction. Mustard poultices should be applied to the soles of the feet and the palms of the hands, and strong ammonia frequently applied to the nostrils. Slight electric shocks are sometimes applied.

Cataract.—This disease consists in an opacity of the crystalline humour of the eye, by which light being excluded blindness is the result.

Catchup, Mushroom. — September is the best month for making this, as mushrooms are more abundant then. The blackest and largest should be chosen for the purpose. Break them in pieces, lay them in a deep dish or earthen pan, and sprinkle with salt. Cover this with a cloth, and let it stand twenty-four hours by the side of a fire, or near a warm stove. Then strain off the liquor into a saucepan, and to every quart put one ounce of spice, containing two or three cloves, allspice, sliced ginger, and black pepper. Boil the liquor for half an hour, put in the spice and boil, and then add the spice. If the liquor is boiled till it is reduced to one-half, it will keep longer. Take it off the fire, let it stand and settle, then bottle off and cork it lightly. The sediment may be bottled and mixed with anchovies, when it will make a good fish sauce.

Caterpillars. — To prevent their destroying Vegetation.— Sow with hemp all borders wherein cabbages and vegetables are planted, and the enclosed part will be found quite free from them, although other parts of the garden may be infested with them. An infusion of the leaves of the elder-tree poured over plants will preserve them from caterpillars. Soapy water applied well to the roots in mild weather will preserve trees and bushes by killing the larvæ.

Cauliflower Fritters.—Boil the cauliflowers. When done enough drain them, then put them into an earthen vessel with a dash of vinegar, salt, and whole pepper. Let them remain for half an hour, then drain them again; form the fritters, dip them in butter, fry them a good colour, and serve up; or boil and drain as before; then cut into pieces an inch and a half long; fry in butter, and serve with grated Parmesan cheese over them.

Cauliflowers. — To Pickle them. — Gather the whitest, firmest. Cut the flower into small pieces, and lay them in strong salt and water for ten days. Take them from the brine and lay them into a saucepan of water, allow them to boil for a quarter of an hour, or until they feel tender, but not too soft, or they will not be crisp. Spread them on a coarse cloth, or drain them from the water, and evaporate the moisture by putting them in the sun; then place them in a jar, warm some white wine or distilled vinegar, put into this mace, whole pepper, allspice, and set the pan by the fire to extract the spice, but do not let it boil. When cold, pour over the cauliflower, adding fresh vinegar, as the flower will absorb it from time to time.

Cayenne Pepper is the ground dried fruit of the *Capsicum baccatum*, or bord pepper, a native of both Indies. The fruit is a small fleshy capsule, of a scarlet colour, and of intense pungency. There is a kind producing a very small species known as chilies, which form an important ingredient in West Indian pickle. Though it is the fruit which is used for making Cayenne pepper, yet the seeds are equally, if not more pungent. The plant is common in our green and hot-houses, and even in this climate the fruit attains a perfection little inferior to that which is imported. Cayenne pepper is a powerful stimulant, which is sometimes used to give a pungent taste to poor beer and strengthen weak spirits.

Celery.—In its raw state celery is rather difficult of digestion. When boiled in water or soaked for a short time in vinegar it becomes more digestible, and in the latter case forms a very cooling wholesome dish. The Germans prepare an artificial coffee from celery root by cutting it into square pieces, which they dry and roast.

Celery, Essence of.—Soak for twelve or thirteen days half an ounce of celery seeds in a quarter of a pint of brandy. A few drops will flavour a pint of soup equal to a head of celery.

Celery Seed.—A teaspoonful of celery seed added to soups, &c., has the same effect that would be produced by a root of celery.

Celery Soup. — Take a large turnip, two ounces of onion, four ounces of bread-crumbs, and six roots of celery, of which only the white part must be used. Cut nearly all the celery into shreds, slice the onion and turnip, and put them with the celery into a pan, adding two quarts of water, the bread-crumbs, and a dessert-spoonful of salt. Boil until the vegetables are perfectly soft, remove and rub them through a sieve, and then return them to the pan. The celery having been previously boiled until quite soft, is next added, with butter and flour well mixed. Stir well, boil for ten minutes, and add a tablespoonful of vinegar.

Celery, to Preserve through the Winter.—Get up the celery on a fine dry day before it is injured by frost, cut off the leaves and roots, and lay it in a dry, airy place for a few days; then remove it to a cool cellar, where it will be quite secure from frost, and pack it up with sand, putting layers of celery and of sand alternately.

Cement Cakes. — Take four ounces of the best glue and two ounces of isinglass. Put them into a common glue kettle with as much mild ale as will cover them. Dissolve them over a slow fire to the consistence of strong glue; then add gradually an ounce and a half of well-boiled linseed oil, stirring the whole very hard. Spread it out to cool, and then cut it into cakes. In consistence it will resemble India-rubber. When wanted for use, boil a a piece of it in a proportionate quantity of ale till quite dissolved, and apply it hot; then let the article rest till next day. It will join wood, earthenware, china, &c. By adding a little tow to the solution, it will afford an excellent cement for casks, &c.

Centigrade—having a hundred degrees. The term *centigrade scale* is usually applied to the Continental methods of graduating thermometers, in which the number of degrees between the freezing and boiling points of water is divided into 100 —the boiling point being 100°, and the freezing point 0°. The centigrade scale is generally used in France, and very frequently in England, especially in scientific researches.

Chair Screens.—To make a very good chair screen, get a large sheet of stiff, thick pasteboard used by bookbinders and trunk makers (of whom it can be obtained), and with a knife pare off the edges and trim it to the required size. It should ascend sufficiently above the back of the chair to screen the neck and shoulders of the sitter. Make a double case, like a pillow-case, of dark chintz or moreen, open at one end, to slip over the pasteboard. At each end of the lower corners sew a strong string of black ribbon or worsted braid, and place two other strings about half a yard farther up on the side edges or seams of the cover. When the cover is finished slip it over the pasteboard, and sew it along the bottom edge to keep the board from falling out. When ready for use, tie it by the strings to the outside of the chair. Three or four of these screens will be found very serviceable in dining-rooms to screen from the heat the backs of those persons who sit on the side of the table next the fire. Also they will save the chairs from being scorched and blistered.

Chalk.—A medicine of the absorbent kind, which causes constipation, and is therefore used to check diarrhœa. Its action on the free acids of the stomach render its frequent use injurious. After it has been taken for some time care should be given to its removal from the intestines, where it might otherwise accumulate, and have a mischievous tendency.

Chalk in Water, how to Remove it.—In water, chalk is almost or altogether insoluble; but it may be rendered soluble by either of two processes of a very opposite kind. When burned, as in a kiln, chalk loses weight. If dry and pure, only nine ounces will remain out of a pound of sixteen ounces. These nine ounces will be soluble in water, but they will require not less than forty gallons of water for entire solution. Burnt chalk is called caustic lime, and water holding caustic lime in solution is called lime water. The solution thus named is perfectly clear and colourless. The seven ounces lost by a pound of chalk on being burned consist of carbonic acid gas—that gas which, being dissolved under compression by water, forms what is called soda-water. The other mode of rendering chalk soluble in water is nearly the reverse. In the former mode, a pound of pure chalk becomes dissolved in water in consequence of losing seven ounces of carbonic acid. To dissolve in the second mode, not only must the pound of chalk not lose the seven ounces of carbonic acid that it contains, but it must combine with seven additional ounces of that acid. In such a state of combination chalk exists in the waters of London—dissolved, invisible, and colourless, like salt in water. A pound of chalk, dissolved in 500 gallons of water by seven ounces of carbonic acid, would form a solution not sensibly different in ordinary use, from the filtered water of the Thames in the average state of that river. Chalk, which chemists call carbonate of lime, becomes what they call bicarbonate of lime when it is dissolved in water by carbonic acid. Any lime-water may be mixed with another, and any solution of bicarbonate of lime with another, without any change being produced: the clearness of the mixed solutions would be undisturbed. Not so, however, if lime-water be mixed with a solution of bicarbonate of lime: very soon a haziness appears; this deepens into a whiteness, and the mixture soon acquires the appearance of a well-mixed whitewash. When the white matter ceases to be produced it subsides, and in process of time leaves the water above perfectly clear. The subsided matter is nothing but chalk. What occurs in this operation will be understood, if we suppose that one pound of chalk, after being burned to nine ounces of caustic lime, is dissolved, so as to form forty gallons of lime-water; that another pound is dissolved by seven extra ounces of carbonic acid, so as to form 500 gallons of a solution of bicarbonate of lime; and that the two solutions are mixed, making up together 540 gallons. The nine ounces of caustic lime from the one pound of chalk unites with the seven extra ounces of carbonic acid that hold the other pound of chalk in solution. These nine ounces of caustic lime and seven ounces of carbonic acid form sixteen ounces, that is, one pound of chalk, which, being insoluble in water, becomes visible at the same time that the other pound of chalk, being deprived of the extra seven ounces of carbonic acid that kept it in solution, reappears. Both pounds of chalk will be found at the bottom after subsidence. The 540 gallons of water will remain above, clear and colourless, without holding in solution any sensible quantity either of caustic lime or of bicarbonate of lime.

Chalk or Limestone.—Carbonic acid combines with earths and alkalies, forming neutral salts. When united to lime, it forms chalk, or limestone, or marble; and these substances, when again deprived of the carbonic acid, are reduced to lime. For the purpose of making mortar, limestone is deprived of its carbonic acid by heat, the stone and some kind of fuel being burnt together in a kiln. The carbonic acid gas, being thus driven off by heat, leaves the stone in a state of quicklime, which is a caustic, corrosive substance. When exposed to the air it gradually attracts the carbonic acid gas, which is always present in a small proportion, and is thus reconverted into chalk or limestone. It is now mild and inert, instead of being caustic, and is no longer fit for making mortar. The extrication of carbonic acid gas when lime is burnt makes it a very unhealthy employment to be engaged constantly in lime-kilns, and many accidents have happened from persons sleeping too near the burning lime. It is the great disposition that lime has to unite with this gas that causes the turbid appearance in lime-water. When exposed to the gas lime by itself is soluble in water, but chalk is not. When, therefore, the lime in the lime-water has attracted the carbonic acid gas and thus becomes chalk, it is deposited, and causes the turbid appearance. As the lime will gradually attract the gas from the air, lime-water should always be kept in bottles well corked, otherwise the lime is separated, as appears by the pellicle on its surface, and the lime-water becomes only common water.

Champagne.—This pleasant beverage ought to be indulged in with caution. It is a powerful stimulant, and its flavour and sparkling brilliancy is due to the presence of carbonic acid gas, which sometimes produces injurious effects. It is apt to cause indigestion and headache, and has been known to dispose to apoplexy, cramp in the stomach, concretions in the gall, bladder, &c. Scudamore, in his well-known work on gout, says, "The heating, exciting, and certainly injurious qualities of champagne, with regard to gout, are much more remarkable than are found to be in any other liquor."

Champignon.—This is a small species of mushroom found on pastures and hills in the morning, especially in autumn. Large quantities are raised artificially in frames on old dung or tan in which pieces of mushroom spawn have been mixed. Mushroom spawn is merely the stuff brought from a bed similarly prepared in which the growth of these plants has been prolific. Wild mushrooms from old pastures, where in the autumn they abound, are considered to have a more delicate flavour and greater tenderness than those which are raised in beds. For cooking, mushrooms cannot be too fresh. A well-known botanist, Dr. Lindley, speaking of gathering mushrooms for food, says, "The greatest caution and knowledge will not always avail; for certain species, which are in general perfectly wholesome, sometimes produce very disastrous consequences. A family at Cambridge some years since suffered from eating mushrooms—a part of what were gathered proved to be a species sold sometimes in the London markets, and these being tested, were ascertained to be most excellent. Where you have reason to suspect the poisonous nature of any mushrooms you may be about to use, put a little salt over the gills. If they are thereby blackened, the mushrooms are genuine; if the salt has no such effect, they are poisonous. Poisonous mushrooms cause sickness and giddiness, with intense thirst and fever, the stomach swells, the skin becomes red, palpitation of the heart follow, and colic symptoms ensue. In a case of this kind an emetic should be at once taken, and the stomach-pump sent for without delay. John Timbs, in his "Domestic Hints," recommends a table-spoonful of vinegar in a glass of water to be taken at frequent intervals. This is a serious mistake. Vinegar will take up the poison, it is true, but in so doing it becomes poisonous itself. The same remark applies to the use of strong salt and water. Ammonia and hartshorn are sometimes recommended, but both are injurious. (See *Vegetable Poisons.*)

Changeable Rose.—Take a common full-blown red rose, and having thrown a little sulphur finely pounded into a chaffing-dish with coals expose the rose to the vapour. By this process the rose will become whitish; but if it be afterwards immersed some time in water it will resume its former colour.

This is a very amusing and interesting experiment.

Chapped Hands and Cracked Lips, arising from exposure to sudden changes of temperature, are usually treated with cold cream, lard, camphor ointment, and spermaceti ointment. Glycerine is frequently used as a preventive. Those whose circulation is feeble are most liable to chaps. (See page 126.)

Characters by which Organic and Living, are Distinguished from Inorganic or Dead Bodies.—A plant is one of the lowest forms of organic existence, and it is distinguished from a stone, an inorganic body, by the following characteristics:—The plant absorbs food, converts it into its own proper substance in the various forms of bark, wood, sap vessels, leaves, &c. Nothing of this kind is done by the stone. Moreover, the plant grows to a maturity, generates heat, procreates and decays by means of processes called vital. Animals are chiefly distinguished from plants by the possession of sensation and the power of moving from place to place, but they retain all the properties by which the plant has its being, namely, the processes of nutrition, respiration, circulation, secretion, excretion, and reproduction. (HINTS and FACTS connected with all these subjects will be found in different sections of this little volume.) The being of the plant is organic, that of the animal is living. Both organic and living beings are supported by the action or function of a set of organs of which the living body consists. The constituent matter of these organs is partly solid and partly fluid. There is no solid which is not the product of a fluid, no solid some part of which is not in a state of fluidity, and alive. The brain is alive, so is the blood, and so is every other distinct organ. In short, in the living body, with some trifling exception, every part is vital. And yet to create this life we have only death. The living and the organic owe their existence to the inorganic. The plant exists by using oxygen, hydrogen, and carbon, the two first aëriform, the last solid; and of carbon, hydrogen, and oxygen is the plant composed. Just so the animal *lives* by virtue of using the very elements of which it is formed. Plants perform one set of functions, which we term organic; animals perform the same functions with greater energy, and functions of a higher order, which are more complex and have a more extensive range, all of which bear a certain harmonious relation to each other and are called the animal functions. One set of organs are required for the plant, two for the animal; the apparatus of organic existence is inside, that of the animal life is outside. The organic organs being those by which life is maintained, are inside, carefully enveloped in protecting muscles and bones. But organs which are animal, and by which a relation between the animal and external objects are established, are outside, and consequently are not those on which life depends. The groundwork of the animal life is the bulwark of the organic existence.

Charcoal, as a means of preserving meat, see page 204.

Charcoal, as met with in commerce, is obtained from the partial combustion of wood. Billets of any kind of wood are heaped up into piles, usually in the form of pyramids. The whole is then covered with earth, leaving an aperture at top and bottom for a current of air. The pile is now set fire to, and when completely ignited throughout the apertures are closed, and the fire consequently smothered. In this process all the juices of the vegetable, its oil, &c., are dissipated, leaving little more than its woody fibre. It loses about three-fourths of its weight, and what remains is called charcoal. This charcoal contains besides carbon small quantities of different kinds of earth, and it is now supposed by some a proportion of oxygen. When charcoal is burnt its carbon unites with the oxygen of the air and so much heat as to give it the gaseous form, and constitutes carbonic acid gas, or fixed air. The same gas may be obtained by the combustion of the diamond, proving that this precious and costly article is carbon or charcoal in a very indurated state, and assuming a determinate form. It is not long since the diamond was first proved to be combustible; but by means of the blow-pipe and a stream of oxygen gas it may be, to speak in common language, wholly consumed. The air that is extricated during combustion is carbonic acid gas, proving the diamond to have been chiefly, if not wholly, composed of carbon.

Charcoal Fires.—Charcoal being nearly pure carbon makes a fire much hotter than wood will make, because wood contains other less combustible elements. The purer the carbon the more intense is the glowing heat it produces.

Charcoal Poultice.—Take equal quantities of linseed and oatmeal, and smear it over with olive oil; add to half a pound of the above two ounces of finely powdered charcoal. Used to foul, unhealthy ulcers, or sores of a fetid smell, &c.

Charcoal, Prepared.—Well calcined charcoal reduced to a fine powder is no doubt a very innocent and excellent tooth-powder. It gives the enamel a fine, healthy, white appearance, destroys the offensive effluvia rising from carious teeth, and will not only prevent caries of the enamel, but even arrest its progress after it has taken place; and it is worthy of remark, that people who have been great sufferers by toothache have not experienced the least relapse after the regular use of this toothpowder. It is likewise very efficacious in destroying unpleasant tastes in the mouth, and for cleaning the tongue in cases of putrid fever, sore throat, and indigestion. The charcoal prepared from the areca nut has been held in high estimation among the Indians. The charcoal from the areca nut (generally termed betel nut in this country) certainly affords a more solid powder than that of wood, and therefore, for the purpose of cleaning the teeth, is more efficacious. It also possesses an alkalescency which renders the matter that adheres to the teeth more readily removed by the brush, a property from which the common charcoal is entirely exempt.

Charlotte, Russe. — Cut into small pieces some French biscuit of different colours. Line or decorate them with a pastry-cook's plain-shaping mould. Make several compartments in the mould, which fill with various preserved fruits, such as marmalade of apricots, apples, peaches, cherries, currants, &c. Then close in your charlotte with biscuit, and bake in hot wood-ashes or in an oven. Dish on a plate just when wanted to serve up.

Charred Bread.—Burnt bread is sometimes put into water to render it more fit for drinking by absorbing any impurities the water may contain.

Charring Casks.—This is done to produce charcoal, which, by absorbing animal and vegetable impurities, is supposed to keep its contents sweet.

Cheese.—All cheese is difficult of digestion; and physicians have maintained that as food it is only fit for outdoor labourers, whose organs of digestion are strong. It is composed of the coarsest and most glutinous part of the milk. When new it is apt, if partaken of too freely, to corrupt the fluids. The idea of its assisting digestion when taken in small quantities after dinner is an erroneous one. At best it is not hurtful, and this is when it is in best condition for eating, namely, neither new nor old. Toasting cheese renders it even less digestible. Salt cheese should be avoided, especially if it is old. (See *Ale.*)

Cheesecakes.—Yolks of four and whites of two eggs (the whites must be put in a plate and beaten with a large knife to a froth), rind of one lemon grated and juice of two, quarter pound of pounded loaf-sugar, quarter pound of fresh butter melted. Beat all together, and put it in a jar or large-mouthed bottle; place it in boiling water, stir it till it is very thick, over a clear fire, make a nice flaky or short crust, according to taste; line your patty pans with it, bake the cheesecakes until they are nearly done, when use the whites of the two eggs you have left to make a frost for them, sift grated sugar over and put them back in the oven to brown. This is an old family recipe.

Cheese Cement.—Take some good Cheshire cheese and wash it until the soluble part is carried off by the water; then press it in a cloth or through a sieve to evaporate the water. When quite dry it will crumble. It is then dried upon unsized paper, and will keep a long time.

Cheese-making.—We are indebted for the following particulars to a correspondent of the *English Mechanic*:—"Cream cheese is prepared by mixing an additional quantity of cream with milk previously to coagulating the whole with rennet. Rennet is the membrane of the calf's stomach, prepared in a peculiar manner, which possesses during life the property of coagulating milk, and retains this property to a remarkable extent after death. All the different methods of preparing rennet have the common object in view, to protect it from undergoing putrefaction. This is done either by smoking, salting, or by both at once, or, lastly, one of the three methods combined with the use of spices. When rennet is salted in the dry state it soon produces a salt brine, which also exhibits the power of coagulating milk, and is employed for that purpose. While in many districts it is the practice to remove the milk that has curdled in the stomach, custom has proscribed in others the use of the stomach, together with its contents, as rennet. In the latter case the cheese is less easily preserved, the butter in the coagulated contents of the stomach having a strong tendency to become rancid. It is remarkable how powerful an action is exerted by a very small quantity of rennet. Thus, one square inch of rennet, smoked and salted, is sufficient to coagulate eighty quarts of milk. In Scotland, for instance, where they do not employ the rennet itself, but an infusion of whey or salt and water with rennet, a table-spoonful is enough to coagulate 120 quarts of milk. The infusion employed in the manufacture of the Limburg cheese appears to exert a still more powerful influence. It is obtained by allowing salt and water to trickle through the smoked rennet. According to the statements of the farmers, from four to six drops are sufficient to coagulate twenty-four quarts of milk. Whether the acid property of rennet is the sole cause of this power has not yet been ascertained, at least I have not seen it mentioned; and it is to be remarked that very often acid parts of vegetable (say, for example, lemons or bramble leaves) are used to assist the rennet, and that that substance, according to all experience, becomes more active by keeping. Berzelius found that 1 part of rennet only lost ·06 parts by weight of its substance in coagulating 1,800 quarts of milk. In Cheshire, a portion of this dried stomach is put into half a pint of lukewarm water, with as much salt as will lie upon a shilling; is allowed to stand over night, and in the morning the infusion is poured over the milk. Dr. Holland said that for a cheese of 60lbs. weight a piece about the size of half a crown will often be sufficient, though of some skins as much as 10 square inches is ofter required to produce the same effect. The coagulation of the milk is often assisted by means of large cauldrons built over a fire. The best temperature is about 104° Fahr. Soft or hard cheese, with proper attention to these circumstances, can be prepared at will. Season and locality appear to exert great influence in the amount of cheese yielded by milk; 8lb. to 10lb. of good milk and cream should give 1lb. of cream cheese.

Chemical Affinity, sometimes called chemical attraction, is that mysterious force upon which chemistry rests as a science. Affinity is active between the infinitesimal particles of all kinds of matter, causing them to combine so as to form new bodies endowed with new properties. The closest proximity is the first necessity of its action, the sphere of this affinity being very limited. The most simple instance of the exercise of chemical attraction is afforded by the combination of two substances. Water and sulphuric acid, or water and alcohol, combine readily; while water and ether, or water and oil, show a want of chemical affinity. Sugar displays a greater affinity for water than alcohol, while camphor displays a greater affinity for alcohol. Chemical affinity acts with varying degrees of power, being in some cases feeble, and in others singularly energetic. Elementary bodies of the metallic class possess a greater affinity for those of the non-metallic class than for others. Chemical *combination* is the result of *chemical affinity*. Chemical affinity acts only upon unlike particles. It does not, for example, unite atom to atom of iron, or of sulphur to sulphur, or of oxygen to oxygen, or of hydrogen to hydrogen. But, for example, it unites sulpur to iron, oxygen to hydrogen, &c. You will see then how chemical affinity differs from *cohesion*. The latter expresses the force by which particles of *the same kind* are united, for although cohesion will also unite dissimilar particles, it is by a mechanical process which is distinct from that of chemical affinity.

Chemical Tests.—Tests are substances which detect the presence of other substances in combination with any solvent or known compound body. Their action depends on the affinity existing between the substance added and any component part of the body under trial, whereby a new compound body is formed, differing essentially both from the test and the body acted upon. The following tests may often be found useful by those who care to know the real nature of anything they may have in use for domestic or other purposes. They are very simple, and very readily applied :—

Test for Alkalies.—If a few drops of tincture of turmeric are poured into any alkaline solution (of potass, soda, or ammonia) the beautiful yellow colour of the tincture will be converted to a deep brown. As a more convenient test, a piece of paper, linen, or cotton stained by tincture of turmeric (and kept dry for experiment) may be dipped in a solution of either soda, potass, or ammonia; on withdrawing the test paper the part immersed will be brown instead of yellow.

Litmus Paper, a Test for Acids.—This paper is prepared in the same way as the turmeric paper, only that in this case tincture of litmus is used. It is an excellent test for the presence of all the acids except the prussic. By these, its fine blue colour is invariably converted to deep red.

Test for Carbonic Acid.—Dissolve some carbonate of potass in water, and dip a piece of litmus paper in the solution; it will assume a dark blue colour. If it be now withdrawn and held over the vessel at the same time that sulphuric acid is dropped into it he wetted part of the paper will be converted from *blue* to *red*. This change arises from the disengagement of the carbonic by the sulphuric acid, which, seizing upon the potass, drives the carbonic acid off with effervescence.

Test to Distinguish Iron from Steel.—To distinguish iron from steel by a chemical process, take nitrate acid. Dilute it with so much water that it will act only feebly upon the blade of a common table-knife. If a drop of the acid thus diluted be put upon steel, and allowed to remain on it for a few minutes, and then be washed off with water, it leaves a black spot; but if a drop of the same acid be put upon iron, the spot will not be black, but of a whitish-grey colour.

Test for Iodine. — Dissolve a drachm of starch in half a pint of water; add about five grains of iodine in another half pint. On mixing the solutions a beautiful blue colour will pervade the mixture, and in a short time a precipitate of the same colour will take place, which is iodine of starch. The blue colour is indicative of saturation; but if the starch prevails it will have a violet hue, and if the iodine is in excess the colour will incline to black. If any liquid containing iodine be combined with another substance (besides water) it must be first free by adding to the liquid a few drops of sulphuric acid, or a solution of chlorine gas in water, and then pouring in the solution of starch. In this way a half millionth part of iodine may be discovered in any liquid.

SULPHURIC ACID AND BARYTES, TESTS FOR EACH OTHER.—Make a solution of twenty grains of muriate of barytes in more than half a wineglass of pure water; dip the point of a straw into a phial containing sulphuric acid and immerse it in the wineglass. The whole liquid will become white like milk; this precipitate will soon fall to the bottom, being heavy and very insoluble. Here the sulphuric acid suddenly seizes upon the barytes, forming sulphate of barytes, at the same time driving off the muriatic acid. The vapour of the latter may be identified by holding the nose over the glass at the instant of decomposition. This experiment may be reversed by adding some of the solution of muriate of barytes to a glass of very diluted sulphuric acid.

TESTS FOR LIME.—Into any transparent liquid suspected to contain lime pour a few drops of a solution of fluate of ammonia; a plentiful white precipitate of fluate of lime (Derbyshire Spar) will fall down in the liquid. Pour into a solution of lime in any acid (muriatic, for example) some of the solution of oxalate of ammonia; an immediate precipitation will take place of an insoluble salt, the oxalate of lime; muriate of ammonia will be held in solution. It is more proper and more convenient to use oxalic acid in combination with ammonia, as this alkali serves to saturate the acid which has been just disengaged from the lime; otherwise this acid, if in excess, will redissolve the lime. Oxalate of potass also is an excellent test for lime.

TEST FOR SULPHATE OF LEAD IN SULPHURIC ACID.—As sulphuric acid, in *the large way*, is made by combustion of sulphur with nitrate of potass in leaden chambers, the superficial parts of the lead are often dissolved by it, thus forming sulphate of lead, small portions of which are held in solution by the acid when sold in the shops. To detect this adulteration pour a drachm of the acid into a tumbler of distilled water; if a white precipitate falls down, it is a proof of the presence of lead. The affinity of water for sulphuric acid is the cause of this precipitation.

TEST FOR SULPHATE OF LIME IN WATER.—Although sulphate of lime is so insoluble a salt that an ounce of cold water will hardly dissolve one grain of it, still it is surprising what quantities of it are held in solution in great bodies of water. To discover this salt, add to a tumbler of Thames or New River water, a drachm of the solution of carbonate of potass. An abundant precipitate of carbonate of lime will instantly take place. Here there is an instance of double decomposition, the carbonic acid combining with the lime, and the sulphuric acid quitting the lime for the potass. The carbonate of lime being very insoluble is precipitated; and the sulphate of potass being soluble in water remains in the clear liquid. In analysing mineral waters carbonate of potass is an excellent test on account of this property of rendering them milky if they contain sulphate of lime.

GENERAL TEST FOR THE METALLIC SALTS.—Into any solution where a metal is suspected to exist in combination pour a few drops of prussiate of potass; stir the mixture. If a precipitate falls down, it is a proof of the presence of some metal, as this salt has not the power of precipitating salts, of which the earths form component parts. The colour and quantity of the precipitate serve, with other tests, to demonstrate the name and nature of the metal.

Chemistry.—Chemical operations are constantly going on about us, and are exercising influences of vital importance in thousands of different ways, all more or less complex. The great purpose of chemistry is to show, by separating bodies into their simple elements or parts, what the various effects of these operations are, the principles on which these elements unite, and the nature of their union. As a writer in *Cassell's Household Guide* says: "Chemical operations are performed every hour of the day in every household. From the moment when the housemaid strikes the first match in the morning to the moment when the last candle is extinguished at night the forces of chemistry are at work; and even when all is still, and the gentle breathing of the sleeping inmates is the only perceptible movement in the house, that very breathing involves a beautiful and complex chemical process. (See *Respiration* and *Lungs*.) And yet how few people know anything of chemistry! The mistress when she washes her hands produces a double decomposition, and the housemaid striking the lucifer is, little as she suspects it, promoting oxydation through the influence of friction. And the cook may be shortly defined as a skilful practical chemist who knows nothing of chemistry." In brewing and baking, in the manufacture of wines and spirits, we have purely chemical operations which can only be understood by those who have given some attention to chemical studies. Almost all the animal functions, such as respiration, digestion, &c., are chemical. The process of breathing was never understood until the light of chemistry was thrown upon it, and pulmonary disease was consequently a matter about which physicians of old could have had no true knowledge. The real nature and operations of air, fire, and water cannot be understood without the aid of chemistry. The agriculturist is aided by chemistry to know the nature of the soil and the effects of manures upon it. Chemistry first showed how varied were the airs and earths, the real character of fire, and the compound nature of water. In short, "how to do it," whatever it may be, will be found to be so closely associated with chemical action, that some knowledge of chemistry ought to be acquired with the earliest rudiments of education, or not having been acquired should at once be sought. (See *Air*, *Heat*, *Digestion*, *Blood*, &c.)

Cherry Brandy.—To half a gallon of gin or brandy put six pounds of Morella cherries, cut off the stalks to within half an inch, and prick each one with a needle. Put them into wide-mouthed glass bottles with a little sugar or syrup and three or four cloves to each bottle; then pour the spirits into each bottle, and cork tightly.

ANOTHER WAY.—To prepare the same quantity as above, bottle them and cover them with brandy or gin, and stopper or cork them up for a month; after which pour off the brandy, and to each quart add ten ounces of powdered sugar-candy. When thoroughly dissolved pour back the brandy to the bottles, and well cork them.

Cherry-stones.—The kernels of cherry and plum-stones steeped in brandy make a nice flavouring liquid for tarts, &c.

Chest, or Thorax.—This is a conical cavity, the apex of which is at the neck, and the base of which is formed by a muscle called the diaphragm, by which it is separated from the abdomen. It is strongly guarded by the breast and back bones and by the ribs, to which bones are attached the muscles which regulate its motions. The thorax is divided by a lining membrane into three portions, the largest of which contains the right lung, the smallest the heart, and the other the left lung. It is the great trunk of the absorbents (see page 2) which pour into it their contents from almost every part of the body. (See also *Lungs*, &c.)

Chicken Fritters. — Make a batter with four eggs, some new milk, and rice-flour; to this add a pint of cream, some powdered sugar, candied lemon-peel cut small, fresh lemon-peel grated, and the white parts of a roasted chicken shred small; set these all together in a saucepan on a stove, and stir well for some time; when done take it off, roll out the mixture, cut it into fritters, and fry them; put sugar on a dish, lay the fritters on it, strew sugar over, and serve them hot.

Chickens, Fattening.—In an old work called "The Complete Cook," dated 1668, the following directions are given with the statement that by adopting them chickens may be made fat in five days:—"Take a pint of French wheat and a pint of flour, half a pound of sugar; make these up into a stiff paste, and roll it into little rolls, wet them in warm milk, and so cram them that they may be fat in four or five days."

Chilblains.—In the earliest stage dry friction or friction with brandy or camphorated spirits will often be effective. When the parts have become shining and inflamed, but before ulceration appears, the following will afford relief:—Take camphor, one drachm; essential oil of turpentine, eight ounces. Dissolve and apply as an embrocation. After ulceration has taken place the following ointment will be found an excellent remedy:—Take lard, one ounce; Goulard's extract, twelve drops; extract of opium, three grains; creosote, ten drops. Mix and spread on a piece of old linen, and apply night and morning. Occasionally it will be as well to use a bread poultice to clean the wound.

Chilblain Liniment. — One ounce of camphorated spirit of wine, half an ounce liquid subacetate of lead; mix, and apply three or four times a day. Some use vinegar as a preventive; its efficacy might be increased by the addition to the vinegar of one-fourth of its quantity of camphorated spirits.

Chilblains, Lotions for.—Equal parts of spirits of wine and rosemary, and oil of turpentine.

Another.—Vinegar and spirits of wine each, one quarter of a pint; alum, one drachm. To be rubbed in night and morning. Equal parts of spirits of rosemary and oil of turpentine. To be well rubbed on.

Another Compound.—Camphor liniment and soap liniment, half an ounce of each; oil of turpentine, three drachms.

Chimneys.—The air of a room expands in passing over the fire, and being therefore lighter (see *Expansion by Heat*) ascends, or is forced upward by the heavier or colder air. When the chimney is too high in comparison with the degree of heat given by the fire, the heated air is apt to grow cold and condense before it escapes. The rapidity with which the air ascends depends upon the intensity of the heat, which is proportionate with the quantity of fresh air or oxygen supplied to support combustion. The air when extremely heated ascends with great rapidity. If the supply of cold air is out of proportion with the heated air, a current of cold air passes down the chimney to supply the void, and brings with it the smoke. If the chimney flue is not high enough it will smoke. In this case the best remedy is to contract the opening of the chimney contiguous to the stove, so that the air may be more effectually heated, when it will rise with greater rapidity. Chimneys sometimes smoke in consequence of buildings rising above them, so that the wind being caught and sent back, passes over the chimney and prevents the smoke from ascending. For the same reason the chimney of a house surrounded by lofty hills will smoke. When smoking arises from such a cause, the remedy is to fix a revolving *cowl* on the top of the chimney-pot. When the opening of the fireplace or chimney is too large, so that a great body of air not warmed by the fire enters it, this mixing with the hot air reduces its temperature, and therefore diminishes the rate of speed at which it ascends; the current of ascending air is then not strong enough to carry up the smoke. What are called "blowers" act in creating a good fire, and so prevent that smoking to which some chimneys are liable when a fire is first lit, by excluding cold air, and compelling all the air which feeds the flame to pass through it. The faster the hot air ascends, the faster the cold air rushes towards the fire to supply it with oxygen.

Many years ago the principle of Davy's safety-lamp was successfully applied to prevent fires in chimneys by M. Maratueh, in France. He found by experiments that if three frames of wire-work were placed near the base of the chimney, one above the other, about one foot apart, no flame would pass through them, while the draught of the chimney was not impaired, and, consequently, no fires can ever happen in the chimney which has this safeguard. As most of the soot lodges on the uppermost wire, but little on the second, and none on the third, he suggested that with a brush applied once a day to the lowest or two lowermost the chimney would never want sweeping.

Should the chimney catch fire, you will immediately be apprised of it by hearing a loud roaring noise and the falling down of flakes of burning soot. If there is no water in the room, have a bucketful brought immediately, so as to put out all the fire on the hearth; and while waiting for the water throw on all the salt that may be at hand, or what will be better still, a handful of sulphur as soon as you can obtain it. As long as it is burning take care to keep all the doors and windows closed, and hold up closely before the fireplace a blanket or some other woollen article—for instance, a table-cover or hearth-rug—so as to completely exclude the air. (See also *Combustion.*)

Ching-Ching, an American Drink.—Put into a large tumbler an orange sliced, a few drops of the essence of cloves, three ounces of peppermint, and some sugar, broken ice, and a quarter of a pint of rum. Mix, stir for a minute or two, and drink through a straw.

Chitterlings, Calf's.—In some parts of the country these, prepared in the following old-fashioned way, form a favourite dish:—Cut a calf's nut in slices of its length, and the thickness of a finger, together with some ham, bacon, and the white of chickens, cut after the same manner; put the whole into a stewpan, seasoned with salt, pepper, sweet herbs, and spice; then take the guts cleansed, cut and divide them in parcels, and fill them with your slices; then lay in the bottom of a kettle or pan some slices of bacon and veal, season them with some pepper, salt, a bay-leaf, and an onion, and lay some bacon and veal over them; then put in a pint of white wine, and let it stew softly, close-covered with fire over and under it, if the pot or pan will allow it; then broil the puddings on a sheet of white paper, well buttered on the inside.

Choke-Damp or Fixed Air.—This gas may be obtained much purer by other means than by the combustion of charcoal. It is this gas that is extricated in almost all cases of effervescence, as when vinegar or any other acid is poured upon chalk, marble, limestone, or potash. The best way of procuring it for experiment is to pour diluted sulphuric acid upon chalk in a common phial furnished with a bent tube. The gas may then be received in jars over water. It possesses the following properties:—It is much heavier than common air; it extinguishes flame, and is fatal to animals. It possesses the properties of an acid, and precipitates lime from lime-water. By keeping in mind these properties, we shall be able to detect the presence of this gas under a variety of circumstances, and thus be enabled to account for various interesting phenomena. We shall find that it is extricated during the fermentation of beer and other liquors; that it is formed during many instances of combustion, and by the respiration of animals; and also that it is met with naturally in certain mineral waters, and in many other situations. This gas being much heavier than common air always keeps its place over the surface of the liquor till it rises as high as the edge of the tub or vat, and then it descends to the floor, so that if you hold the candle only a few inches above the edge of the vat it is not extinguished, but goes out immediately when held over the liquor and below the top of the vat. This is the reason too why the vat is emptied of the liquor. The gas for some time occupies the bottom of it, so that it is unsafe for the workmen to get into it with a view of clearing it. This is well known to the labourers in breweries, who never descend into the vats before they have tried the purity of the air in them by lowering a candle. If the candle is not extinguished, they know that they may descend with safety, for it is then certain that fixed air has made its escape. The first effects that are experienced by a person exposed to this gas are extreme lassitude and drowsiness. He soon becomes unable to support himself, and faints away. If he has not the power to remove from the effluvia when he first feels its influence and is not shortly removed after he faints, he remains senseless, and is soon irrecoverably lost. When a person is discovered suffering from this cause he should be treated in the way explained on page 19. We have said that carbonic acid gas is given out by the respiration of animals as well as combustion. This is easily proved by passing it through lime-water, for it immediately becomes turbid, which we have before stated to be one of the properties and a distinguishing property of carbonic acid gas. This extrication of carbonic acid gas in breathing is another cause to be added to that of the absorption of oxygen, or the pure part of air, why animals can live only a short time when confined in close vessels, and why we so constantly require the access of fresh air. From the greater specific gravity of carbonic acid gas it is frequently found occupying pits and low situations. It often occupies the bottom of wells, and therefore workmen ought to be cautioned against descending into such places without first lowering a lighted candle. If the candle continues to burn they may descend with safety, but if not, it is sure to be dangerous. There are several caves and grottoes in different countries that are occupied, at least near their bottoms, by this heavy gas. A man may often walk in them without any ill effects, whilst a dog or other animal, breathing a stratum of air nearer to the ground, will soon experience unpleasant symptoms. In mines this gas is called the *choke-damp*, as inflammable air is called the fire-damp. A lighted candle is a sufficient test to determine the presence or absence of the choke-damp, but for reasons before mentioned to try this would be attended with danger where fire-damp is present. In all cases where the presence of fixed air is likely to be attended with inconvenience, the following rules should be observed to obviate it:—Where it can be done, it should be removed by ventilation. In rooms where charcoal is burnt, fresh air should be freely admitted. In mines fires should be kept up near one entrance, so as to cause a constant current of air through the mine, and where it is practicable a stream of water should be made to flow through that part that is most charged with the gas, for water will absorb a considerable portion of it. The plan that is most frequently applicable for removing this baneful gas is to absorb it by means of lime. In apartments where it is present tubs of water with a quantity of quicklime in it will be sufficient. In wells the same mode will answer; and in mines, pits or pools of water may be impregnated with chloride of lime, which may be sprinkled about the floor. Springs of water are sometimes met with naturally impregnated with carbonic acid gas, as that of seltzer, which is noted for its medical virtues. To imitate such natural water we have only to pour diluted sulphuric acid on powdered chalk, and suffer the gas that is extricated to pass repeatedly through water till a sufficient quantity is absorbed. Water impregnated with carbonic acid gas is enabled to dissolve more lime than common water, and water thus charged deposits its redundant lime, when by exposure to the atmosphere it loses its carbonic acid gas. This is the cause of all the calcareous incrustations termed petrifactions and all the stalactites formed in caverns. The water in such situations being impregnated with fixed air, dissolves more lime than it can afterwards hold in solution, when by exposure to the atmosphere it loses its air. As the water loses its fixed air, therefore, it gradually deposits its lime; and if there happens to be moss or any other substance in the stream, it becomes incrusted with the lime whilst it retains its natural form. (See also *Inflammable Air*.)

Chowder, an American Dish.—Frizzle pork and onions till quite brown; put a layer at the bottom of the saucepan, a saucerful; on that a layer of mashed potatoes, a soup-plateful; on that raw sea bass (turbot is a good substitute for sea bass) cut in lumps, four pounds; on that pork and onions as before; add half a nutmeg, a spoonful of mace, a spoonful of cloves, and double that quantity of thyme and summer savory; another layer of mashed potatoes; half a bottle of catchup, half a bottle of claret, a large pinch of black and a small pinch of Cayenne pepper. Just cover this with boiling water, and put it on the fire till the fish is cooked.

Church Festivals and Anniversaries:—

EPIPHANY.—From the Greek ἐπιφάνεια, "manifestation," applied to the period when the Saviour was "made manifest" to the Gentiles.

PLOUGH MONDAY.—So called on account of the custom of resuming agricultural pursuits on this day, after the Christmas holidays.

SEPTUAGESIMA.—This and the following Sundays are regarded as preparatory to the Lenten fast, which, counting by Sundays, is supposed to begin about forty days before Easter, hence called Quadragesima. The three Sundays of the weeks preceding have names significant of their situation, reckoning by decades, thus:—Septuagesima (seventy days), Sexagesima (sixty days), and Quinquagesima (fifty days before Easter).

SHROVETIDE.—So called on account of the ancient practice of confessing and receiving absolution — that is, being *shriven*, or *shrived*—before the beginning of the Lenten fast.

ASH WEDNESDAY.—So called on account of penitents wearing sackcloth next their skin, and sprinkling ashes on their heads.

PALM SUNDAY. — So called on account of its being intended to commemorate the day on which our Saviour rode into Jerusalem, the multitudes cutting palm branches to strew and to bear before him.

MAUNDAY THURSDAY.—The word "maund" formerly signified a hand-basket, and on this day baskets of provisions were given to the poor.

GOOD FRIDAY.—The adjective here employed, beautifully expressive as it unquestionably is, is peculiar to the Church of England. Its ancient title was Holy Friday; and the week in which it falls was, and still is, denominated Holy week.

EASTER.—This term, which is traced by some to the goddess of the East—*Eastre*—is more probably derived from a word significant of rising, and used as expressive of our Lord's resurrection.

LOW SUNDAY.—So called on account of the religious ceremonies being of a lower degree than those of the high festival of Easter.

ROGATION SUNDAY received its title from the Monday, Tuesday, and Wednesday immediately following, which are called "Rogation days," from the Latin *rogare*, "to beseech."

WHIT-SUNDAY.—The derivation of the term "Whit" is very uncertain, but the most probable conjecture seems to be the practice of the clergy and candidates for baptism wearing white robes on that day.

DOG-DAYS.—The ancients ascribed the heats of this season of the year to the rising of Sirius, the dog-star. Under its influence, according to their belief, the sea boiled, the wine turned sour, dogs went mad, and all other creatures became languid; causing to man, among other diseases, burning fevers, hysterics, and frenzies. It is scarcely necessary to add that there is no foundation for the superstition.

St. Swithin.—The legend of this saint relates that, the bones of St. Swithin working wonderful miracles, the monks of Winchester proposed to remove them from the churchyard to the chancel of the cathedral. On the day appointed violent rains came on, and prevented the removal. The rain lasted forty days, and was considered to indicate that the saint objected to the change. It was supposed that if it rained on St. Swithin's Day there would be a continuation of wet weather. The real fact is that this period of the year is often a rainy season.

Lammas Day.—This is one of the most ancient quarter-days. Whitsuntide was the first, Lammas the second, Martinmas the third, and Candlemas the fourth. It has been conjectured that Lam or Lamb-mass originated from St. Peter being the supposed patron of lambs; the mass being therefore instituted in his honour, that lambs might escape the danger arising from cold, after being shorn at that season.

Advent.—Advent is dependent on the feast of St. Andrew, always being the Sunday nearest to that day, whether preceding, on the day itself, or on that following it.

Christmas is observed in memory of the birth of Christ—hence called the mass or service of Christ, or Christ's mass.

Chymification.—The process by which food is turned into chyme. (See *Digestion* and *Blood.*) The period necessary for chymification to take place varies with the nature of the food (see *Food*), the degree of insalivation and mastication it has received (see *Mastication*), and the degree of vital energy.

Citric Acid.—The essential principle of ordinary vinegar is acetic acid, and the genuine but rough kinds popularly sold are made by means of the oxidation of the fermented wort of malt. The finer kinds of vinegar, obtained at certain stages of wine-making, possess the special property of tartaric acid, with which the grape abounds. Citric acid is the base of the sourness in oranges, lemons, limes, and other similar fruits.

Claret-cup. — Take a bottle of claret, half a pint of seltzer water, two table-spoonfuls of powdered sugar, with twelve cloves, a little grated nutmeg, the rind of a lemon, a sprig of borage, and a small glass of pale brandy. Put into the jug the lemon-peel, the cloves, the nutmeg and sugar first, to these add the seltzer, and stir. When the sugar has melted add the claret, and after it the brandy with the sprig of borage, and a lump of ice.

Clarified Butter. — Frequently used to supply the place of olive oil for salads and frying. (See *Butter.*)

Cleaning Glass and Porcelain Vessels.—It often happens that glass vessels, used as pots for flowers and other purposes, receive an unsightly deposit or crust, hard to be removed by scouring or rubbing. The best way to take this off is to wash it with a little dilute muriatic acid, which acts upon it, and loosens it very speedily.

Cleaning Japanned Trays, Urns, &c.—Rub on with a sponge a little white soap and some lukewarm water, and wash the waiter or urn quite clean. Never use hot water, as it will cause the japan to peel and crack off. Having wiped it dry, sprinkle a little flour over it. Let it rest awhile, and then rub it with a soft cloth and finish with a silk handkerchief. If there are white-heat marks on the waiters they will be difficult to remove, but you may do so by rubbing them with a flannel dipped in sweet oil and afterwards in spirits of wine. Waiters and other articles of papier maché should be washed with a sponge and cold water, without soap, dredged with flour while damp, and after a while wiped off and then polished with a silk handkerchief.

Cloth.—HOW TO CLEAN.—TO REMOVE WAX FROM CLOTH.—Hold a red-hot iron (or poker, for instance) within an inch or two of the cloth till the wax has disappeared; then rub the cloth with some soft clean rag. Wax droppings may be removed in the same manner from velvet.

SPERMACETI, TO REMOVE.—First scrape off the drops of spermaceti with a knife; then lay a thin, soft paper over them, and press on a warm iron, which must not be hot enough to injure the cloth. Afterwards rub the place with spirits of wine. If the spermaceti has fallen on an article at which you can conveniently get at the wrong side, first scrape off as much of the grease as stands on the surface; then rub the under side of the spot with fuller's earth scraped to powder, and let it rest for an hour or two. Then repeat the application. (See also p. 121.)

Clothes' Balls.—Take four ounces of fuller's earth, dried so as to crumble into powder, and mix with it half an ounce of pearlash. Wet it with a sufficiency of lemon-juice to work it into a stiff paste. Then form it into balls, and dry them in the sun or on the top of a moderately warm stove. When quite dry put them away for use. They will be found efficient in removing grease spots and stains from articles of clothing, first wetting the spot with cold water, and then rubbing on the ball, afterwards drying the place in the sun or by the fire, and then washing it off with a sponge and clean water.

Clothes' Lines.—The best and most lasting are made of gutta-percha.

Clothes' Lines will last longer, and keep in better order for wash-day service, if occasionally treated in the way described below. (See *Clothes' Pegs.*)

Clothes' Pegs, to Preserve.—Those pegs boiled a few moments and quickly dried, once or twice a month, become more flexible and durable.

Clothes' Posts soon decay at the bottom if exposed to the weather; to prevent this they should be so constructed as to be removed after use, which may be effected by fixing little boxes in the ground fitted to receive each post. They should be kept *under cover* during the interval between each washing. A clothes'-ground should not be in a situation too windy; the violent *flapping* tears the corners of table-cloths, &c., and takes the firmness out of the linen, making it look flabby after mangling.

Clothing.—GENERAL REMARKS.—In this capriciously changeful climate the clothes worn should always be of sufficient quantity and warmth. Woven cloths of a soft, easy, flexible kind are best for preventing the escape of animal heat too rapidly. The shape should not restrain muscular action or the proper play of the organs. In no case should winter clothing be left off before the summer weather has fairly set in, and it should be resumed directly there is a probability of coming damp and cold. The saying we sometimes hear, that the same clothing is equally adapted for one season or another, is at once seen to be false when you consider the part clothes play in establishing a proper equilibrium between the functions of the skin and the temperature by which these functions are so palpably influenced. The importance of flannel near the skin can hardly be overrated. In military statistics it is found that the list of sick always includes a larger number of those who do not wear flannel than of those who do. For a sedentary life in hot, damp climates cotton is, however usually preferred. Linen is by universal consent pronounced dangerous wherever there is a chance of its receiving much perspiration, as it retains it, and while still wet clings coldly to the skin. Dark-coloured clothes hold the heat of summer sunshine, while light-coloured clothes have the advantage of being cooler, as they throw off the heating rays of the sunlight instead of absorbing them. (See *Heat; Vital Heat; Air, Hot and Cold,* &c.)

CHILDREN'S CLOTHING.—The practice of binding a newly-born infant with bandages and flannels, which has rendered many a healthy infant weakly and ailing, has happily gone out of fashion. Still, however, we often see a baby so loaded with clothes that they almost equal its own weight, which renders a healthy child so tender and chilly that it cannot bear external air; and if by accident it should be exposed to a refreshing breeze, the consequence is frequently a serious inflammatory affection of the lungs or bowels. The clothes should be in all cases proportioned to the climate and temperature of the atmosphere. A newly-born infant is more susceptible than an adult to changes of temperature. The clothing should be loosely put on, so that the bowels may have room, the limbs liberty to act and exert themselves, and the circulation of the blood through the *superficial* vessels may not be impeded, for malformation or unnatural swellings may be produced by partial compression. To this error are doubtless attributable very many distortions and deformities, particularly among females, who suffer more in this respect than the males. The great pleasure a child manifests on being divested of a superfluity of dress by all its powers of expression one would suppose sufficient to convince nurses, were they capable of making just observations, that the free use of its muscles is both agreeable to its feelings and necessary for its proper growth and strength. A flannel waistcoat, *without* sleeves, should be made to fit the body and tie *loosely* behind with a petticoat, and over this a kind of gown, which in summer should be thin and light. The petticoat should not be too long, and the gown or robe should be a few inches longer. Shoes and stockings are often an encumbrance. The latter keep the legs wet and nasty if they are not changed two or three times a day, and the former frequently cramp the legs and hurt the feet so as to prevent them learning to walk. Children in this simple dress would be perfectly easy, and enjoy the free use of their legs and faculties. They should be put into it as soon as they are born, and continued in it until they are three years old, when it may be left off for any other more fashionable and genteel. The baby's clothes ought to be changed at least once a day. The night-clothes should be *loose*, and less in quantity than those worn during the day, otherwise the child will be very liable to be affected with cold and complaints of the bowels. Safety-pins should be used instead of ordinary pins in fitting on napkins. The common practice of leaving the neck and upper part of the chest bare all the year round has been very largely a source of disease. If the reader will turn to our remarks on the *Lungs*, and those on *Consumption*, he will readily understand how this may be. The parent must not, however, run into the opposite extreme by over-heating the body. The infant's clothes should be light, but warm enough to meet the requirements of the season; and the best materials for this purpose are flannel and calico. For some few months after birth the infant's skin is peculiarly sensitive, so that a shirt of fine linen between it and the flannel should be put on. A child's clothes should allow for growth, and never be too tight round the chest, armholes, or wrists, and should be easily put on and taken off. When the child is short-coated, socks should be put on, which will keep the legs sufficiently warm according to the condition of the weather. Shoes should be light and pliable, and by no means small. A child should not be short-coated in cold weather. Garters and tight stays are things to be avoided in children's clothing. Some further hints and facts on the subject of clothing for babies may be found useful. Begin with six flannel rollers; thes should be about a yard long and a quarter deep; they require no making or binding, but should be of very soft texture. A needleful of strong cotton should be kept in the cushion to fasten the roller when put on, as pins are utterly inadmissible. This is most important, as frequently infants seem fretful and ailing when it is nothing but some carelessly placed pin in the roller hurting them. The next requirement will be six little shirts, usually fine lawn, but where economy is an object the finest long cloth will answer. There is a make of cloth called the "Lilly," very suitable for such articles. The pattern of the shirt is a matter of taste, and we should recommend for trimming narrow real or imitation lace. The long flannels—three for day and the same number for night use—may be made, the former of fine Saxony, bound with silk binding; the latter of stout Welsh, bound with union. The quantity for each set of three will be five yards and a half, as ample allowance must be made for shrinking. Some mothers like a stout roller of calico or linen placed over the flannel, and fancy it supports the back of the infant. This is a great mistake. Inexperienced nurses think that by tightly compressing the child they give strength, whereas they only impede circulation. A lady was once much alarmed at seeing her baby boy turn perfectly black in the face after being fed; her first thought was convulsions, but on examining the child she found the roller so tight from the distension of the stomach that it almost prevented respiration. Upon the removal of the roller the child was in a few minutes quite comfortable and lively. One flannel roller is quite sufficient support for any healthy, well-formed child, but if any other is deemed necessary let it be a knitted one; this kind is more elastic, and gives with the movements of the baby. The tightness should never be greater than that which will allow a person's hand to be introduced under it; this should also be fastened by a stitch or two, and not pins. We now come to the dresses. Six little night dresses, made of fine calico, trimmed with narrow Coventry frilling round the neck and sleeves, the front of the body gathered into a neat band ornamented with feather-stitch. The day or monthly dresses should be made of fine hair cord muslin, trimmed with good needle-work and insertion; two handsome robes, with long calico petticoats to be worn under, may be added where economy is no object. Where ladies are industrious and accomplished they may work most beautiful robes at about half the price of those purchased ready made. Both robes and monthly dresses should have short sleeves. Caps are quite ignored, and considered by medical men far from healthy; but should any lady wish for them, they can be purchased for less than they can be made at home. Two squares of fine pink or blue flannel bound with white silk are required to be placed over the infant's head on its removal from one room to another. Six squares of good strong flannel, hemmed round, must also form part of the *layette*. Many people shape them into what they call pilchers, but the squares will be found far more convenient and useful. The purchase of diaper must now be suggested, and as it is about the most expensive item, we strongly recommend ladies not to buy it in the twelve square lengths as usually sold; they are in reality only six squares, as they must be doubled; the Russian diaper is preferable to the bird's-eye, having more substance and durability; it is bought by the yard, and requires eighteen yards to make a dozen diapers the proper size; the price is about eight or ten pence a yard. As regards a cloak, we suggest a large square of fine llama—colour a matter of taste—in summer bound with ribbon, in winter trimmed with swan's-down. Children are not now kept in long clothes more than three months, consequently a cloak is then nearly useless, whereas the llama cuts into two pretty little dresses, and looks while used as an outdoor covering equally elegant. Good scarlet or blue llama will wash well. The hood must be chosen with regard to baby's sex, being quite different for boys and girls.

Clothing, Non-inflammable.—Linen and cotton goods dried after being immersed in a solution of one or other of several salts possess the valuable property of non-inflammability. The best results are obtained with a solution of sulphate of ammonia, or of tungstate of soda, neither of which liquids produce any injurious effect upon the tissue or colour of the fabric. The tungstate of soda solution was found most applicable to laundry purposes, on account of its not interfering in any way with the process of ironing. Muslins, &c., steeped in a seven per cent. solution of sulphate of ammonia, or a twenty per cent. solution of tungstate of soda, and then dried, may be held in the flame of a candle or gas lamp without taking fire. That portion of the stuff in contact with the light becomes charred and destroyed, but it does not inflame, and hence the burning state does not spread to the rest of the material. (See *Incombustible Fabrics.*)

Cloths and Woollens, Directions for Cleaning.—First, one must obtain a knowledge of the various substances that can occasion spots on them. Then we must know the substances to which we must have recourse to remove those stains when deposited upon the cloth. Thirdly, that of the manner in which the colours will be affected by these agents meant to be employed for the removal of the spots. Fourthly, how to restore the colours when changed or rendered faint. Wanting some knowledge on these points, it is evident that no person can undertake to clean cloth under all circumstances without great danger of spoiling the article. Of the substances which occasion spots upon cloth some are easily known by their appearance—for instance, grease of every kind. Others produce more complicated effects, such as acids, alkalies, perspiration, fruits, wine, &c. The effect of acids upon black and purples, blues (except those produced by indigo or Prussian blue), and some other colours, and upon all those shades of colours which are produced by means of iron, archil, and astringent substances, is to turn them red. They render yellow more pale, except those produced by arnatto, which they turn to an orange colour. Alkalies turn scarlet, and all red produced by Brazil or logwood to a violet colour. They turn green (upon woollen cloths) to yellow, and they give a reddish cast to the yellow produced by arnatto. The effect of perspiration is the same as that of the alkalies. Spots which are produced upon cloths by simple substances are easily removed by well-known means. For instance, greasy substances can be removed by alkalies, by soap, by yolk of eggs, or by fuller's-earth, while the stains caused by iron-mould (oxide of iron) may be removed by dissolving the metal out of the fabric by means of either sulphuric, nitric, oxalic, citric, or tartaric acids more or less diluted with water. Spots occasioned by acids are removed by alkalies and *vice versâ*. Stains (caused by fruits) upon white cloth are removed by sulphuric acid, or what is still better, by hydrochloric acid, or a weak solution of chlorine gas in water. If the sulphuric or hydrochloric acid is employed for this purpose, great care must be taken that they are much diluted. But when the spots are of a complicated nature, various means must be employed successively; thus to remove a spot occasioned by the dirt of carriage wheels we must first dissolve the alkali by some of the means above mentioned, and then take away the oxide of iron by oxalic acid. The colours of the cloths are often injured by the re-agents made use of in order to restore them effectively. When such is the case we must thoroughly understand the art of dyeing, and know how to modify the means according to circumstances. This is sometimes difficult, because it is necessary to produce a colour similar to that of the rest of the cloth, and to apply that colour to a particular part only. Sometimes also the mordant which fixed the colour or the basis which heightened it has also been destroyed, and must be restored. It is evident that in this case the means to be employed depend upon the nature of the colour and that of the ingredients which produced it, for the same colour may be, and often is, obtained from different substances. Thus, when using an alkali to remove an acid spot upon brown, violet, or blue cloth, &c., there remains a yellow spot, the original colour is again produced by means of a solution of tin. A solution of the sulphate of iron restores the colour to those brown cloths which have been dyed with galls. Acids give to yellow cloths which have been rendered dull or brown by alkalies their original brightness. When black cloths dyed with logwood have any reddish spots occasioned by acids, alkalies turn such spots to a yellow colour, and a little of the astringent principles makes them black again. A solution of one part of indigo in four parts of sulphuric acid properly diluted with water, and with the acid neutralised with chalk, will restore faded blue wool or cotton. Red or scarlet colours may be restored by means of cochineal and a solution of chloride of tin, &c. The choice of re-agents is not a matter of indifference; vegetable acids are generally preferable to mineral ones. The sulphurous acid, however, may be used for spots from fruit; it does not injure blue upon silk or the colours produced by astringents, nor does it affect yellow upon cotton. The volatile alkalies succeed better than fixed alkalies in removing spots produced by acids. They are usually made use of in the form of vapour, and act quickly, seldom injuring the colour of the cloth. The means of removing spots of grease are well known—namely, alkalies, fuller's earth, essential oils dissolved in alcohol; a sufficient degree of heat to render the grease volatile, &c. Spots of ink, or any other occasioned by yellow oxide of iron, may be removed by oxalic acid. The colour may be restored by alkalies, or by a solution of the chloride of tin. Such spots may also be entirely obliterated by a solution of chlorine gas in water when they are upon white cloth or paper. The effect of alkalies and that of perspiration being the same, their spots may be removed by acids, or even by a dilute solution of muriate of tin. When the spots are owing to various unknown causes, we must have recourse to compositions possessing various powers, of which the following may be considered as one of the most efficacious:—Dissolve some white soap in alcohol; mix with this solution four or five eggs, add gradually some spirits of turpentine, and then stir with the mixture such a quantity of fuller's earth as will enable you to form it into balls. The manner of using these balls is to rub the spots with them, having previously wetted the places with soft water; after which the cloth is to be wetted, rubbed, and washed. By this means all kinds of spots, except those occasioned by ink or any other solution of iron, may be removed. The washing of the cloth takes off the gloss, and leaves a dull spot disagreeable to the eye. This gloss may be restored by passing in a proper direction over the washed part of the cloth a brush wetted with water in which a small portion of gum is dissolved, and then laying upon the part a piece of paper, a piece of cloth, and then a pretty considerable weight, which must remain until the cloth is dry. A screw pressure may be substituted for the weight with considerable advantage.

Cloth, to Clean.—"Bernardin" says:—Moisten a sponge with pure water, press it in a very clean towel till it becomes nearly dry; then sponge the cloth, one place after the other; all the dust will enter into the sponge; wash the sponge afterwards in water. This method of cleaning wears out the clothes less than brushing. Many spots also disappear with pure water.

Cloves are the dried flower-buds of the *Caryophyllus aromaticus*, a tree of the myrtle tribe, and a native of the East Indian Archipelago. They are beaten from the tree when the *calyx* or cup expands, but before the petals open. The former organ is easily recognised in the spice, and the central round knob consists of the unexpanded petals, and not, as is commonly supposed, of the fruit. Cloves yield abundance of essential oil of a strong pungent aromatic flavour, to which that of the spice is due. This oil is extracted by pressure or distillation, and is used in medicine. Cloves are much employed in perfumery.

Coal.—There is no possible doubt that the general origin of coal must be referred to the vegetable kingdom. Some species of coal are merely fossil wood (or lignite) impregnated with oily or bituminous matter. The branches, trunks, and roots, although closely pressed together, are scarcely altered in texture in some places, while in others they gradually lose every vegetable feature, and the substance in colour, lustre, and feature resembles pitch. Of this nature is the Bovey coal of Devonshire and a species found in Iceland. In some species of the former the fibres are flexible when taken from the pit, though soon after they become hard and brittle. From the disposition of these Bovey lignites, which lie in alternate strata with clay and gravel, it has been reasonably inferred that the trees and vegetables of the adjacent mountains were washed down at different periods into a lake. The clay and gravel of course sunk first to the bottom and formed the floor ; but in time the trees, saturated with moisture and pressed down by an accumulation of other trees, sank also, and were again, perhaps, in succeeding ages covered by successive depositions. The common or cubical coal, as it is called from the shape into which it breaks, does not bear the same obvious marks of vegetable origin in its structure ; but where one species of coal can be so clearly demonstrated to be only altered vegetable matter, it would be bad philosophy to ascribe the other species to other causes. In the prodigious beds of coal, however, in Staffordshire there is no dearth of vegetable traces, and even in the Newcastle coal the impressions of the branches are frequently found, as well as on the freestone and slate clay which intervene between its numerous strata. At Kilsyth, in Scotland, a very singular specimen was discovered, a tree standing upright with its roots resting on a bed of coal, from which they could be scarcely distinguished, and its stem passing into a stratum of sandstone rock. The lower end was completely bituminated, and it burned with a clear flame ; yet the upper part, though scarcely altered in the grain or apparent texture of the wood, was converted into sandstone similar to that by which it was enclosed. Round the stem there was a space of about an inch in thickness filled with coal, which renders it probable that the same process that converted the roots into coal acted upwards on the bark. The rock contained innumerable remains of plants, some of which were so perfect that their species have been made out, and no pencil could trace their delicate ramifications with greater nicety. In short, it appears that coal of every species has proceeded from vegetables of different kinds, but under different circumstances, and that its chemical change was effected under the pressure of deep water. In one stage of that process it was probably in a soft, pulpy state, like the lowest part of a deep peat bog, for this is the only supposition upon which we can account for the impression of leaves, canes, seed-vessels, and shells which are so commonly found on the external surface of coal. Sir James Hall thought that peat might have been converted into coal by heat acting under great compression, and he actually succeeded in making a substance very like it. The chief difference between the various kinds of coal which are applied to economical purposes arises from the proportion of bitumen they contain. What is called *caking coal* yields about forty per cent. When burning it swells, agglutinates, and emits much smoke and gas, which inflame at a certain temperature. *Cannel* coal has only twenty per cent. of bitumen, and does not agglutinate or cake. It burns with a bright flame like a candle, from which circumstance it takes its name, cannel being the common pronunciation of candle in the north of England. The third sort is called *anthracite* by mineralogists, but its common name is blind coal or Kilkenny coal, so named from a district in Ireland where vast beds of it were found. It contains little or no bitumen ; it neither cakes nor flames, and gives out very little smoke. But as there are several varieties of coal between those principal species, much confusion has taken place in their names. The fact is that almost every mine affords a coal differing in some respects from that of others ; and although the inland coal is generally very different from the Newcastle, which we call sea-coal, yet both vary so much as procured from different mines, or even different parts of the same mine, that one parcel of inland or of sea-coal will differ very considerably from another, both in its burning and its general appearances. The different manner in which coals burn deserves notice, and if any arrangement of the varieties of coal is to be made, this affords the best grounds for it. The difference does not depend wholly upon the proportion of bitumen, but partly upon the kind, whether it is more or less volatile, and whether it is more or less easily separated from the earthy base. As the coal varies in these respects, it comes under, or approaches to, more or less, one of the following divisions :—The first includes such coal as affords a very considerable flame, and burns with so much rapidity as only to require being lighted like a candle to continue its combustion. This contains most bitumen, as we have explained in our reference to the candle or cannel coal. How to burn coals economically will be seen in our hints on *Combustion*, *Fuel*, and *Chimneys*.

Coal-ashes. — These preserved, mixed with coal-dust, and rendered damp with water, will be found to make good economical fuel to burn with ordinary coal.

Coal-cellar, Coal in the.—When coals are shot down into an ordinary cellar the large lumps roll down the sides of the heap, while the smaller accumulate at its top, consequently the large coal is usually burnt first. To avoid this result, the coal should be mixed after it is shot down. The men who bring it will usually do this.

Coat, Brushing a.—It is desirable when a coat is beaten for the removal of dust, that it should first be spread upon a coat-horse, as then the work is more thoroughly and quickly done. If it is wet or splashed with mud, it should not be beaten until it is thoroughly dry, nor before you have taken the cloth between your hands and rubbed off the mud-spots. When it is spread out let it be well beaten with a cane, taking care not to strike the buttons, lest they be scratched or broken. When the dust has been beaten out, spread the coat out back uppermost upon a table, observing that it is not dirty. Take your clothes-brush in your right hand, and the collar of the coat in the left hand, and begin by brushing the collar, proceeding to brush between the shoulders, the sleeves, and then the skirts, beginning with that which is farthest from you. Always brush in the direction of the nap, downwards towards the skirts. Some use one brush for the collar and cuffs, which are most liable to be greasy, and another for the rest of the coat, but if the brush is kept clean this is unnecessary. If the brush is dirty, you may ascertain it by putting a piece of white paper over the corner of the table and rubbing the brush upon it.

Coat, to Fold a.—We often see a good new coat so wrinkled and creased by careless folding as to look quite shabby. To fold a coat properly, and so avoid this, proceed as follows :—First, spread it on the table, double the left sleeve from the elbow towards the collar; the other the same way, then the left lappel over the sleeve as far as the back seam, and the other in the same manner. Next, turn up the left skirt so that the end may touch the collar, do the same with the right skirt. Give it a light brushing all over, and then turn one half the coat exactly even over the other half. Folded in this manner, the coat may be put into a trunk, and will keep smooth during a journey of any length.

Cod-fish.—This fish generally comes good into season in October, when it is as fine eating as at any time in the year. It is in good condition at the latter end of March, April, and May, but towards the latter end of January, February, and March, it is generally poor eating. The cod most esteemed is that which cuts in large flakes. The best cod-fish are generally found on the Dogger-bank. It eats firmer when a little salt has been put in the gills, and the fish hung up a few hours before dressing. The tail or lower part of a cod, cut into fillets or slices and fried, makes a capital dish, although the same part when boiled is always soft and watery. It is good when fried to a fine brown with sliced onions, and it is sometimes stewed with a good white gravy, a little curry powder, a bit of butter and flour, and three or four spoonfuls of rich cream, cut into cutlets and cooked as you would cook veal cutlets. This fish is excellent eating. A pleasant dish is made in Scotland of the head and tail of the cod-fish stewed and served up with anchovies or oyster sauce and the liquor in which they have been boiled. When stale cod-fish is brought to table it eats woolly, or stringy. Cod-fish reaches to a large size, the average weight being from fifteen to twenty pounds, although thirty pounds is not an unusual weight. By rubbing a little salt down the bone and along the thick part of the fish, its eating qualities will be greatly improved.

Cod-fish Baked.—Grease a baking dish with butter, and put in a bundle of sweet herbs, with an onion stuck with six or seven cloves. Lay in the fish with a spoonful of black and white pepper, salt, and a quart of water. Dredge the fish with some flour, and lay over it lumps of butter and a small quantity of rasped bread-crumbs. When the fish is sufficiently baked take it out, strain and thicken the gravy, and add to it one dozen oysters, half a pint of picked shrimps, a little essence of anchovy, and half a gill of Reading or Worcester sauce. Warm up in a small saucepan, and garnish the dish with curled parsley or lemon. Codlings may be dressed in the same manner. Cod-fish is very good stewed if cut into slices and seasoned with salt, pepper, and two or three cloves, put into a saucepan with half a pint of gravy, half a pint of white wine, a little juice of a lemon, some oysters with their liquor, a few blades of mace, and a nut of butter. When the fish has been stewing fifteen minutes serve it up nice and hot, and pour the sauce over or not at pleasure. As a substitute for the wine any kind of fish sauce may be used, and anchovy sauce instead of oysters. Should there be any cod-fish left, it may be dressed in the following manner, when it is called

Cod-fish au Gratin.—Cover the bottom of the dish with some cold cod-fish. Cover with cold oyster sauce, filling the dish with alternate layers of each, seasoning each one with pepper and salt, nutmeg or mace, a little of the liver and sound if there is any, and when the dish is full cover the whole with a little butter and some bread. Bake for about half an hour. To dress cod *à la Provençale*, you must cook the fish until tender, and mince it with a small portion of garlic. Put some oil and white wine into a stewpan, sufficient to cover it. Put the pan over a slow fire, and constantly shake it until the mixture reaches the consistence of cream. If oil is objected to, cream may be substituted, but if wine is used it must be mixed with the cream slowly and gradually to prevent curdling. Cod sounds and cod tongues can be dressed in many different ways. They must be soaked in warm water for an hour, after which they must be slowly boiled in milk till they are tender. Serve with egg sauce, *au ragoût.* Clean three sounds, and boil them slightly in water and milk. Make a forcemeat of bread-crumbs, butter, pepper, salt, and chopped oysters and the yolk of an egg. Spread this thinly over each sound, and skewer them up. Roast them in the oven with a little flour dusted over them.

Codicils.—These are additions to a will (see *Will*), by means of which the testator can revoke the whole or any part of a will, make fresh dispositions, or re-arrange those already made.

Coffee.—Its Effects on the Constitution.—Coffee exerts a very powerful influence on the sympathetic nerves and brain; for this reason, after taking it all feelings of drowsiness are dispelled while the system continues under its influence. Coffee possesses this property chiefly owing to the empyreumatic oil it contains. It is for this reason that the beverage should always be prepared from the freshly-roasted berry, ground immediately before use. Coffee contains a considerable quantity of nitrogen, which tends to render it more nutritious. Coffee as a beverage is most suitable for elderly or thin individuals. It is not so well adapted for persons of an excitable temperament, or for plethoric individuals. It is liable to produce, if taken to excess, hæmorrhages from the bowels, and congestion of the liver. It is thought that coffee promotes digestion when taken after a meal, and that it also removes the symptoms caused by too great an indulgence in wine; but as a matter of fact, if taken immediately after a meal, it impairs the action of the stomach and injures the digestion. These affections are, however, thought to disappear more readily on persons leaving off its use, than those complaints which are produced by the excessive use of strong tea.

Coke.—When coal is piled up, ignited, and the fire then smothered, as in making charcoal, the result is a light porous substance called coke, which burns much like charcoal without flame or smoke. It is used in drying malt and other operations, where the flame and smoke would be injurious. In some places furnaces or ovens are built for making coke, and the fires are put out by dampers when it is sufficiently burnt. In this operation the more volatile, oily, or bituminous matter is exhaled, and if collected, as in some manufactories is the case, it forms a very excellent tar. It is the caking coal which makes the best coke, for it is necessary that the pieces should be at first small that the heat may extricate the bitumen without continuing it, and that it should afterwards run together into larger masses, that it may be less porous and spongy. At Newcastle the coal-dust that is too small for common use is burnt into coke, and forms excellent fuel. Coal-dust of the most inferior kind may be made into combustible bricks by mixing with a small proportion of clay, and if requisite a small quantity of some inflammable material, as the coal tar, so as to make an economical fuel for open fireplaces.

Cold Cream.—Take two ounces of oil of sweet almonds, one drachm each of white wax and spermaceti. Scrape them very fine, add the oil, and put them into an earthen pipkin by the fire to melt slowly. Stir it until it is quite smooth; after which let it grow cold, and add one ounce of rose-water. The cream should be very thick, and kept in a closely covered gallipot. It is useful for chapped lips, &c.

Cold Paste.—This can be obtained at any time, when it is not convenient to boil it, by keeping always in the house a bottle of gum arabic water made in the proportion of an ounce of pulverised gum arabic to a gill of water. Mix a little flour with barley-water enough to dissolve it, making it very smooth and free from lumps; then add a little of the solution of gum arabic, diluting it with more water if necessary. The gum will make the paste sufficiently adhesive for any common purpose without boiling. Paste for artificial flowers is made by the addition of sufficient starch to mucilage of gum arabic to thicken it. This starch will be found very valuable to all who construct fancy articles of cardboard, and for all purposes where it is wished that the gum shall not sink through the substance of the paper and stain its surface. This paste does not keep very well.

Coloured Fires.—The following are very good recipes for coloured fires:—Red—Nitrate of strontia four parts, chlorate of potash one part, shellac one part. White—Chlorate of potash twelve parts, nitre four parts, sugar four parts, stearine one part, carbonate of barytes one part. Green—Chlorate of potash two parts, nitrate of barytes one part, sugar one part. Yellow—Chlorate of potash six parts, nitre six parts, oxalate of soda five parts, shellac three parts. The nitrate of strontia must be melted before use, so as to drive off the water of crystallisation. The chlorate of potash should be pounded separately, for if struck when mixed with sulphur it explodes violently. Neither must the chlorate of potash and the other ingredients be rubbed together in a mortar, otherwise they will explode. These coloured fires should not be prepared before they are required for use, as they are very apt to ignite spontaneously. By "parts" we mean parts by weight, not by measure. Many people in making coloured fires fail from not observing this precaution.

Colouring Marble.—The art of colouring marbles so as to give them the richest and most beautiful tints, has been recently carried to great perfection in Italy, by M. Ciceri. A solution of nitrate of silver penetrates into the marble, and produces a deep colour. A solution of nitro-muriate of gold penetrates about the twelfth part of an inch; it gives a beautiful violet purple. A solution of verdigris gives a clear green; solutions of dragon's-blood likewise penetrate marble, giving it a beautiful red. It is penetrated to a considerable thickness by all alcoholic tinctures of colouring woods, such as Brazil-wood, Campeachy, &c. The alcoholic tincture of cochenille, mixed with a little alum, produces a very beautiful bright colour, which penetrates far into the marble, and makes it resemble the red marble of Africa. Orpiment dissolved in ammonia quickly dyes marble a yellow colour, which becomes more vivid the longer it is exposed to the air. The solvent which causes the colouring matters to penetrate farthest into the marble, is wax. Verdigris, which has been boiled in wax, and applied to marble quite hot, penetrates to the extent of nearly half an inch, and produces a fine emerald.

Combustion.—(See also *Heat.*) The generally best known effect of heat is combustion. When a body that is not very inflammable is heated to a certain degree, it becomes luminous, as iron, for instance, and is said to be ignited, or to be in a state of incandescence; but when a more inflammable substance is heated, it undergoes a process called combustion, during which heat and light in a greater proportion are emitted, and the chemical qualities both of the inflammable substance and of the surrounding air are materially altered. Incandescence is probably the same process with inflammation, only in a slighter degree, and we shall consider both under the term "combustion." The combustible body, in common language, is said to be consumed; but it must not be supposed that it is annihilated, that it is absolutely destroyed; for, in fact, it is only changed, and the results of combustion are always equal in weight to the inflammable body, and the air absorbed. It ought here to be observed, that inflammation or combustion can never take place without air. If an ounce of phosphorus is confined in a vessel of air, and the whole apparatus weighed, and if you then set fire to the phosphorus, and let it burn until it is, to speak in common language, all consumed, the apparatus, on being again weighed, will be found to have neither lost nor gained by the experiment. A change, however, has taken place—the volume of air is diminished, and the phosphorus is converted into an acid, which acid, if weighed, will be found equal to the phosphorus that has been burnt, and the air that has disappeared. Similar facts have been ascertained in every instance of combustion. There is a chemical change, but no absolute loss or consumption. If the whole products were collected after a candle is burnt out, or after the combustion of any kind of fuel, they would always be found to equal in weight the inflammable body and the air, that seemed to be consumed. As the presence of air is an essential requisite in every case of combustion, and as it always undergoes a chemical change, it is probable that it is the source both of the heat and light that are extricated. Of the heat, indeed, we know it to be the chief, if not the only source, in consequence of the change of capacity that attends its chemical change. The vulgar opinion, therefore, that the fuel gives out the heat, and the candle the light, is erroneous; and it is an inaccuracy in language to say that one kind of fuel gives out more heat, or one kind of fuel more light than another. As, however, the error and the inaccuracy can be the cause of no inconvenience, it would at least be useless in common conversation to make use of other terms. As air is thus necessary to combustion, great attention to procure a sufficient supply becomes a point of considerable consequence in promoting and keeping up the process. In constructing furnaces, and even in putting up fireplaces, it requires the chief consideration. In the former, the length of the chimney in a great measure influences the heat, by causing a greater or a smaller current of air through the fire; and dampers or registers are in some cases used, which, by admitting more or less air into the furnace, regulate the intensity of the heat. The use of bellows depends upon their supplying a greater quantity of air; and in the furnaces of smiths' forges immensely large bellows are used to increase the draught. In common fireplaces, the dimensions of the chimney, the position of the stove, and the free accession of air, are the three points chiefly to be attended to, with a view of having good fires, and preventing the inconvenience of smoky chimneys. When the chimney is very large, as most kitchen chimneys were formerly built, they are almost sure to smoke. The column of air in the chimney not being all sufficiently heated to ascend, there are different currents; the heated air ascends in the middle, whilst the colder air descends at the sides, and in descending forces part of the smoke with it into the room. To prevent this the fire is made larger, and the door or a window is opened. The heat now is sufficient to expand all the air in the chimney; but if the door or window is not open, there not being a sufficient quantity of air admitted by the usual crevices, the external air forces itself down the sides of the chimney to supply the place of that which is consumed, and that which, being expanded, passes up the middle of the chimney, and thus the same inconvenience is repeated. By contracting the throat of such a chimney, the column of air to be heated is less, and is sufficiently expanded by less fuel, at the same time that the current of air required to keep up a brisk fire is less; so that the chimney will no longer smoke, nor does the necessity of opening the door exist. If a stove is placed very forward in the room, the heated air is expanded, and ascends in the apartment, and the smoke along with it, particularly when the fire is first lighted; the air in the chimney then not being heated so as to establish a current. This is often observed in old-fashioned movable fire-grates, and is generally remedied by pushing them a little backward. The free accession of air is the most important consideration. We have seen that without it a current of air will be formed down a chimney, that must inevitably bring the smoke with it. In small and close rooms it is the most frequent cause of smoky chimneys and bad fires. When it is found that opening a door or window prevents the smoke from descending, the cause is evident, and the cure is generally accomplished by contriving a communication with the air, and if this can be done under the grate, or near it, so much the better, as a current of cold air from a distant part of the room will be sure to prove inconvenient. If the room is lofty, a communication may be made over the door or near a window, above the height of persons in the room, which will prevent any inconvenience from the current. But in low rooms we have seen this attempted and fail; or it has answered when the fire was first lighted, or before the air in the room has been heated by company. The reason of this becomes clear and evident if a candle is held before the opening, at a time when the air in the room is heated, for the flame of the candle is drawn towards the opening, and not from it into the room, which proves clearly, that instead of admitting air, it is the channel through which air is carried out of the room. This may be prevented by laying the fire very light, and setting fire to a handful of shavings on the top previously to lighting the fire at the bottom; or more certainly, by setting fire to a piece of paper, and holding it a little way up the chimney. This heating the air in the chimney is sure to establish a current in a proper direction, and carry the smoke upwards. Most fires are in this predicament when they are lighted for the first time after a long interval, as in the beginning of winter; and ignorant people attribute it to the air in the chimney being damp. The fact is, that the air in the house, and consequently that in the chimney, is colder than the external air, as is the case during summer and autumn, until by lighting fires we have increased its temperature. The first time a fire is lighted, therefore, as the air in the grate is expanded, its place is supplied by cold air from the chimney, which rushing through the fire, carries the smoke into the room, unless, as before mentioned, some means are taken, first to warm and rarefy the air in the chimney. An Argand lamp burns better than a common one, because it admits a current of air through the centre of the wick. This causes so complete a combustion, that the smoke, which it usually gives out, is burnt in this lamp, and therefore it affords more light. When we wish for light rather than heat, we employ such inflammable substances as allow their particles to be volatilised, as spirits or oils; for flame is part of the inflammable substance volatilised by heat, and still in a state of combustion. It is always conical, and its external surface only is in an ignited state, as is easily proved by suddenly thrusting a match into the centre of the cone, say of that arising from spirits burning in a shallow dish. If you allow it to remain there some time, and then suddenly withdraw it, the brimstone at the end of it will not be burnt. The reason why only the surface is in combustion is, that the contact with air is necessary, and it has no access to the centre.

Common Cement.—Mix together half a pint of vinegar and half a pint of milk. When they have formed a curd, take the whey only, and mix with it the whites of five eggs, beating the whole thoroughly; then sift in gradually sufficient quicklime to convert the whole into a thick paste. This will be found useful for broken bowls, jugs, &c. Rub both the broken edges, and then cover the crack with it, allowing it a fortnight to dry.

Compass.—This instrument is too well known to need describing, and most people know its use. The best compasses are constructed with joints of two different metals, usually steel and brass, to equalise the wear and render the movements of extension or contraction while the instrument is in use more uniform and steady. The points of a well-made instrument are of finely-tempered steel, in order that they may not be too easily bent or blunted. They should meet very closely when the compasses are closed. Compasses are used to reduce uniformly, to measure spaces off by scale, to set off equal distances upon a given line, make angles, and describe circles, intersecting arcs, &c. &c. To work with great precision, when extreme accuracy is of importance, hair-compasses are employed, which work with a fine spring (hair-spring), and screw. Movable points are provided for compasses sold in the more portable form in order that, when required, a pen, a pencil, or a dotting-point may take the place of the sharp steel point. To enable compasses to describe a larger circle or measure greater spaces a lengthening bar is sometimes provided. Bow compasses are used to form very small circles; they roll more easily between the fingers. The tubular compass (the invention of Mr. Brunel) may be used as the ordinary instrument is used, but is most useful for describing small and large circles, with the advantage of reversing points which may be changed without removing or deranging it while the instrument is set. There are compasses of various other kinds, but of these we shall only mention the proportional compasses, as specially useful where extreme accuracy is of importance, and the triangular compasses, which are particularly useful in copying mechanical drawings.

Composition Ornaments.—One pound of glue, one pound crude turpentine, half a pint of boiled oil, half a pint of water, and as much finely-sifted gilder's whitening as it will absorb, are mixed up much stiffer than oil putty. It is an improvement if a quarter of a pound of common yellow soap and a small quantity of flour are mixed with it. The brimstone moulds are oiled, the composition pressed in with the hand, and afterwards put under a screw press. If you have no press it may be pressed in and rolled over hard with a silk roller, wetted and pressed on a board. Let it remain about a quarter of an hour, then the mould is gently raised by means of a tool put underneath. The ornament is then cut off by means of a large carving-knife, and glued on a wooden moulding or shape for frames, cornices, brackets, &c. Such ornaments are afterwards painted, grained, or gilded.

Condiments.—Condiments may be classified as saline, saccharine, acidulous, aromatic, and oleaginous. They are used sometimes to improve the flavour of food, sometimes to counteract the injurious qualities of food, sometimes to promote digestion, and at other times to accelerate the passage of food through the body. (See *Salt*, *Sugar*, *Pepper*, *Spices*, *Mustard*, &c.)

Conduction of Heat.—In our article on *Heat* (page 220) we describe how heat is communicated from one body to another. Some materials are bad conductors of heat; others are good. For instance, wood being a bad conductor of heat, one end of a piece of timber may be blazing while it is quite cold at the other end.

Conductors of Heat.—Metals and stones are good conductors of heat, in proportion to their density. In winter iron feels colder than wood, because the iron extracts the heat from your hand more rapidly. Amongst metals, gold, silver, and copper conduct heat more readily, while lead and metals of its kind, being less solid, are of inferior value as heat conductors. Eider-down is a very bad conductor of heat, because of its light open nature. A metal handle to a kettle or tea-pot grows hot where a wooden handle would remain cool, for this reason. Wool is therefore a better material for a kettle-holder than most other materials, except paper. (See *Absorption of Heat.*) Water is a better conductor of heat than air, and hence a wash in hot weather is often found to be refreshing. The air extracts heat more slowly than the water, although liquids are not good conductors of heat. These bodies, because they transmit heat most readily, are called, in opposition to those by which it is retained, conductors of heat. Iron, for instance, is a conductor. The fire-irons which remain cold even near a huge fire become hot very quickly when placed in contact with the heated iron of a stove.

Constipation.—Indigestible food, or food not properly digested, or food which is too astringent in its character, such as bread containing an excess of alum, are common causes of this complaint. But it may also arise from general debility; from a want of proper exercise; from neglecting to give prompt attention to the calls of Nature; from a spasmodic contraction of the muscular coat of the bowels, as in colic; by stricture of the intestines, worms, hæmorrhoids; or from an inflammatory state of the serous and other textures forming the coats of the bowels. For further particulars, see *Indigestion*, and for remedies, see *Medicine*. See also *Diet* and *Meals*.

Consumption, or Phthisis.—This disease, which is very prevalent in this country, has its seat in the lungs. Rules for detecting the earliest symptoms of a tendency to it will be found under the letter L, on page 259. The vital characteristics of the lungs will be sufficiently well understood for all practical purposes by readers who have taken the Hints given by our Facts about *Respiration*, *Blood*, the *Lungs*, and *Exercise*. The structure of the lungs consisting of what we may term an interwoven mass of extremely delicate and fragile vessels, its tender membranes are consequently very susceptible to injury. Tuberculous consumption is a disease which for insidiousness and fatality has no prototype. It is due to the formation of tubercles, resembling small boils, in the lungs, which make their first appearance in a grey, semi-transparent, granular form, gradually enlarging and ulcerating until they finally destroy the lung. The first stage of this disease frequently commences with drowsiness and a headache. These are followed by a cough, which is very slight at first, and only heard in the morning. It next occurs during the day, and is accompanied by the expectoration of a transparent fluid resembling saliva. When taking exercise or ascending stairs the breathing becomes oppressive, and occasional darting pains are felt in the chest. The pulse soon begins to beat more rapidly, the body becomes heated and chilled at short intervals, a burning sensation is experienced in the soles of the feet and palms of the hands. At night the victim is slightly feverish, and in the morning perspires slightly. The countenance assumes an expression of languor, and grows pale. The flesh wastes away, and strength decays. At this stage of the disease a change of weather or removal to a warmer or less fickle climate will for a time at least dissipate such symptoms; and now, if ever, the progress of the disease must be earnestly and carefully striven against. In the next stage of this disease the fluid expectorated undergoes a striking change, specks of opaque matter of a yellowish colour, due to the rupture of an abscess, with sometimes streaks of blood, appear in it, and at the same time the other symptoms above-mentioned become aggravated. The cough, the alternate heats and chills, and the morning perspirations, increase in severity and in frequency. Hectic fever is established, the pulse and breathing become more hurried, the flesh grows flabby, and the body becomes more wasted. The delicate flush, which is so well known as the most fatal symptom of this disease, appears in the cheeks, and blood appears with greater frequency in the expectorations. The third and final stage of this disease follows closely upon the second. Diarrhœa comes on, the perspirations and expectorations become more copious, and the coughing incessant. The feet and ankles swell, the breathing is oppressive, the chest sinks in, and a gurgling sound marks every expiration of the breath. The patient grows rapidly weaker, and soon after dies. Consumption varies in its nature to some extent in different cases, but the above are the ordinary symptoms. Amongst other symptoms more or less common is a certain form of indigestion known as "strumous dyspepsia," which creates a strong distaste for all food of a fatty nature by heartburn and acidity of the stomach. The appetite usually remains unimpaired.

Acute Consumption is so called from the rapidity with which it runs its course.

Latent Consumption is so gradual in its progress, that up to the period of dying scarcely any of the usual symptoms are discoverable, and very often only dissection makes the cause of death quite clear.

Febrile Consumption is that which is brought on by a cold.

Chronic Consumption is the most common form of this disease, and the least understood. Patients suffering from it often linger on from year to year, and enjoy at intervals more or less long all the characteristics of perfect health. It is, however, nearly always fatal.

Causes of Consumption.—These are classified as *exciting* and *remote*, Under the first of these heads is included hereditary predisposition. Whatever occasions a determination of blood to the lungs, or irritates them, will in the case of scrofulous individuals produce partial effusions of scrofulous lymph in the cellular substance of the lungs—in a word, tubercles. These prevent the due expansion of the lungs, and, of course, that free circulation of the blood through the pulmonary organs, which is of vital importance. (See *Lungs* and *Blood.*) It was formerly held that the tubercles had their origin in inflammation of the lungs, but this idea has, we believe, been entirely abandoned by all our best authorities. Improper diet, impure air, deficient exercise (see *Exercise*), injudicious clothing (see *Clothing*), a want of cleanliness (see *Ablution*), drunkenness, or anything which tends to deprive the body of its due nutrition, is an active agent in producing scrofula or king's evil, which is now identified with consumption. Amongst other causes are mental anxiety, exposure to cold and wet, over-exciting aliment (see *Diet*) which gives the digestive organs an undue proportion of work (see *Digestion* and *Anxiety of Mind*), excessive sedentary labour, tight lacing, breathing an atmosphere impregnated with dust, &c.

Treatment of Consumption.—Consumption is so insidious in its first approaches, and so rapid and strong in its after progress, that too much care cannot be exercised in watching for premonitory symptoms in those who are predisposed for its reception. At first the disease produces so little inconvenience to the patient that he is not alive to the importance of at once checking it, and instead of having immediate recourse to medical advice, he pooh-poohs the words of those who bid him do so, and foolishly allows the disease to work its fatal way in secret, undisturbed. The treatment usually adopted is that which strengthens the system to resist its approach, and acts upon the seat of its development. In the first case nutritious diet of a wholesome non-stimulant kind, and frequent gentle exercise in fresh, mild, pure air, generally that of the sea-side, are recommended (see page 339, *Sea-side*), with regular and particularly cleanly habits. Cod-liver oil is a very valuable remedy, which has been adopted with the most beneficial results in numerous cases. Tonic medicines, such as bark, sarsaparilla, iron, and iodine, are also very beneficial where the symptoms of febrile conditions do not exist. Counter-irritants applied to the upper parts of the chest are used where inflammation is apparent, and in some cases warm baths are found to do good service by promoting more vigorous circulation in the extremities and in the surface of the body generally. Care must be taken not to check the perspirations, either by diminishing the quantity of bedclothes at night or by throwing them off in the morning. When the purging occurs care must be exercised in not checking it too suddenly. Carefully-selected diet will serve best to moderate it. From the foregoing directions it must appear evident that a low diet should be adopted, and everything avoided that has a tendency to inflame the constitution. The jellies of arrow-root, sago, tapioca, oatmeal, and light bread pudding may be occasionally varied, as agreeable to the inclination of the patient. The animal jellies of calves' feet, hartshorn shavings, and isinglass; a little boiled fowl, shell-fish, flounders, and soles (without sauce) may be allowed when febrile symptoms are not high, or when the system is not irritable; but animal food in substance, as beef, mutton, lamb, and pork, and wine and spirits of all sorts, must be scrupulously avoided. The beverage should be very simple, such as the almond emulsion, whey, distilled water, linseed-tea, weak lemonade, butter-milk, and barley-water. Flannel should be worn next the skin; and any sudden transitions from heat to cold, and *vice versâ*, must be carefully guarded against; and as a light atmosphere is more easy of respiration than a heavy one, the patient should sleep and live as much as possible in the uppermost room of the house. By a strict observance of these instructions the progress of the disease may be speedily and effectually suspended, the effect of the diseased action removed, the lungs rendered adequate to their important functions, and the patient, of course, gradually restored to his usual strength and health. Some writers disapprove of a milk diet in this disease. The experience of many ages and the arguments which may be adduced from analogy have, however, proved, to the conviction of every candid inquirer, that it affords a nutriment admirably adapted to support the debilitated frame of a consumptive patient. When it is found to be too heavy for the stomach it may be diluted with barley-water or distilled water, which will often reconcile it to the stomach. Ass's milk, being thinner than that of the cow, often agrees better with the patient. Some, however, have so great an aversion to the milk of this animal that they cannot be prevailed on to take it. In such case some substitute of a kindred nature should be adopted.

Consumption of Food.—We have already given the reader so many FACTS, which involve HINTS, concerning the selection and use of food under a large variety of circumstances, that we need merely add under this head that it is better to eat too little than too much food. In a general way the amount of food taken should be proportioned to the appetite, the digestive powers, the waste of organic power, and the state of health.

Convection of Heat, or Boiling.—The *convection*, or communication of heat, by the means we see in operation when heat ascends from the water at the bottom of a vessel to that at the top, is commonly known as boiling. When you place a kettle on the fire to boil, the water nearest the fire is first heated, and being expanded (see *Heat, Expansion by*) rises to the top. As the heated water at the bottom of the vessel is converted into steam it darts upward, and the cold water rushes in to supply its place; the hot water, rising through the colder water above it, and being condensed before it reaches its surface, the bubbling noises known as simmering are produced. As the heat ascends near the surface the water begins to boil, that is to say, the evaporation or expansion of it by heat becomes more general, and escapes as steam. The noises made by a kettle when the water in it is beginning to boil are also due to the convection of heat. The ascending currents of heated water rise in the middle, the descending currents pass downward by the sides, and the rattling, bubbling commotion kept up by this process we are all familiar with. We have explained on page 180 that liquids are not good conductors of heat, which is therefore communicated to them by this process of convection. The reason why liquids are not good conductors is found in the fact that by changing their temperature the particles are put into motion, and consequently escape the communication of heat by contact, whereas in good conductors the particles are in close contact; in other words, such materials are most dense. (See *Conduction of Heat.*) To this process of convection is due the fact that heat applied to the top of water does not affect the water beneath it as it would do if applied from below. This, moreover, shows that water is a bad conductor of heat, for if it were not, heat applied to one part would be communicated by contact to its surrounding parts, whether above or below. The fire above an iron grate makes the iron in contact with it hot whether it is above, below, or on either side of it, because iron is a good conductor of heat. We have said that the cold currents of water descend. To this fact it is due that to cool liquids the cold element should be introduced at the top rather than at the bottom of it. In our remarks on *Evaporation* we explain how, as water ascends in the form of steam, it reduces the surrounding temperature. (See page 181.) This is why water, when it has reached the boiling point, retains that degree of heat. Air, like water, is heated by convection, not conduction. Thus the air nearest the fire is first heated and ascends, cold air rushing in to supply its place. (See *Combustion.*) For this reason fireplaces are put near the floor. If you want a very simple practical illustration of convection, make a poker red-hot and hold it with the heated end downward. The hot air ascending will scorch your hand. Reverse the hot end, and this is no longer the case.

Convulsive Fits.—In children these usually arise either from a disordered state of the bowels or from teething. If they occur before the fifth month, it is probable that the bowels are mainly in fault. If about the usual period when dentition has commenced, this may be the cause, but it is more than likely that it will be so in conjunction with a disordered state of the bowels. (See *Dentition.*) The causes of such fits are usually improper feeding, teething, worms, bad air, such as arises from unhealthy, ill-ventilated apartments. (See *Ventilation.*) When a child is in a convulsive fit, the first thing to be done—pending the arrival of the doctor—is to admit plenty of air to the child's face and mouth, and to put it into a warm bath, in such a position as enables it to breathe freely. If the fit is due to an overloaded stomach—indigestion—tickling the mouth with a feather or the finger, in order to bring on vomiting, would probably do good. If the child be in an exhausted state from previous diarrhœa or other cause, a little simple food may be given, such as fresh milk and water or barley water; or if the child should be very much reduced, a little *very weak* brandy and water, sweetened with sugar. If the fit is due to teething, the gums should be lanced. The operation is not at all a painful one, nor is it at all dangerous, and it is one that the parent may readily perform. Sprinkling cold water in the child's face while it is in the bath is sometimes found effective. Convulsions are sometimes brought on by the use of opiates to keep children quiet by unfeeling or ignorant nurses and mothers. To lance the gum place the thumb and forefinger of the left hand on either side of the gum on which you wish to operate, and draw the edge of the lancet vertically along its top with a very slight pressure. You will know when the gum is lanced by hearing the lancet touch the tooth. Mr. Cline used to relate how one unfortunate mother lost child after child in these fits, until she was taught how to use the lancet, after which she never under the same circumstances lost another.

Cooking.—Details of cooking will be found attached to the names of the various processes, such as *Roasting*, *Boiling*, *Broiling*, *Baking*, *Frying*, &c. Cooking has for its purpose the removal of deleterious qualities from food and the rendering it more easy of digestion or more nutritious and palatable. In almost all processes of cooking the agent in use is fire. (See *Fuel.*)

Cookery is of two kinds, simple and refined, or compound. The object of the first is either to destroy some deleterious property or to render food palatable and nutritious. That of the second is to stimulate appetite and please the palate, an end sometimes attained by fantastic and unwholesome compositions. The general modes of cooking are as follows :—1, Roasting ; 2, boiling ; 3, stewing ; 4, broiling ; 5, frying ; and 6, baking. By roasting a greater quantity of nutritious matter is retained in meat than by any other process of cookery except that of boiling. The perfection of this process consists in doing the meat neither too rapidly nor too slowly. By the first method it is withered, by the second burned or scorched, and by either rendered unnutritive and indigestible. Meat to be wholesome should neither be over or under-done. By over-dressing meat, as its fluids are expelled by the heat and the fibres compelled to approach closer to each other, it is rendered indigestible ; by its being under dressed it runs quickly into putrefaction. The perfection of roasting consists in the medium between over-dressing and under-dressing, namely, in the meat being well done, when it will eat short and agreeable and be in its most nutritive state. The flesh of old and full-grown animals is not unwholesome if eaten rather under-done ; but young and viscid food, as veal, lamb, pig, chicken, &c., should be thoroughly cooked, or it will disagree with the stomach, and probably occasion sickness. Such food is also more wholesome and nutritious and more easily digested when roasted than when boiled. Boiling renders meat more tender than roasting it, but it deprives it of more of its nutritive qualities. Boiled too long or too fast meat becomes hard and indigestible, besides, all its nutritive qualities are lost or dissipated in the water. Meat boiled in hard water is more tender and juicy than when soft water is used ; while vegetables, on the contrary, are rendered harder and less digestible when boiled in hard water Boiling is the best process for dressing vegetables, as they are thereby rendered more soluble in the stomach, and are deprived of a considerable quantity of fixed air. By stewing, meat is rendered more tender than by any other process of cooking ; but as more of its soluble parts are extracted than is the case with the other processes, the only good aliment that it affords is the soup, for though the meat is rendered sapid, it is hard and less nutritious. By broiling meat more of its nutritive qualities are retained than by most other processes, for the evaporation or exhalation of the juices of the meat is prevented by the sudden hardening or browning of the surface. For imparting strength it is therefore the best mode of dressing animal food, as it is thereby rendered more nutritious and easier of digestion than by any other preparation. Frying is the most objectionable mode of dressing any species of food, as it is rendered highly empyreumatic by the heat being applied through the medium of burning oil or fat. Baked meats are not unwholesome for occasional use ; but from the retention of their oils, occasioned by the confined space in which they are dressed, they are not so digestible and nutritious as roasted food is. On this account those who are subject to dyspepsia or biliousness when they partake of this species of food, should assist the powers of the stomach by the additional stimulus of spices and aromatics, and they should abstain from its gravy, as it is highly empyreumatic. If by this restraint the meat should not be sufficiently savoury, by pouring boiling water over it on the plate a wholesome and sapid gravy may be obtained.

Cooking, Application of Heat to.—Heat is applied in various ways for the purpose of cooking food, either directly or indirectly. Radiant heat (see page 316) acts directly upon the substance placed at a short distance before its source, the fire, which should be clear and glowing and impeded as little as possible by the bars of the grate. Another direct mode is that of placing the substance over the fire in the heated ascending air (see *Bacon, Curing*), or placing it on the burning fuel, or on bars or a plate of iron above it. Heat is often employed through the intervention of fluids, chiefly water, or of steam, or some oily material. The peculiarity of baking consists in the food being cooked by the confined heat of a small space. (See the HINTS given under the head of *Diet.*)

Cooling Drinks.—Ice water should be drunk but sparingly. A most excellent substitute for it is pounded ice taken in small lumps into the mouth and allowed to dissolve upon the tongue. This will prove very refreshing, and much more enduring in its effects. Travellers who find it inconvenient to use lemons can carry a box of lemon-sugar, prepared from citric acid and sugar, a little of which in a glass of water will help to furnish quite a refreshing drink, and one that will help oftentimes to avert sick-headache and biliousness. Citric acid is obtained from the juice of lemons and limes. A delicious beverage can be made from cherries, and will keep a year or more. Take six pounds of cherries and bruise them ; pour on a pint and a half of hot water, and boil for fifteen minutes ; strain through a flannel bag, and add three pounds of sugar. Boil for half an hour more, or until the liquid will sink to the bottom of a cup of water (try it with a teaspoonful of the liquid) ; then turn into jelly cups, and cover with paper dipped in the white of an egg. To prepare the drink : Put a spoonful of jelly into a goblet of water, and let it stand about ten minutes ; then stir it up and fill with pounded ice. Currants and raspberries made into "shrub" furnish a pleasant and cooling drink when mixed with ice-water. Pounded ice is also an agreeable addition to a saucer of strawberries, raspberries, or currants. Pound it until it is almost as fine as snow, and spread it over the berries. With fruit it is also an excellent substitute for cream. Water-ices are always acceptable. Those made of lemon, orange, currants, strawberries, raspberries, and pine-apple, are much improved by adding the stiff-beaten whites of four eggs to every two quarts of the liquid. Put it in just as it is turned into the freezer, and it will freeze in a foam (see *Freezing* and *Ice*). "Cool Tankard" is a pleasant summer drink, which is made as follows:—Add to a quart of mild ale two wine-glasses of white wine and rather more than one of lump sugar, the juice of one lemon, and half its rind ; stir this with a sprig of borage and a sprig of balm, which are then left in the drink. Let it stand in a cool place, and just before it is drunk add a tumblerful of broken ice.

Copper is used in a variety of the arts. With tin it forms bell metal, and gun metal, and with a metal called zinc it forms brass; when a small proportion of zinc is employed, it forms an ornamental and useful compound called pinchbeck. Vessels made of copper for culinary purposes are highly prejudicial, for all acids and all oily or fatty substances, when allowed to turn rancid, combine with the copper, and form verdigris, which is poisonous if taken in sufficient quantity, and very detrimental, even in the smallest quantities. Copper boilers must consequently be highly prejudicial, for it is impossible to keep them so clean but that some verdigris will be formed about the edges where the oily or fatty substances are sure to lodge. To prevent these bad effects, most copper vessels are tinned on the inside. To do this the surface is well cleaned by rubbing it either with sal ammoniac or an acid. The tin, or a composition of tin and lead or lead and pewter, is then melted in the vessel and rubbed well about with old rags doubled up. But this tinning, let it be remembered, does not wholly prevent the bad effects of the copper, as it soon wears off. It has been usual to attribute the bad effects often experienced from tea to its being somewhat impregnated with copper, from being dried on plates of that metal; but it is now known that iron plates, not copper ones, are employed for that purpose ; the ill effects of tea must therefore be attributed to its own properties, to adulteration, or perhaps in a great measure to the debilitating power of hot water.

Copper, Sulphate of.—Sulphate of copper, commonly called bluestone (though it is also known as blue vitriol), is a compound of oxide of copper and sulphuric acid. Sulphate of copper is sometimes used as an escharotic for reducing the exuberant granulations of ulcers when healing to a proper level. It is formed either by boiling copper in sulphuric acid or by exposing wet sulphuret of copper (copper pyrites) to the atmosphere. Sulphate of copper is used in dyeing. It was formerly used in the manufacture of green and blue verditer, at one time much used for painting.

Coral, Artificial, for Grottoes.—To two drachms of fine vermilion add one ounce of clear resin, and melt them together. Having the branches or twigs peeled and dried, paint them over with this mixture while hot. (The sprays from an old blackthorn are best adapted for this purpose, when an irregular branch is required, while the young shoots of the elm-tree are altogether as regular; the thorn and holly boughs are picturesque in shape.) The twigs being painted, hold them over a gentle fire, turning them round till they are perfectly covered and smooth. White coral may be imitated with white lead; black with lamp-black, mixed with the resin. Sealing-wax will answer. (See *Electrical Varnish.*)

Corner Dish.—Slices of apples and potatoes fried make a pretty corner dish spread upon a light netted d'oyly.

Corn Plaster.—One ounce of naval pitch, half an ounce of galbanum, dissolve in vinegar; one scruple of vinegar ammonia, and one drachm and a half of diachylon mixed together.

Corns.—To cure corns, the most effective way is to remove the cause of their growth, namely, undue pressure. The little elastic pads perforated in the centre sold for this purpose readily adapt themselves to the toe and foot, and are worn without the least inconvenience. Cutting corns is dangerous.

Corns, Soft, Cure for.—Apply a piece of adhesive plaster, such as is sold by chemists and druggists; spread this on moleskin, cut a piece the size of the corn, but not to cover more than is absolutely necessary to secure a firm hold upon the healthy skin beyond the corn. Renew the plaster three times a week, and it will soon cure either hard or soft corns. A friend of ours assures us that by dissolving some pearl shirt-buttons—three—in a little vinegar he obtained a liquid which had invariably removed corns in every case it was tried. He applied it morning and night regularly. Bathing the feet every other night in a warm arnicated lotion consisting of one part mother tincture of arnica with forty parts warm water until the skin becomes soft, and the corns can be carefully picked away, is another excellent plan.

Cough Mixture for Children.—The following we have found very useful for children threatened with croup or bronchitis:—Ipecacuanha wine, three drachms; syrup of tolu, five drachms; mucilage of gum arabic, one ounce; mix. Dose, a tea-spoonful every hour or two.

Court Plaster.—This well-known plaster is a useful application for recent superficial cuts, to keep the edges in contact, and defend them from the action of superficial air, &c. The best court plaster is made by stretching the silk in a frame, and painting its surface over with a solution of gelatine in warm water. This is to be repeated several times, the surface of the silk being allowed to dry before another coat is applied. Sometimes in common plaster, it is said, gum arabic dissolved in water alone is used for this purpose. Occasionally when the last coat of gelatine has been applied to the surface of the silk, it is painted over with a weak tincture of benzoin. This, although it improves the appearance of the plaster, renders it more irritating to wounds. Instead of gelatine some use benzoin dissolved in rectified spirit, mixed with a hot solution of isinglass, and finish with benzoin in clean turpentine.

Correspondence, Secret. — The great advantages of secret writing are simplicity, impossibility of detection, and the capability of multiplying its keys to infinity. Let the key to each of the correspondents be a line of poetry, or the name of some memorable person or place that cannot be forgotten, and let them all be provided with a copy of the above table, which may be printed, as it matters not into whose hands it falls. When the despatch is composed, write the key sentence beneath the text, letter for letter, repeating it as often as it may be necessary. For example, suppose the key sentence to be "Sir Humphrey Davy," and the secret clause of the despatch to be "Protract the negociation as much as possible." The reader will readily see that when written as we have directed, the despatch will stand thus:—

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z
b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a
c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b
d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c
e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d
f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e
g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f
h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g
i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h
j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i
k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j
l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k
m	n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l
n	o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m
o	p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n
p	q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
q	r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
r	s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q
s	t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
t	u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s
u	v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t
v	w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u
w	x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v
x	y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
y	z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y

Pro t r a c t the n e g o cia t i o n as mu ch as
Sir Humph rey Davy Sir Hump hr ey Da vy
pos s i b l e.
Sir Humph

Now look to the left-hand vertical column for the first letter of the text, P, and in the upper horizontal column for the corresponding letter of the key, S; where these columns meet h will be found, which write down. Proceed in this manner for the representation of the next letter r (that is, at the junction of the columns r and i), which will be z; and so on through the whole of the paragraph. It will then appear as follows:—H z f a l m r a k f h n z e g kzhnudu rq p u x f s e g v m e x i c e. The inverted process for deciphering needs no explanation.

Crassamentum.—That portion of the blood which when drawn from living animals coagulates, and after separation from the *serum* remains red. (See *Blood.*)

Crayon Drawings, to fix.—The best method is to dissolve strong isinglass in water, and brush it over the paper before commencing the drawing. Allow it to dry when the surface is in good condition for making the drawing. When done, the paper should be held horizontally over steam. This will melt the size, which absorbs the charcoal or crayon. When allowed again to dry, the drawing has become fixed.

Cream as food is exceedingly nourishing, but where the digestion is not good it should be avoided. Cream has many of the properties of oil.

Cream Soda.—In a porcelain saucepan or small preserving-kettle put two quarts of water, three pounds of white sugar, and two and a half ounces of tartaric acid; place over the fire, and let it just come to a boil. Beat to a stiff froth the whites of three eggs, and add to the boiling water, &c. Let it boil just four minutes, *stirring constantly;* strain, and when cold add one teaspoonful of either lemon, pine-apple, or any flavouring essence that is desired; bottle it tightly. When wanted for use turn two tablespoonsful of it into half a tumblerful of ice-water, and stir into it one-third of a tea-spoonful of carbonate of soda; it foams very nicely, and is a very agreeable, refreshing beverage.

Crême à l'orge.—Three-quarters of a pound of veal, half a pound of beef, two ounces of pearl barley, one quart of water. Stew gently eight or ten hours, and rub through a sieve. It should be the thickness of cream.

Crockery.—To Repair Dishes Broken in Half.—If you have any dishes merely broken in half, but not shattered, procure from a house-painter a small quantity of white paint. Take the two halves of the dish, first seeing that they are perfectly dry and free from grease. Place them, bottom upwards, on a shelf or common table, or on the floor, and smear the broken edges with paint, laying it on neatly with a small brush, then join these edges together, fitting them tightly. Cut some strong new tape the exact size of the fracture, cover one side of the tape also with paint, and lay it over the crack where you have joined the two broken pieces together. Press down the tape closely on the crack, so as to make it lie smooth and even; then let the dish remain untouched for three or four weeks, by which time the crack will be firmly cemented, and the dish will never break again in the same place.

Croustacle.—Bread baked in a mould and scooped out to contain minces.

Croutons.—Bread cut in various shapes and fried lightly in oil or butter.

Crystallised Windows.—For this purpose you may use Epsom salts, alum, Glauber's salts, or *blue stone* in hot water, making a saturated solution. Then wash the window while hot with a brush. It will soon cool, and deposit the salts in a crystalline form upon the glass, and when the water has evaporated the window will be beautifully frosted. You must be careful to use none of those salts which will deliquesce in a damp atmosphere.

Cucumbers.—A gently aperient, cooling fruit, which has been recommended to the consumptive from its property of acting upon and correcting the acrid humours. We hesitate to endorse this statement, because the large quantity of woody fibre cucumbers contain must render them indigestible. To counteract their natural coldness and prevent their tendency to ferment they are usually eaten with vinegar and pepper. Oil and salt are sometimes added to the vinegar, but by so doing the cucumbers are rendered less wholesome.

How to Cook.—Pare off the rind; then cut the cucumbers into slips *lengthways*, dust both sides of the slices with Indian-corn meal or wheaten flour; pepper and salt to your taste. This done, fry them brown, and you will have one of the most delicious dishes.

Cucumber Soup.—Pare and slice six moderately large cucumbers and four ounces of onions, cut up six cos-lettuces, removing the outside leaves. Put these, with one ounce of parsley, salt, and pepper, into a pan with four ounces of butter, and stew them for three-quarters of an hour over a gentle fire, stirring occasionally. Pour in two quarts of boiling water, add six ounces of bread-crumbs, and stew gently for two hours. Mix and add a teaspoonful of flour, with one ounce of butter, and stir this well in; boil for ten minutes, and add a teaspoonful of vinegar.

Custard, Gooseberry.—Boil a quart of gooseberries in just enough water to prevent them from burning. When they are quite tender and as free from water as possible rub them through a hair sieve, beat up the pulp with three yolks of eggs and two whites, adding by degrees sugar to your taste with a tablespoonful of orange-flower water. When these are all thoroughly mixed together set them over a slow fire, and keep stirring them one way till they have reached the consistence of a custard, but they must not be allowed to boil or they will curdle.

Cuttle-fish.—This fish is sometimes used for food, but it is very unwholesome, and only fit for very strong stomachs. The bone of this creature is used for rubbing out ink-marks from paper, and, in a finely-powdered state, it enters into the composition of tooth-powders.

Damajavag. — The remarkable name of Damajavag is given to a preparation made from the chestnut-tree, and employed as a substitute for oak-bark or gall-nuts. In 1825 a person named Giroux took out a patent for making the preparation, but did not meet with any great encouragement. The method of proceeding in the manufacture of the article is as follows:—A quantity of the external shell of the chestnut, or even the wood itself, is to be broken into small pieces, and soaked for at least twelve hours in double its weight of soft water, and then boiled gently for about four hours, when the liquid is to be drawn off and filtered, in order to separate and get rid of the fibrous matter. The liquid extract is now to be returned to the boiler, and evaporated till such time as the extract becomes of about the consistency of paste. After this it may be dried in an oven, formed into cakes or sticks, and applied to the various purposes in connection with art and manufacture, as gall-nuts are, and makes an excellent substitute for the same.

Dampness in Beds, to Detect.—Have the bed heated by a warming-pan, after which place a goblet or looking-glass between the sheets; if found dry and not tarnished with steam, when taken out (after allowing it to remain some few minutes) the bed is perfectly safe; but if the contrary is the case, you may feel sure the bed is damp.

Damp Rooms.—So serious an enemy to health is a damp sleeping or dwelling room, that we gladly extract the following from the *Builder*, merely advising our readers who may adopt the hint, for a reason they will find below, to first test the quality of the pitch by a preliminary trial. The writer says :—"Some years ago, in the erection of a large country house in an exposed position, where the outer walls were of stone and lined with brickwork, instead of having the south and western walls battened, I had a coat of Stockholm pitch laid completely over the whole internal surface of these walls, and, while in a soft state, the pitch was roughly scored with a stick, so as to form a key for the plaster, which was subsequently applied in the usual manner, and with three coats. The result was perfectly satisfactory. No damp of any kind has since appeared. The rooms were papered within a very short period of their completion, without any subsequent discoloration, and there has been no annoyance from smell. I have subsequently applied it on brick walls with as satisfactory a result; but last year, in the erection of another large house, where the main walls were of flint, lined with brick, and covered with Portland cement on the outside, I had the inside walls coated with pitch in the same manner as above described. The pitch seemed longer drying than usual, and the smell continued for a longer period. After the joiners' work was finished considerable annoyance was experienced from the smell of pitch, and some of it had to be taken down with a view to give air and vent to the smell. After leaving it exposed for two or three months, the annoyance seemed at an end; but now, on the return of the family from abroad, and the occupation of the house, the smell seems to have returned, to the annoyance of every one. The builder declares that he used the best pitch, and that no tar was mixed with it." We think the probable cause of this evil was not the pitch, but the non-absorbent nature of the Portland cement.

Damp Sheets.—(See page 231, under the head *Homœopathy*.)

Damp Walls.—When these arise from deliquescence of the muriate of soda, &c., in intimate combination with the sand used for the mortar, it is merely necessary to wash the wall with a strong solution of alum. This converts the deliquescent salt into an efflorescent one, and the cure is complete. Or alum may be added to the plaster in the first instance.

Damson Cheese.—Let the fruit be gathered in a dry season; weigh them, and bruise them with the hand; to one gallon of boiling water put eight pounds of fruit.

Damsons, to Bottle.—Put damsons into a wide-mouthed bottle, and cork them down tight; put them into a moderately heated oven, and about three hours more will do them; observe that the oven is not too hot, otherwise it will make the fruit fly. All kinds of fruit that are bottled are done in the same way, and they will keep two years. After they are done, they must be put away, with the mouth downwards, in a cool place, to keep them from fermenting.

Damsons, whole, to Preserve.—Take some damsons and cut them in pieces, put them in a skillet over the fire, with as much water as will cover them; when they are boiled sufficiently, strain off the juice. Take for every pound of the damsons a pound of sugar, put the third part of the sugar into the liquor, set it over the fire, and when it simmers put in the damsons. Let them boil well, and take them up for half an hour, covered up close; then set them on again, and let them simmer on the fire after turning them; then take them out and put them in a basin, strew all the sugar that was left on them, and pour the hot liquor over them. Cover them up and let them stand till next day, then boil them again till they are done enough. Take them up and put them in jars, boil the liquor till it thickens, and pour it on them when it is almost cold, then tie over with a bladder, or what is better still, beat up the white of an egg; cut papers the size of the pot, dip it in the egg, and lay it gently over the jam, being careful to exclude all air first.

Dandelion Coffee.—Procure the dandelion roots and let them be well washed and dried; do not scrape, but cut them into pieces the size of peas, and roast them in an earthen vessel. "Coffee" made with this is said to be very wholesome and pleasant.

Dates.—The fruit of an African tree. In their dried state, as they are imported into England, they are not very delicate eating. Stewed in the same way as dried plums, they are recommended for coughs and colds. When dried dates are not delicate eating. They contain much sugar, are nourishing, and are generally stated to be detersive and laxative. The palm, on which dates grow, is found in Syria, Egypt, Arabia, and Northern Africa. Owing to the large amount of nourishment they contain, dates constitute the chief food of the countries where they grow. One pound of dates represents—albumen, one ounce; fibrine, eighteen grains; sugar, eight ounces twenty-one grains; water, three ounces twenty-five grains; gum, two ounces three hundred and thirty grains; fat, fourteen grains; woody fibre, one hundred and forty grains; and mineral salts, ninety-eight grains. In the East, by the addition of water and distillation, dates afford a very good ardent spirit.

Deafness.—This troublesome complaint is not uncommon. It may be due to any one of the following causes:—1. Too much wax in the ear. 2. A common cold. 3. Scarlet fever. 4. Gout, &c. To remove the accumulation of wax, inject warm water with a syringe. Avoid picking and poking at the ears. A little oil dropped into the ear helps to dissolve the wax. Deafness arising from cold will be removed by the cure of the cold. In scarlet fever deafness arises from the connection which exists between the throat and the ear. The discovery of gout-stones in the fine structures of the ear clearly shows how gout may affect the hearing.

Death.—The necessary termination of life may result from the decay of the vital powers, as we shall presently proceed to show, or it may be due to some injury or disease affecting the organism of the body. The signs of its approach vary under differing circumstances. Sometimes the dread event is heralded by a growing dulness of the senses, a want of muscular activity, loss of the sentiments, and a want of intellectual effort, as in death from old age. It is frequently preceded by delirium, sometimes of a peculiarly pleasant character, and sometimes terribly the reverse. Optical delusions are sometimes experienced, and the dying frequently put forth their hands to grasp objects invisible to those about them. The victim of typhus is frequently seen picking invisible objects from the bedclothes, and often hears imaginary sounds. The voice grows weak, sometimes is husky, and at other times has a peculiar sharpness. As death grows nearer the pulsations of the heart become more rapid but weaker, the respiration is sometimes hurried, sometimes grows slower, until it gradually ceases, and is sometimes hard and stertorous. There is frequently an accumulation of mucous, serous, or purulent fluids in the bronchial tubes, producing the sounds known as "the death rattle." "The moribund are often impatient of any kind of clothing, throwing off the bedclothes, and lying with chest bare and arms extended, and the neck as much exposed as possible." The eyes become sunken and glazed, the nose sharpened, the forehead dry and hard, the complexion livid or sallow, or a dull purplish grey, the lips cold and flaccid, and of a leaden or pallid hue. It is generally believed that the process of dying is in itself not a painful one. The most satisfactory proof of a death being real and not merely apparent, as there is reason to fear it often may be, is found in the signs of putrefaction which are first displayed in the peculiar blue-green discoloration of the skin over the abdomen, a colour which speedily extends to the whole body.

Death by Natural Decay.—In the process of natural death the organic life—so called to distinguish it from the animal life (see p. 109)—the first to come into being, is the last to quit it. Disease will destroy sensation and the power of voluntary motion, but circulation, respiration, secretion, excretion, and the entire system of our organic life may continue in operation. On the other hand, the animal life which comes last into being, and is longest in attaining maturity, is the first to decay and perish. Dr. Southwood Smith says:—"An animal may appear to be dead when, together with the abolition of sensation and the loss of voluntary motion, respiration, circulation, and the rest of the organic functions can no longer be distinguished; but these functions go on some time after they have ceased to afford external indication of their action. . . . . In man the process of death is seldom altogether natural. It is generally rendered premature by the operation of circumstances which destroy life otherwise than by that progressive and slow decay which is the inevitable result of the action of organised structure. Death when natural is the last event of an extended series, of which the first that is appreciable is a change in the animal life, and in the noblest portion of that life. The higher faculties fail in the reverse order of their development, the retrogression is the inverse of the progression; and the noblest creature, in returning to the state of non-existence, retraces step by step each successive stage by which it reached the summit of life. In the advancing series the animal is superadded to the organic life; sensation, the lowest faculty of the animal life, precedes ratiocination, the highest. The senses called into play at the moment of birth soon acquire the utmost perfection of which they are capable; but the intellectual faculties, later developed, are still later perfected, and the highest the latest. In the descending series the animal life fails before the organic, and its nobler powers decay sooner and more rapidly than the subordinate. . . . . And with the diminution of intellectual power the senses continue progressively to fail, the eye grows more dim, the ear more dull, the sense of smell less delicate, the sense of touch less acute, while the sense of taste immediately subservient to the organic function of nutrition is the last to diminish in intensity and correctness, and wholly fails but with the extinction of the life it serves. But the senses are not the only servants of the brain, the voluntary muscles are equally so; but these ministers to the master-power are no longer kept in active service. The former are no longer employed to convey new, varied, and vivid impressions, the latter no longer employed to convey new, varied, and intense desires, become successively feebler, slower, and more uncertain in their action. The hand trembles, the step totters, and every movement is tardy and unsteady. And thus, by the loss of one intellectual faculty after another, by the obliteration of sense after sense, by the progressive failure of the power of voluntary motion; in a word, by the declining energy and the ultimate extinction of animal life, man from a state of maturity passes a second time through the stage of childhood back to that of infancy, and lapses into the condition of the embryo. What the fœtus was, the man of extreme old age is. When he began to exist he possessed only organic life; and before he is ripe for the tomb he returns to the condition of the plant." And this condition is not a lasting one. The arteries become rigid, and the supply of nourishment grows smaller; the veins become weak and unfit for conveying the mass of blood by which they are oppressed; the lungs become choked by adventitious depositions, and, the respiratory apparatus losing strength, they no longer properly expand and collapse, and so the decreasing quantity of feebly-flowing venous blood becomes imperfectly aërated. (See *Respiration.*) The heart lacking its wonted stimulus, contracts with increasing feebleness, and the blood is consequently not propelled with sufficient energy to reach the various organs, which consequently gradually cease to act. So day by day the wonderful machine grows feebler in its action, until at last it stops, death ensues, and decomposition takes the whole to pieces, sending forth the elements of which it was composed "to enter into new combinations, and become constituent parts of new beings which in their turn must perish." Thus, as death supported life, so from death springs life. Thus changes move in widening circles from generation to generation onward into the greater circles of eternity.

Deaths, Registration of.—A death must be registered within forty-two days, by some person who was present when it took place. Up to that period no fee is required by the registrar. After that period, and up to six months, a fee of 7s. 6d. will be charged.

Decayed Teeth, Stopping for.—Take quicksilver and fine silver filings (a small quantity of the former in proportion to the latter), and mix them together to a stiff paste, or as much of the filings as the mercury will hold together. Scrape away the decayed part of the hollow tooth, and wipe it dry. then press the paste into the cavity. At night after supper is the best time to do it, as by the next morning it will have hardened without interruption. Zinc, tin, or lead, which are sometimes added to the paste to save silver, should never be used for this purpose, since the cement thus made wears away with great rapidity, and falls out. If the additional expense is no object, gold filings may be substituted for the silver with much advantage. The best way of mixing is to put a small quantity of quicksilver and as much silver filings as will stand on the point of a penknife into a dry phial, cork it, and shake it together for two or three minutes; then turn out the ball into the left hand and knead it between the finger and thumb until it is of proper consistency, when it should be inserted into the tooth and any small particles spit out. It will be hard enough to eat with in a few hours.

Deeds, Old.—To make the writing in these legible when sunk or obliterated, take five or six galls, bruise them, and put them into a pint of strong white wine; let it stand in the sun two days, then dip a brush into the wine, and wash the part of the writing which is sunk, and by the colour you will see whether the wine has enough of the galls. The writing fades because the gallic and tannic acids contained in the ink perishes through age, but the iron still remains. When, therefore, the fresh gallic and tannic acids are re-supplied the ink again becomes black.

Dentifrice, Asiatic.—Armenia bole three parts, prepared chalk two parts, pumice-stone and ochre one part each; reduce them to a fine powder, sift through lawn, and scent with any essential oil.

Derby Cakes.—Mix one pound of well-dried flour with a quarter of a pound of powdered loaf sugar, and six ounces of currants; add a quarter of a pound of melted butter, one egg well beaten, and two tablespoonsful of cream. Mix, roll into a paste, cut into cakes, and bake in flat tins.

Dessert Fruits (see *Preserving*).—We shall here confine ourselves to a few observations on the chemical and medical qualities of these fruits. No wild fruit—if we except the strawberry—can be regarded as easy of digestion, and an intemperate indulgence in wild fruit is consequently often productive of the most dangerous, and sometimes fatal results. The crab-apple and the sloe are used in the form of preserves or jams, when the presence of a large quantity of sugar corrects the astringent nature, but they are otherwise wholly unfit for use. The fruit most generally in use for the dessert is:—

The Apple.—Of this fruit we have many varieties, all containing more or less of saccharine, acid, mucilage, soft woody fibre, and water, the quality of the fruit depending upon the proportion in which one or other of these prevails. Previous to cooking, the apple consists of a large number of minute cells and vessels, which hold the pulp and the acid, which we term the juice. The application of heat causes these cells to expand and burst (see *Heat*), and as the temperature increases the water partly evaporates in the form of steam. In this condition they are most wholesome, and therefore apple-pie, if not over-spiced, is rightly regarded as highly nutritive, and at the same time easy of digestion. The aroma of apples, to which their various kinds of flavour seem intimately allied, is supposed to act as a mild stimulant and to aid digestion, and therefore those apples which have the finest flavour are esteemed best. The American species of apple and the rennets abound in this quality, and they also contain in larger proportions the mucilage and sugar which render them nutritive. The harder varieties, such as the pippins, having in a greater degree the woody fibre element, are less desirable as food. The dry mealy kind of apples are highly nutritive. The watery apples are generally crude, cold, and ill adapted to weak stomachs till cooked, when all apples become wholesome and good for food. By the process of cooking the freed acid and pulp appear to enter into union, and the pulp containing saccharine, also disengaged by the heat, mixes with and modifies the acid. The Ribstone pippin, easily known by its coats of dull green, red, and russet, is a famous apple for dessert, but it is inferior for culinary purposes, as it is apt to become tough and leathery in cooking. Ripe, sweet, mealy apples have a laxative effect on the bowels, but the sour, astringent fruit is to be avoided, especially by those who follow sedentary pursuits, or those who indulge freely in wine or spirits. Costiveness, griping, and flatulency are then likely to result from eating them. For modes of cooking apples, see *Apples*.

ALMONDS should be eaten cautiously. They contain (more especially the bitter almonds) that deadly poison, prussic acid. In persons of weak digestion, even when eaten in moderation, they have been known to produce the most serious consequences. Cramp, nausea, and fainting fits are not seldom traceable to the incautious use of almonds. (See *Almonds*.)

CHERRIES.—Those kinds which contain the largest proportions of water and sugar, fermenting easily, are apt to produce flatulence and colic; but others, which contain a large portion of water and acid, being slightly stimulating, are more wholesome and digestible; but the best are the pulpy, mucilaginous kind. Cherries may be eaten without fear when they are quite ripe. The kernels of cherries contain a small proportion of prussic acid. Care should be taken to guard against the accidental swallowing of cherry-stones, as they sometimes lodge in the bowels and produce obstructions.

CURRANTS rank next to gooseberries, but are less laxative. They contain sugar and mucilage, and the seeds and skin are very indigestible. Black currants are considered the most wholesome.

GOOSEBERRIES.—Next to strawberries, gooseberries are most favourably regarded as food by medical authorities. They contain a good portion of sugar and acid, with a somewhat large proportion of hard seeds and mucilage. The skins being astringent, acid, and indigestible, should not be eaten. Gooseberries, like apples, are greatly improved by cooking.

GRAPES.—The chemical principles of grapes resemble those of other fruits, with the addition of super-tartrate of potass.

LEMONS.—Of these we may say all that we have said of oranges. The acids of these fruits when properly corrected with sugar are light, wholesome, and cooling.

ORANGES abound in water, mucilage, acid, and woody fibre, with a variable proportion of sugar. The peel of oranges contains a strong oil, the principle of their peculiar aroma, and this oil is highly indigestible. Both the inner (the white) and the outer rind of the orange should be removed before eating. Brazil is a great country for oranges, and the Brazilians know how to eat the delicious fruit. "To eat an orange thoroughly," says one of the newspaper correspondents in Professor Agassiz's recent expedition, "you should eat it in Brazilian fashion :—You slice a segment off the flower, deep enough to go completely through the skin; and then, replacing the segment, thrust a fork through it to the very centre of the orange, if the tines are long enough. Holding the fork in your left hand, peel the orange with a very sharp table-knife, slicing all the skin off, the segment at the base of the fork being in this operation a shield to prevent any danger of cutting the left thumb. Now, with two cuts of the knife, dissect out the pulp of one of the pockets, and convey it to your mouth. Follow this up pocket by pocket, and the skins of the pocket remain on the fork like the leaves of a book opened until the covers touch." In fever oranges are very grateful to the patient, and often useful. They have been very strongly recommended in scorbutic cases, and it is said that as a mild tonic and freely eaten they have been known to cure really serious cases of consumption. They should not be eaten freely directly after dinner, as they sometimes stop digestion.

PEARS.—These are less acid than apples, and more sweet, but the woody element being ascendant in the composition of most pears, they are commonly much less digestible. The softer and sweeter kinds of pears contain a larger proportion of mucilage, which, taken in excess, is apt to ferment in the stomach, and sometimes produces very distressing symptoms. The old Jargonelle pear consists of little more than *eau sucrée*, analysis showing that when ripe it contains 83·88 per cent. of water and 11·52 per cent. of sugar. The Maria Louisa, a Flemish pear, and the old Burgundy, when ripe, are very wholesome, however, being sweet, mellow, and slightly laxative. Pears, however, should always be taken in moderation, and persons of weak digestion should never partake of the harder kinds of pears. Pears, unlike most other fruits, are finer in flavour when they have been plucked early in the season, and allowed to ripen in the house. They must, however, be kept warm, as cold destroys all their best qualities, and renders them hard and tough.

PINE-APPLE. — The acidity and astringent qualities of this delicious fruit make it unfit for weak stomachs. It is least dangerous when eaten with plenty of sugar and dipped into wine.

PLUMS AND PEACHES.—These contain sugar, water, mucilage, acids, and fibre in varying proportions, according to their quality and their kind. Eaten unripe they are very dangerous, but when quite ripe they are excellent food, wholesome, easy of digestion, and gently laxative. The same may be said of nectarines and apricots. Sometimes these stone-fruits are ripe on the side most exposed to the sun, and on the other unripe; when this is the case, only the half of each should be eaten.

RASPBERRIES resemble strawberries.

RAISINS, CURRANTS, FIGS, and other dried fruits should be eaten in moderation, and the skins invariably rejected, for they are very indigestible and apt to produce flatulency.

STRAWBERRIES.—Dr. Abernethy described the strawberry as the most wholesome of all fruits, "balsamic and refreshing, and one of the most precious gifts of Providence." Strawberries contain a medium proportion of mucilage and sugar; they are mildly acid, and the seed has a laxative effect. When taken with cream they are very nourishing, although then they are not so good for weak stomachs. Strawberries should not be eaten too freely after dinner, nor after wine has been freely partaken of. With lemon juice and sugar no ill effects arise. "Strawberries when the snow is upon the ground taste only of—money."

WALNUTS, ALMONDS, AND NUTS.—The component parts of nuts differ from those of other fruits materially, as they are of a farinaceous character, and contain an oil which in other vegetable productions is rare. Nuts ought to be eaten newly gathered, as the oil they contain becomes rancid, and in moderation, as they are hard of digestion. Fatal consequences have arisen from indulging too freely in them. Salt is an excellent thing to eat with nuts, and it is very important that the kernel should be well chewed. (See *Digestion*, p. 158.)

Devonshire Squab-pie, to make.—Make a good crust, cover the dish all over, put at the bottom a layer of sliced apples, strew over them some sugar, then a layer of mutton chops cut from the loin, well seasoned with pepper and salt, then another layer of apples. Peel some apples, and slice some onions thin; put a layer all over the apples, then a layer of chops, then another of apples and onions; pour on a pint of water, cover the pie with crust, and bake it.

Dew.—(See *Evaporation.*)

Diachylon Plaster, spread on leather, is a common and good application for slight contusions, excoriations of the skin, chilblains, corns, and fresh cuts. Made with wax, gum ammoniacum, and turpentine.

Diamonds are well known as the hardest and most costly of the precious stones. They are cut, generally on account of the shape of the rough stone, in various ways, and consequently assume different names, as a brilliant, a rose, a table, and a lasque diamond; of these the brilliants are most splendid. But few people are aware of the many gradations of colour through which the diamond ranges, nor are they cognisant of the effects these tints have on the commercial value of the stone. Of course, the first place is accorded to what is called a diamond of pure water. This means a perfectly colourless stone, free from every possible shade. Perhaps the lowest place is given to a yellow stone, though there is a peculiar ruddy brown, a most delicate *nuance*, which amateurs especially prize. The reason for lowering the standard of the yellow diamond is simply the law of supply and demand. If it resembles slightly the tint of the topaz, it has, however, an inherent fire and brilliancy which make the humbler topaz become absolutely dim by comparison. The diamond known as the Austrian yellow of 139½ carats is of this nature, but unfortunately so deep in tone as to somewhat impair its fire. The blue diamond, where the azure of the sapphire is combined with the natural lustre of the diamond; the rose-coloured, imitating the fire of the ruby; the green diamond, rivalling the emerald, are rarer shades. When these colours are intense, when the depth of tone is positive, they become rarities of untold price, and are fancy stones on which no positive value can be placed. Milky stones, with black diamonds, save for the industrial arts, have as ornaments no especial worth. Some very remarkable experiments have been instituted in order to change the colour of diamonds. It would be a secret worth untold fortunes, could we succeed in depriving a yellow diamond of its unpopular tint. It was supposed at one time that this could be effected through the agency of heat. Faint yellow stones, by long subjection to the furnace heat, were convertible into pale rose-coloured diamonds; but, unfortunately, after a certain lapse of time they slowly but surely resumed their original tint. The yellow diamonds, however, notwithstanding what has been here said, find favour in the eyes of many. Diamonds were first cut and polished at Bruges in 1489. They increase in value according to their weight. Thus diamonds of three carats are valued at £72; those of four carats, at £126; of five carats, £200; ten carats, £800; and one hundred carats, £80,000. The strongest acids and alkalies will not destroy diamonds; and although they are very combustible and may be entirely consumed in the open air, yet in a vessel excluding air they may be subjected to the most intense heat without receiving any perceptible injury. This fact those who rejoice in the possession of precious stones, and who would put their diamonds beyond the chance of injury by fire, should avail themselves of. The largest known diamond is the famous Koh-i-noor (mountain of light).

Diarrhœa, to Check.—Mix together twenty drops of laudanum; chalk mixture, four and a half ounces; tincture of cinnamon, half an ounce; cinnamon-water, two ounces; and take two tablespoonfuls when relaxed. Another good remedy is to take ten grains of rhubarb; powder of chalk, with opium, one scruple; make into four powders, of which take one night and morning.

Diet.—We have elsewhere pointed out that the mere fact of food being nutritious is of very little use if it is at the same time taken in an indigestible form (see *Boiling*, *Roasting*, *Indigestion*), and we have also pointed out that food which some men's stomachs digest easily is totally unfitted to be the food of others. Burke and Wills died from eating the very seeds upon which the Australian savages fed and thrived. In the same way Gardener's party in Tierra del Fuego perished of starvation, where the natives preserved life and health on a diet of shell-fish. From statements made by Dr. Christison in the Blue-book concerning the dietary of soldiers in the Crimea, it appears—1st, that a man of sedentary life can exist in health on seventeen ounces per day of *real nutriment;* that a man engaged in active life requires fully twenty-eight ounces per day; and during severe labour he requires thirty ounces, or even more; 2ndly, that this nutriment must consist of three-quarters, by weight, of one class of nutritive principles (C), and one quarter of another class of nutritive principles (N); 3rdly, that all the articles of common food admit of being placed, as below, in a table, by which we see at a glance how much nutriment of Class C, and how much of Class N, is found in 100 parts, gross weight, of any of them. Thus, by a simple computation, the effective value of a dietary may be ascertained. Class C are the carboniferous principles, that maintain respiration; Class N are the nitrogenous principles, that repair waste of tissue. N will partly replace C, but at a great waste: C will not replace N.

TABLE SHOWING THE QUANTITY OF NUTRIMENT IN DIFFERENT ARTICLES OF DIET.

ARTICLES OF DIET.	C. (Carboniferous.)	N. (Nitrogenous.)	Total real Nutriment per cent. of gross weight.
Wheat Flour	71·25	16·25	87·50
Bread	51·5	10·5	62·10
Oatmeal	65·75	16·25	82·0
Pearl Barley	67·0	15·0	82·0
Peas	55·5	24·5	79·10
Potatoes (preserved potatoes are thoroughly dry)	24·5	2·5	26·10
Carrots	8·5	1·5	9·10
Turnips	5·7	0·3	5·10
Cabbage	6·7	0·3	6·10
Lean of Beef and Mutton ...	...	27·0	27·0
Fat of meat	100·0	...	100·0
Average Beef and Mutton ...	15·0	20·25	35·25
Bacon	62·50	8·36	70·86
Skimmed-milk Cheese	0·4	64·6	64·10
White Fish	...	21·0	21·0
New Milk	8·0	4·5	12·5
Skimmed Milk	5·5	4·5	9·10
Butter-milk	1·0	6·0	7·0
Beef Tea, strong	...	1·44	1·44
Beef Tea and Meat decoction of Broth	...	0·72	0·72
Sugar	100·0	...	100·0
Butter	100·c	...	100·0
Total Nutriment required in Sedentary life	12·75	4·25	17 oz.
Total Nutriment required in Active life ...	21·00	7·00	28 ,,
Total Nutriment required in Severe labour	22·50	7·50	30 ,,

NATURE OF DIET.—Under the head of *Dig:stion* we have already shown how food, after being converted in the stomach into the creamy liquid called chyme, and in the first portion of the small intestines—the duodenum—into chyle, is taken up by the lacteal tubes. It is then converted into blood, from which, however, chyle differs chiefly in its colour or whiteness. Food is thus made available for keeping up the supply of that great vital element, the blood. All the food which plays any useful part in the body is first converted into blood, and it is from this blood that all the constantly-wasting organs of the body—muscles, bones, and nerves—are as constantly repaired and supplied. In some valuable papers contributed to *Cassell's Household Guide* by an eminent chemist, food is described as fuel, rendered necessary by the constant process of combustion going on within us. "We require food frequently," says this writer, "for just the same reason that a fire requires coals frequently, and a lamp oil, because we are literally burning away. The air that we breathe into our lungs (see *Respiration* and *Atmosphere*) contains oxygen, and this oxygen combines with or burns the muscles and other organs of our bodies just as it does the coals in the fire. (See *Oxygen.*) The heat produced in a man's body in the course of a day is considerable in quantity, though not very intense in quality. Taking the average, it is enough to raise five and a half gallons of water from freezing-point to boiling-point, and this is about the heat that would be given off during the burning of a pound of coals. All this heat comes from the slow wasting or burning of the substances of the body, so that it is evident that if we did not make up for this constant loss by eating food, our organs would soon be wasted away or consumed." If food is not supplied to repair the waste thus caused, by creating fresh material to take the place of that consumed, the animal wastes away, becomes thin and feeble, and ultimately dies from what is termed starvation—literally, from the want of fuel. But the heat to which we have already alluded—the vital heat—is due not only to the combustion going on within the muscles and other organs of the body, but even more largely to the direct combustion of the blood itself. The above considerations will show you that the food we take has first to repair waste, and secondly to produce heat.

Turning from these necessary considerations to our more immediate subject, food, we must first point out that while one class of food is composed of materials almost identical in composition with the organs which have to be repaired, the composition of others renders them unfit to be employed in this work of repairing, and they are only valuable for the heat they produce when converted into blood. For this reason food is usually classified as flesh-forming and heat-producing, although the boundaries between the two must not be regarded as too strictly marked. Heat-producing food is the source of power or energy in our body, and we strongly advise our readers to give this oft-neglected fact their best attention. Men who do hard work require a larger supply of food; but it is essential for the selection of a suitable diet that they should understand these questions, which are indeed of vast importance to people of all kinds, who for want of such knowledge may be cramming themselves with useless food to a very mischievous extent.

The solid part of the flesh of all animals consists chiefly of fibrine, or what physiologists used of old to call "liquid flesh." A thin slice of lean meat when washed in cold water to whiteness will show what fibrine is in its form of insolubility. This forms the basis of fish, flesh, and fowl. Fibrine stands naturally at the head of the list of flesh-forming foods, because nothing can be more suitable for the repair of flesh than flesh itself. Albumen, which is found in the juice of the flesh, in the white of an egg, and in the blood, is another flesh-former very similar in composition and properties to fibrine itself. It has, however, the curious property of coagulating or becoming insoluble when boiled. Albumen is more largely present in the flesh of young animals than in the flesh of old ones. Arrowroot, sago, tapioca, and cassava all contain albumen. It exists nearly pure in the white of an egg, and the serum of the blood, and in certain vegetables. Milk is flesh-forming, by virtue of the caseine, which also forms the curd of milk and constitutes the greater portion of cheese. The gluten contained in flour is a very important flesh-former; and, lastly, peas, beans, and some other vegetable substances contain a flesh-forming compound called legumine, which closely resembles caseine in its composition and properties. We may add to this description of the five kinds of flesh-formers—namely, albumen, gluten, fibrine, caseine, and legumine—that the muscular tissue, or fibre, we call meat is composed most largely of fibrine, but is mixed in its ordinary state with blood, membranes, nerves, fat, &c. For further information about the character of this kind of food after it has undergone the process of cooking, in relation to diet, see *Cooking* on page 135, &c.

Articles of food which are exclusively heat-producing are more numerous than those which go to form flesh. Roughly classified, they may be described as fats and oils, starches, gums and sugars. Fats and oils are of course found in both animal and vegetable foods, and their composition is not to any great extent varied. The fat of butchers' meat, lard, dripping, and butter, are the most important articles in this class. Starches and sugars are mainly derived from the vegetable kingdom, although examples of both occur in the animal body. They all have about the same composition, and although they contribute largely to the heat of the body, they are not so valuable, considered in the light of fuel, as the fats and oils. Contrary to popular opinion, gelatine, a constituent portion of nearly all animals and of some vegetables, must be ranked amongst the producers of heat and not flesh. The common idea of the nutritious quality of soup or broth being decided by the stiffness of the jelly it forms on cooling is therefore a great mistake, for this stiffness is due purely to the proportion of gelatine present. It is very easy to make the poorest soup set to a firm jelly by merely adding a little isinglass, which is pure gelatine, as glue is impure gelatine; but by so doing it must not be supposed that we at all add to its nutritious properties. Veal contains more gelatine than beef.

We think we have now said enough to demonstrate that a proper diet is that in which the nutritive or flesh-forming material is duly proportioned to the calorifiant, or heat-producing. "By a fit admixture," remarks Albert J. Bernays, Ph.D., F.C.S., "a diet can be obtained of a composition analogous to that of wheaten bread or milk. By the addition of bacon or fat pork to peas and beans; of fat bacon to veal; of potatoes to beef; of rice to mutton, we increase in each case the proportions of heat-giving matter." Fermented liquors, though to a much smaller and far less useful extent, perform the same duty when taken with lean flesh and with but little bread. Liebig—the great authority on all these subjects—calculates that as much as fourteen ounces of carbon are exhaled every twenty-four hours from the lungs in the form of carbonic acid. (See *Respiration.*) The colder the air, the larger is the amount of oxygen we take into the lungs at every breath; for by cold the air is condensed; and though the relative proportions of oxygen and nitrogen in the air are the same both in winter and summer, the actual amount of oxygen inhaled must be greater than in summer. And so, inasmuch as substances which abound in carbon and hydrogen belong to the heat-producing class of food, these ought in winter to be taken in the larger proportion. With reference to the quantity of food which ought to be consumed, as no general rule can be given for individual guidance as to the exact proportions of animal and vegetable food which ought to be taken, so no general rule can be said to exist regulating the quantities of food to be taken during meals. The appetite and the feelings are the best and most reliable guides in this respect. Cornaro used to say, "Of all parts of a feast, that which one leaves does one the most good;" and if Cornaro meant that which one leaves after one's appetite is satisfied, his remark was a very significant one, and well worth remembering. So long as food is relished it is vigorously masticated, and therefore it is the more readily dissolved by the gastric juice. (See *Digestion.*) Excess of food disends the stomach, and weakens its muscular and digestive fibres and powers, and consequently diminishes their energy, in the same manner as the muscular power of the bladder is paralysed, if it be distended with urine beyond the period which Nature claims for its evacuation. But the exact quantity of food necessary for the support of nature must be left to every person's reason and instinct; for, from the diversity of organisation and idiosyncrasy of constitution, it sometimes happens that an article of lower apparent nutritious power will best satisfy the appetite and digestion. On the other hand, too little food is not less to be avoided by those who desire that good digestion may wait on appetite, and health on both. (See *Meals.*)

In rest less food, and under the influence of combined exertion, bodily and mental, more food is required. "To preserve the body in a healthy condition, the quantity of food taken at meals should be in proportion to age and the amount of exercise. The state of the weather, too, has much to do with the quantity, for the colder it is the more food is necessary. The Esquimaux will devour as much as twelve pounds of raw whale's blubber in a day." The various substances used for food may be again classed under two heads—the nutritive and the digestible. If we except beef and veal, the flesh of mature, in general, is more easy of digestion than that of young animals, on account of the greater quantity of fibrine in the latter. All mucilages are difficult of digestion. Even the vegetable mucilages, which in small quantity are generally grateful to the stomach, will oppress it if taken too freely, producing a feeling vulgarly called "phlegmy," a sign of indigestion well known to those who suffer from it, according to the degrees in which they are either the one or the other. It will be seen under the head of *Digestion* that food is nutritive in proportion to its capacity of affording the elements of chyme, and digestible in proportion to the facility with which it undergoes the necessary changes in the stomach. Between these two qualities there is an essential difference, nor do they by any means bear an exact proportion to each other. Many substances which contain the elements of chyme in abundance are difficult of digestion, and it is remarkable that this difficulty is sometimes greatly decreased by mixing them with certain less nutritious substances. Condiments consist for the most part either of salts or spices, and they probably act by stimulating the stomach to a more energetic performance of its functions. Possibly they may also exercise some corrective influence over the various species of aliment during the process of digestion. Thus, the tendency of vegetable substances to acetous fermentation may be checked by aromatics and spices, and the tendency of animal matter to pass into a putrid state, by salts and acids. The stomach, when weakened, digests food better if it be taken in a small quantity. In this case Mr. Abernethy recommended that the food should be divided into three equal portions, each taken with strict regularity at intervals of six hours. Under this treatment the restoration of the digestive organs to the healthy performance of their functions is said to be truly wonderful. (See *Indigestion.*) The stronger kinds of animal food, of which beef may be considered the strongest, are most apt to excite fever. On this account medical men often allow those recovering from fever, or otherwise disposed to it, to eat the animal mucilages, or those meats which contain a greater proportion of them when even mutton is forbidden. Thus animal jellies and young meats have obtained credit for being light, although in reality, as far as digestion is concerned, they are heavier than mutton, and to many stomachs, than beef. But this term "light" only relates to the tendency to produce fever. A similar observation applies to vegetable diet, which is less apt to create fever, although it is, as we have elsewhere shown, really more difficult of digestion. Most kinds of game are of easy digestion. Fish, independent of the heavy sauce usually taken with it, is less easily digested than the flesh of land animals, and at the same time affords less nutriment; but from the white kind being less apt to excite fever, it is therefore popularly regarded as light. The confusion of light food and digestible food is often a source of errors in diet, productive of very mischievous results. Fat meat is more difficult of digestion than lean meat, for which reason the flesh of geese and ducks containing more fat mixed with lean than other kinds of poultry, is less easy of digestion. Mutton is to most stomachs more indigestible than beef, although the reason why would be difficult to state. Turkey is more indigestible than fowl, although next to mutton it is—if the skin be avoided—the lightest of all animal flesh used for food. Of the different kinds of game pheasant is least easy of digestion. Of all meat the lean part of venison is, perhaps, the most digestible. Hare and partridge appear to be as much so as mutton. Eggs, so far as regards a tendency to produce fever, may be regarded as occupying a medium between animal and vegetable food. The common opinion is that they disagree with bilious people, but if eaten soft-boiled with stale bread, there is no reason for this opinion. Few things are more difficult of digestion than new bread. (See also *Bread.*) Potatoes, when good and well boiled, are nutritious and easily digested. Carrots are very nutritious, but unless thoroughly boiled they are indigestible. Turnips are very easily digested, but not very nutritious, and when well boiled and separated by pressure from the watery part, do not, as some people suppose, produce flatulence. Asparagus is light and nutritious, but is spoiled by the addition of melted butter; when old, it is, however, most unwholesome. Cauliflower and broccoli are not very nutritious. Greens should not be taken by the dyspeptic, nor should they be eaten to excess. They require great care during the cooking. Vegetables too little boiled are always more or less indigestible. Pease-meal is very nutritious, containing a large proportion of caseine, but is not very digestible. Sugar is nutritious, but taken in excess it will give rise to flatulence and acidity. (See also *Salt* and *Dessert Fruits.*) As a general rule, all stews and ragouts prepared with butter or oil, wine, or vinegar, ought to be strongly seasoned. All cream or milk dishes or messes should be flavoured; and broiled fish will be better food with the addition of mustard sauce. Roast meat is preferable to baked meat. A good salad is a very agreeable condiment, and helps digestion. Returning to the question of quantity, Mr. Mott, in one of the Reports of the Poor-law Commissioners, says that the following scale may be considered a fair estimate of the proportion of food requisite to support human life in a sound and healthy state:—"1st. For a person of moderate health and constitution, but using little exercise or exertion, daily allowance of food, 12 oz. to 18 oz.; in nutritive matter equal to an average daily of 10 oz. 2nd. For persons of good health, accustomed to moderate labour, as sailors and soldiers on ordinary peace duty, or agricultural labourers, or mechanics at their usual work, daily allowance of food 18 oz. to 24 oz.; in nutritive matter equal to an average daily of 16 oz. 3rd. For persons subject to hard labour, or other violent exertion, in good bodily health, 24 oz. to 30 oz. of food; equal to 22 oz. of nutritive matter." A variety of circumstances, in addition to those previously enumerated, force upon the mind a conviction of the truth that a *mixed* is the most natural diet for man. Dr. Wollaston, a celebrated scientific physician in his day, has observed, with reference to this subject, that persons who live exclusively upon animal food are liable to calculous affections; a large quantity of *lithic acid* is secreted, and this lays the foundation of a peculiarly distressing and painful disorder. Simplicity of diet certainly has the effect of rendering the mind more clear in its operations. Even the senses become more acute when the diet is attended to. It is recorded that a boy found in a forest possessed so acute a sense of smell, from the simplicity of his diet, that he was able to distinguish by it poisonous plants from innocuous ones; but this delicacy soon wore off when he lived like other men. Carneades, previous to his disputing with the sect of philosophers opposed to him, abstained from much food, and took several doses of hellebore. This had, it is said, the effect of rendering his faculties more vigorous and his imagination active. During the seven years in which Protogenes was engaged on the picture of Jalysus, we are told, his diet consisted wholly of lupines and a little water, which gave great freedom and delicacy to his fancy. We are informed by Philo that the Therapeutists were not permitted to eat before the sun went down, in order to enable them the better to search after wisdom.

LOW DIET.—We now give a dietary table for the sick who are compelled to live low:—*For Breakfast:* Milk and water, or weak black tea, with its astringent properties corrected by a due admission of milk. Gruel, dry toast of home or stale household bread, and rusks. *For Dinner:* Gruel, new milk, and arrowroot, sago or tapioca; chicken and veal broths; roasted apples, light bread-pudding. Pastry of every kind must be avoided. *Supper:* Gruel or arrowroot. For occasional drinks, spring or filtered water may be adopted, toast and water, barley-water, whey, lemonade, not too acid, and if the thirst be oppressive, sweet oranges.

As a MEDIUM DIET, neither low nor high, the following may be adopted:—*For Breakfast*, the same as in low diet. *For Luncheon:* A cup of isinglass, arrowroot, sago, tapioca, with biscuit, or a little stale bread toasted, or these with oranges. *For Dinner:* In addition to the items given under the head of low diet, we may mention boiled chickens, calves' and sheep's feet stewed, mutton broth, beef tea, boiled soles, whiting, turbot, and lamb; potatoes, asparagus, light bread or rice pudding; roasted apples. After the repast, may be taken one glass of port, old sherry, or Madeira wine, in twice its quantity of water. *Supper:* A cup of gruel, sago, tapioca, or arrowroot.

FULL DIET.—*Breakfast* and *Tea* same as in medium diet, with the addition of chocolate or coffee, or stale bread sparingly buttered. *Luncheon:* A biscuit and a glass of porter. *Dinner:* The medium diet bill of fare may be augmented by boiled lamb, chicken, mutton broth, rump steaks, roast or boiled fresh meats, light bread puddings, fruit pies, avoiding the pastry, rice baked or boiled, or tapioca puddings. At this meal porter, with afterwards one, or even two glasses of port, old sherry, or Madeira, carefully observing the symptoms they produce. *Supper:* Same as in middle diet.

DIET *versus* MEDICINE.—Sir John Sinclair said when diseases are cured by medicine, the body is left weak and emaciated, whereas it is not so when the cure is effected by a judicious diet. Among the means by which strength can be restored, there is none more likely both to secure the renovation of health and to prevent the recurrence of disease than to follow a well-chosen regimen, accommodated to the circumstances of the case, the age, constitution of the patient, and the nature of the malady from which he has recovered. "Indeed, so powerful are the effects of regimen in the restoration of health, that by means of it the whole juice of the body can be altered, and the recurrence of the most dangerous disorders, as the gout, the scurvy, consumption, &c., can be in a great measure obviated." We venture to affirm that our careful compilation of all the information bearing upon food, its variety of kind and character, its chemical properties, its various degrees of power in different directions, if studied in connection with the information which is given in other parts of this little book bearing upon digestion, exercise, the preparation of food, &c., will enable each reader to select for himself a regimen calculated either to keep him in health or to improve his health.

DRINK.—For taking with your meals, no drinks surpass pure spring water. Our reasons for this belief will be found on page 155, and we think they will be found satisfactory. Toast and water is wholesome. Tea exerts a powerful influence upon the nervous system, which renders its use undesirable where nervous disorders exist. (See *Tea.*) Coffee is a highly stimulating drink, which exercises a strong action upon the nervous system (see page 126). Chocolate prepared with sugar and milk is very nourishing, but by corpulent persons and those who exhibit a tendency to apoplexy it is best avoided. Cocoa—which is, in fact, chocolate weakened—is a light, nutritious, and wholesome drink. Ardent spirits we have treated of elsewhere: they are less injurious in cold than in hot or mild climates, unless taken to excess, when they will be injurious under any circumstances. Taken occasionally with water after exposure to cold or wet, they are useful. Those who have taken ardent spirits regularly ought not to discontinue doing so suddenly. Malt liquors we have treated of under various heads (see pages 11, 12, 46, and 155). Strong wines and similar stimulating drinks we shall now speak of separately.

STIMULATING DRINKS.—The spirits in use as stimulating drinks consist of alcohol (see page 11) in various states of dilution, and flavoured with a variety of essential oils, such as juniper berries, from which gin is prepared. Alcohol freed from water, that is to say, "absolute," is, as we have explained on another page, a poison; but in other sections of this small work we have also pointed out the poisonous nature of pure oxygen—in other words, of oxygen undiluted with nitrogen, without which, nevertheless, we could not exist. (See *Animal Heat.*) Without arguing that spirits are as essential to a man's existence as the atmosphere, which would be absurd, for most people can do without them, there is yet no serious harm done in a moderate indulgence in stimulating drinks, and in many cases much good is done by its adoption. Dr. Carpenter says that in one class of cases "malt liquors constitute a better medicine than could be administered under any other form—those, namely, in which the stomach labours under a permanent deficiency of digestive power consequent either on original debility or through persistence in some unhealthful system during the preceding part of life. There are many such cases in which no form of medical or hygienic treatment seems able to develop in the stomach that spontaneous power which it has either completely lost or which it never possessed, and in which the artificial excitement of an alcoholic stimulus affords the only means of procuring the digestion of the amount of food which the system really requires." Dr. Carpenter goes on to say that the daily use of a tumbler or two of bitter ale in such cases is essential to ward off the debility which results from imperfect nutrition, attended as this is with the feeling of utter incapacity for the duties or enjoyments of life, and with a constant liability to the attacks of depressing disease. For indigestion, he further says, "a glass of bitter beer or pale ale taken with the principal meal of the day does more good and less harm than any medicine the physician can prescribe." But, on the other hand, it is a fact well known to medical men of experience in the metropolis, that a confirmed and excessive beer-drinker can scarcely scratch his finger without risking his life. "It is for the public safety to have it known," says another authority, "that whether from some peculiarity of the London climate, or of the London beer, a copious London beer-drinker is all one vital part. He wears his heart upon his sleeve, bare to a death-wound even from a rusty nail or the claw of a cat." It has been stated by a celebrated physician that the worst patients brought to the London hospitals are those apparently fine models of health, strength, and soundness—the London draymen. When one of these receives a serious injury, it is generally necessary to amputate if you would give the most distant chance of life. The draymen, it is asserted, have the almost unlimited privilege of the brewer's cellar, and some exercise that privilege with boundless liberality. Sir Astley Cooper was once called in to attend a drayman, a powerful, fresh-coloured, healthy-looking man, who had suffered an injury in his finger from a small splinter of a stave. Suppuration had taken place in the wound, which appeared but a trifling one, and Sir Astley Cooper of course opened the small abscess with the lancet. Upon retiring, the justly distinguished surgeon found that he had forgotten his lancet-case, returned to recover it, and saw his patient in a dying state; and dead the patient was within a remarkably short space of time. The conviction in Sir Astley's mind, and that which he evidently intended to impress upon the minds of the pupils, when alluding to the circumstance, was that in London at least the most simple surgical operation can scarcely be resorted to in the case of draymen and great beer-drinkers without considerable hazard of losing the patient. Of course, where a surgical operation is dangerous the injury calling for it must be more dangerous still, so that every medical man in London above all things dreads a beer-drunkard for his patient in a surgical case. It seems that those who indulge in copious libations of beer, drinking, for instance, two or three pots, that is, quarts, of porter a day, do not eat solid food in proportion. They therefore become blown up with a preternatural enlargement of muscle accompanied with fat; their blood is also in a state exceedingly liable to inflammation, and therefore, like plants which draw their nourishment from water alone, the smallest injury disturbs the system and destroys vitality. By the constant imbibing of liquors, strength and bulk may be attained, but it is with the fatal assurance that neither will conduce to long life or permanent good health. Whether a man be strong or not, it is of the greatest importance that he live in such a temperate manner that the principle of healing inherent in the system may be at liberty to act vigorously in case of any personal injury or distemper. If he lives intemperately, this principle becomes so much weakened, if not altogether destroyed, that when disease arrives all the powers of art or medicine can seldom save him. Among the other pernicious effects of habitual indulgence in stimulating drinks are various painful affections of the liver, which render the sufferer's life one of the deepest misery, and, should the evil habit remain unchecked, at length prove fatal.

RELATIVE CHARACTERS OF WARM AND COLD DRINK.—All dilutants taken with food, except broths, soups, and other liquids holding nourishing substances, together with tea, coffee, chocolate, &c., should be taken cold, for warm drinks taken in large quantities are apt to weaken the action of the stomach and impair the digestion. They also hurry the food into the intestines before it is properly dissolved, and thus deprive the body of nourishment; the nutriment which ought to feed the glands of supply and chylification being then carried off as exuvia or waste.

WATER FOR DIET.—Water, when pure, is an admirable drink which ought to be more commonly adopted, but, unfortunately, really pure water is by no means a common thing. It neither stimulates the appetite excessively, nor does it affect the nerves. It dissolves food with great readiness, and it absorbs the acrimony from the juices. It penetrates the smaller vessels with greater readiness, and consequently has more force in removing obstructions. But impure water has none of these advantages, and is always more or less prejudicial to health. Good water becomes hot or cold most readily. In summer it is cool, and in winter it is slightly warm; dropped upon paper and allowed to evaporate, it leaves no stain behind. It reaches the boiling-point more quickly than impure water does, and is sooner cold after boiling. The worst water is, of course, that of ponds and standing pools. River-water is always more or less impure, and changes its character with the nature of the soil it runs over. Water which deposits a stony secretion in our kettles of course carries the same stony concretion into our system when we drink it; but this deposit, being a calcareous earth, is easily dissolved, and is therefore not so mischievous as it is often believed to be. A little vinegar boiled with some of the deposit will illustrate this fact. Well-water is always more or less impure. Rain-water is purer, but not pure; snow-water is much purer. Spring-water, running over a flinty bed, and filtered slowly through its sandy particles, is of all water the purest and best. A draught of such water is a delicious, extremely wholesome, and a very nutritious drink.

VEGETABLE FOOD.—The question whether animal or vegetable food was best suited for the people of England was at one time a source of heated controversy. Experience shows, however, that in our climate a diet composed exclusively of either animal or vegetable food is not desirable, although it must be acknowledged that more evil has arisen from the use of animal food than can be traced to the use of vegetable food. The great rule is, as Dr. Abernethy, in his "Surgical Observations," observes, to adapt the qualities of the food to the feelings of the stomach. (See *Meals.*) "In proof of this proposition, numerous instances might be mentioned of apparently unfit substances agreeing with the stomach, being digested, and even quieting an irritable state of the stomach, merely because they were suitable to its feelings. Instances might also be mentioned of changes in diet producing a tranquil and healthy state of the stomach in cases where medicine had been tried in vain." (See *Indigestion.*) "A man's own observation," saith Lord Bacon on regimen (a good authority on this subject as well as in philosophy), "what he finds good of is the best physic to preserve health; and it is a safer conclusion to say, 'This agreeth not well with me, therefore I will not continue it,' than this, 'I find no offence of this, therefore I may use it;' for strength of nature in youth passeth over many excesses which are owing a man till his age." In hot climates a vegetable diet may be carried to a great extent without injury, but in cold climates it may be received as a rule that a larger proportion of animal food will be generally required. In summer less animal and more vegetable food should be indulged in. Persons of sedentary and inactive habits should, as a general rule, adopt a larger proportion of vegetable diet; but where great bodily exertion is habitual, the superior nutritive power of animal food is required. (See also *Animal Food.*) In most instances animal food is more easily digested than vegetable food. It also acts more as a stimulant, and is less flatulent than a vegetable diet. A dyspeptic invalid may be restricted to bread and meat with considerable advantage until his digestive powers have recovered vigour enough to convert vegetable matter into healthy chyle. (See *Digestion* and *Indigestion.*) In the first stage of life animal food is not required, and would be prejudicial to the infant's health, as every mother knows; "but," to quote Thackeray on Diet and Digestion, "during the period of growth the nutritious quality of aliment is especially important, and in the middle period of life a strict attention is required to temperance, and the greatest attention should then be given to diet" (as the reader will readily perceive from our remarks upon *Old Age*). "Age requires food in small quantities, but it must be nutritious and digestible. At every period of life and in every state of the body the diet should be accommodated to the powers of the digestive organs. The power of digestion is considerably reduced in the advance of life, and the work allotted to it then should be proportionately small and easy of execution."

Diet for Infants.—It is the duty of all sickly mothers, especially when they have any hereditary disease, to provide strong, healthy nurses. Those who declaim so loudly against mothers who do not nurse their own children, forget that by giving their babies food better both in quality and quantity than that they could themselves supply, such mothers may be really acting with greater wisdom and humanity than many display who nurse their own children. The numerous diseases common to infancy, and the many feeble or deformed children we see would be certainly diminished in number if this consideration were less commonly overlooked. Of course, where the mother enjoys good health and a sound constitution, she ought to suckle her own infant; but when she is feeble and has little milk, suffers from scrofula, belongs to a consumptive family, or is in delicate health, a robust, healthy wet-nurse is a thing certainly to be desired. Bull, in his little work on "The Maternal Management of Children," says, "It is very clear that there is no nourishment so well suited to the constitution of the individual child as its own mother's milk. There is a natural relation between the two which is not so perfectly realised when the child is transferred to another breast;" and also points out that a delicate state of health is not always to be regarded as unhealthy, and that therefore, if sanctioned by the medical attendant, the attempt to nurse should be made; and if persevering attention is given to the various measures that invigorate the system, it may be that the delicate woman will become strong, and be enabled to nurse with beneficial effect to herself as well as to her child. The experiment should always be tried, and never given up hastily. In selecting a wet-nurse, carefully ascertain that she is not a drunkard. Leroy says, "That having prescribed human milk for a lady in a very delicate state of health, she derived great benefit from it; but the nurse having drank too much, her milk was turned sour, and brought on fever and nausea. Infants who have been fed with milk in so unwholesome a condition are feverish and in pain, uttering plaintive cries. When artificial food is substituted for that of nature, good fresh cow's milk with the addition of water, or without, as may be found suitable, may be adopted. Hards' farinaceous food, tops and bottoms, sago, or arrowroot may be used; or, if these disagree with the stomach, weak beef-tea, veal or mutton broth, clear and free from fat, and mixed with an equal quantity of farinaceous food and a few grains of salt. (See page 186.) When the infant has cut two or three teeth it must be gradually introduced to a nourishment differing from that it receives from the mother's breast. Milk, however, should long form a part of their diet. A proper proportion of vegetables and the tender flesh of young animals are admirably adapted to the next stage of growth.

Diet for Children.—Children's food should be carefully considered with reference to both quantity and quality. As they increase in years, stronger nourishment will be desirable, and when this is judiciously selected and provided children grow faster, and the tissues acquire a greater degree of strength. They should be accustomed to take wholesome nourishment, and all fanciful aversions and caprices should be discouraged. A suitable proportion of meat and vegetables (see *Meals*) is best suited to them, roast meat being preferable to boiled, as there is more juice in the former, for which reason a smaller quantity suffices, and, consequently, the digestive organs are not overloaded. Without a sufficient quantity of vegetable food, meat often produces costiveness. For children fresh-water fish are considered preferable to those caught in the sea. The more tender flesh of animals should be selected. Dried fish and salt fish of all kinds should not be given to them. Growing children require nourishment at frequent intervals to aid their development and repair the waste occasioned by active and constant exercise, and the operations of other functions. Bull, from whom we have already quoted, recommends that the children's breakfast should consist of tops and bottoms steeped in boiling water, a little fresh and pure cow's milk being added with a few grains of salt, and, if required, a little sugar. Bread may be substituted for the tops and bottoms. Oatmeal porridge and milk is sometimes to be preferred ; it is unstimulating, easily digested, very nutritious, and usually acts slightly on the bowels. For dinner he recommends chicken, fresh mutton or beef, with a little bread and water, with, on alternate days, a well-boiled pudding of rice and milk, or a plain bread, sago, tapioca, or arrowroot pudding, made with one egg, or farinaceous food with beef-tea. The afternoon meal he advises should be provided of the same kind as the breakfast, and before bed, at seven o'clock, a little arrowroot made with a very small proportion of milk, or a biscuit, or a crust of bread, should be given to each child. As the child grows older, vegetables may be added to the food, and the quantity increased at each meal. The more strong and healthy the child, the more liberal may the diet be, as too low a diet would be apt to stint the growth of such a child, and induce a state of body deficient in vigour, and unfit to resist impressions unfavourable to health. If symptoms of fever and debility, together with irregular bowels, appear in any degree, it will be wise to lower the diet. If the child is very delicate and weakly, too generous and liberal a diet will not be desirable, or its debility will be increased, and a tendency to consumption created.

THE PROPORTIONS OF SOLID AND LIQUID FOOD.—On this subject considerable controversy has existed from time to time amongst medical writers. According to the discharges of the human body in a state of health, the proportion of liquid to solid is as 2 to 1, and we may accept this fact as indicating in a general way the medium rate at which the system should be supplied with liquid and solid food. But it must be remembered that as these discharges vary according to the conditions of the body under the varied influences of exertion, fatigue, climate, temperature, the nature and quantities of food partaken of, and so on, the proportions of food and drink taken may also be varied. Too large a quantity of fluid distends the vessels appointed to receive it, weakens the activity of the digestive powers, and carries off the finer parts of the chyle by water or perspiration. On the other hand, too small a quantity of liquid, although undesirable, is far less disadvantageous.

Digestion.—The stomach is the receptacle of the food, and contains the organs of digestion. It secretes a powerful fluid which is capable even out of the body of converting food into that form which we recognise in the natural discharges of the bowels. Such is the power of this fluid, that when the stomach is deprived of the vital principle which enables it to resist its action, it will eat away the stomach itself. The food, after it has undergone mastication and admixture with the saliva in the mouth, is carried by the œsophagus, or gullet, into the stomach, where it is acted upon by the gastric juice, which converts it into a greyish pulpy mass called chyme. This pulp passes by the lower end of the stomach, called the pylorus (the circular ring by which the stomach communicates with the small intestines) into the duodenum, or inner stomach. But if any portion of the food has not undergone chymification, every particle of that portion is rejected by the faithful pyloric sentinel until digestion is completed. In the duodenum the chyme is submitted to the action of the bile and pancreatic (the sweetbread) fluid, by which it is separated into two parts; the one a white opaque liquid, rich and nutritive, called chyle, and the other that which is afterwards excreted. The innumerable lymphatic tubes, or absorbing vessels, which are dispersed through the whole body, and absorb every fluid with which they come in contact, cover the intestines something like the pile of velvet. Having a muscular coat, they are endowed with a longitudinal, peristaltic—or contractile—motion, and a vermicular, or circular motion, by which their contents are propelled forward, the chyle to be taken up by the open mouths of the lymphatic tubes, and afterwards converted into new blood, while the useless refuse, which then acquires its feculent odour and character, is carried on to the termination of the alimentary canal. When the chyme arrives in the duodenum, the gall-bladder, which is the reservoir of that most bulky of our organs, the liver —which secretes bile—ejects a part of its contents into this portion of the intestines, by means of a duct or tube, common to it and the pancreas. This acting chemically precipitates the useless matter from that which is nutritious. All solid foods, by undergoing the process of mastication, or chewing, and by being properly and sufficiently mixed with the saliva during that process, are rendered more easy of digestion. That food which is most easily digested does not remove the sensation of hunger for so long a period as other kinds of food which are digested with difficulty, and acquire a certain volume in the stomach. (See *Indigestion*, and the various hints given under the head of *Diet.*)

Dill.—A plant very much resembling fennel in its properties. Distilled dill-water is a good remedy for hysterics. The seeds of dill are recommended as a good carminative, and may be employed for making stomachic liquors.

Dinners a la Russe.—The table is laid out for dinners *à la Russe* with plate and glass, flowers, &c., as if for dessert only, and the dinner itself is served to the guests from side-tables. Its success depends largely on the tact and attentiveness of the servants who wait at table.

Dish-covers.—Bright metal is best for preserving boiling water hot, for the reason we have given under the head of *Radiation of Heat.* For this reason tea made in a metal pot kept bright remains hot longer than it would do in a dull, or an earthen vessel, and for the same reason metal dish-covers should always be kept clean and bright. (See p. 69.)

Disinfectant, a New.—A new method of using carbolic acid as a disinfectant has been proposed. It consists in wetting pieces of card-board in a solution of the acid, and hanging them up in the room which it is wished to disinfect. The pieces of card thus treated may also be placed in drawers to keep away moths and other insects.

Domestic Servants. — DURATION OF SERVICE.—Where no express agreement exists the servant may demand, or the employer give, a month's warning, usually upon the date when payment is due, or forfeit a month's wages. With clerks, governesses, and others holding posts not menial, in the absence of any agreement to the contrary, three months' notice can be claimed, or must be given. But to prevent serious inconvenience, such as might arise from serious misconduct, the law permits the exercise of summary dismissal with the payment of no more wages than are actually due, under certain circumstances. These are immoral conduct, stopping out all night without leave, or without giving a justifiable reason for doing so, intoxication, theft, and refusal to carry out lawful commands. It is not necessary that the month's warning should be given from any particular date.

LEGAL DUTIES OF THE EMPLOYER. —The duty of an employer from the legal point of view is to house and feed his servant in a way suitable to the nature of the employment, and to the proper preservation of health. An employer is not bound to provide his servant with medicine or medical attendance, but in the event of his sending her away under such circumstances he must give either a month's warning or forfeit a month's salary.

Giving "Characters."—No one is obliged by law to give a discharged servant what is termed a character, but in the event of this being done it prescribes under what circumstances it must be given. The law protects the employer in giving an honest opinion, even when it is only based upon suspicion; but if it can be shown that a bad "character" has been given maliciously, an action for defamation may be brought against the employer. A statute of George III. provides that if any person gives another a false character by personating an employer, making false statements with regard to the same, &c., that person is liable, on conviction before two justices of the peace, to be fined twenty pounds, or in default to be imprisoned with hard labour for from one to three months.

Liability of Master (or Mistress) for a Servant.—A master may justify an assault committed in defence of his servant, as a servant may justify an assault committed in defence of his master. If any one cause or procure a servant to quit his master's service, or hire him at the time he is in that service, so that he leave it before he be legally entitled to do so, the master can bring an action for damages against the new master and the servant. For all acts of a servant done by command of the master, that master is responsible, as he is also for certain acts not done by his command, but done under circumstances that seem to warrant the idea that the master has consented to be responsible. If a servant, in pursuance of direct orders, shoots a neighbour's dog, the master of the servant will be clearly responsible to the owner of the dog; and if a man has a coachman who drives badly and runs into a carriage, that man, by trusting such a driver with the reins, is assumed to have undertaken the responsibility of his acts. Some one must suffer loss; who so worthy as the man who caused it by employing an unskilful servant? If a blacksmith's servant lame a horse in shoeing him, the blacksmith must make good the damage caused to the owner. It is at the same time no excuse to the servant who does an unlawful act, such as shooting the dog, that he did it by order of his master. He is not bound to obey any unlawful command. If a servant commit an injury without the authority of his master, the master is not liable; so that if the laundry-maid at Mrs. A's, having a quarrel with the laundry-maid at Mrs. B's, destroys Mrs. B's clothes'-lines, or throws lighted lucifer matches among the clothes hanging out to dry, so that the clothes are burned, Mrs. A. is not liable. If the cook at Mrs. A's come into Mrs. B's house, and say that her mistress is in need of change for a five-pound note, and that if Mrs. B will give the cook the change she will herself presently bring the note, in such a case if the cook, unauthorised to say what she did, goes off with the money, her mistress is not liable to make good the loss to the deceived person. If a servant procures articles on credit from a tradesman with whom her mistress has been in the habit of dealing for cash payments, it is the tradesmen's loss if the servant prove a cheat. If, however, the mistress has had articles sometimes for cash, sometimes on credit, it is her loss; for the tradesman cannot know whether she has really ordered the goods or not. But by far the most preferable system is that now adopted by most respectable tradesmen—namely, to have every order entered in a book, the tradesman undertaking not to supply anything without a written order from the customer. — *Cassell's Household Guide.*

Door-mats.—The best are perhaps those made of cocoa-nut fibre.

Doors, to keep Open.—Bricks

covered with crimson baize are sometimes used for this purpose.

Drainage.—The importance of this subject cannot possibly be over-estimated. As the great novelist, Charles Dickens, wrote, "Oh, for a good spirit, who would take the housetops off with a more potent and benignant hand than the lame demon in the tale, and show a Christian people what dark shapes issue from midst their homes to swell the retinue of the Destroying Angel as he moves forth amongst them!" As no organised being can live without food, so no food can afford its full supply of strength and nourishment without a proper supply of pure air, and yet how careless most of us are with reference to the atmosphere we breathe; how few of us consider either its wholesome quality or its sufficient quantity. That the sewers of your house are of the proper form and dimensions, are flushed at frequent intervals, are water tight, properly ventilated, and have the right degree of fall are matters on which the health and happiness of an entire family may be depended. Yet what inquiry concerning these things is ever made by the ordinary head of a family? A few hints are all we can give to this subject here, but these are of no small importance. All drains should be double-trapped, to prevent the foul air generating in them or returning by them, one trap—a bell-trap—at the sink where the waste water enters, and the well-trap short of the inlet to the drain. All drains should be so constructed that they can be readily opened and cleansed with being broken up. The air of every house in which the bell and water-traps do not act perfectly is sure to be impure. To prevent the removal of the bell-trap it is a good plan to fix it to the trap by a hinge with a piece of metal so fixed that it can only be partially raised for for the purpose of cleansing the trap, and falls into its place by mere force of its own weight when it is not held up.

Draughts, Beetles, Rats, and Mice, how to Exclude them.—The clefts and chinks between badly-joined boards may be well stopped by the following plan, which will serve to exclude not only draughts but also rats, beetles, and mice:—Mix one quart of flour with one drachm of pounded pepper, and the same quantity of pounded aloes into a paste. Cut long strips of cap-paper, and turn up the sides so as to form oblong troughs, the edges of which paste to the respective sides of the crack or aperture between the boards, wainscoting, or what not. Then mix one part of plaster with nine parts of clay, and knead the mixture well with the pepper and aloe paste. When the paper over the hole, or holes, is quite dry, fill the troughs it forms with this mixture.

Draught.—In medicines this term implies as much as should be taken at once or at a draught.

Draughts are caused by cold air rushing in to supply the place of the ascending warm air. They are often elements of discomfort and danger. If the lower sash of a window be opened, the external air rushes in; if the top sash be opened, the internal air rushes out.

Drawing - Papers. — A good drawing-paper should be of one uniform colour and equally sized in every part. Its thickness varies with its size.

Drawing-room Fire Grates, Cheap Ornaments for.—A correspondent of the *Gardeners' Magazine* says:—"Having become tired of the paper ornaments and the mixture of shavings and tinsel with which the drawing-room fire-grates have in past years been decorated, I determined last year to try the ivy ornaments which you recommended some years past, and this year we have had them in use, and they have produced a most pleasing effect. Several boxes of the same length as the width of the fireplace, and similar to those placed on the window-sill, were procured; to these flat, and rather stout wire trellises, just large enough to cover the grate, were fixed by fastening the uprights to the back of the boxes by means of screws. The boxes were then filled with a compost consisting of turfy loam three parts, leaf mould one part, and decayed manure one part. Previous to filling with soil, three six-inch pots were put in each, one in the centre and one at each end, for the purpose of receiving pots of a smaller size, containing ferns or flowering plants, when the boxes are placed in the drawing-room. The ivy used was that known as the common Irish, although I should imagine that any of the strong-growing green-leaved ivies would do equally well for the purpose. To prevent any loss of time, strong plants in five-inch pots were procured, and three plants put in each box, and the shoots trained regularly over the trellis. This was done early in the spring of last year, and the trellis is now densely covered with healthy, deep green foliage. To keep the ivy within bounds, it will be simply necessary to prune in early in the spring all straggling shoots. There is practically no limit to the plants that may be placed in the receptacles provided in the boxes, as bright flowers are effective backed with the ivy, and the appearance of ferns is very cool and refreshing in hot weather, and the hardy varieties are equally as desirable as the choicest of the exotic species. When the plants in pots require water they are simply lifted out of their places and taken where the superfluous moistures running from the pots will do no harm; but when the soil in the boxes becomes dry, it is necessary to take them outside, which can be readily done by two persons, one at each end. Of course the bright parts of the stove should be removed and packed away carefully, as they will be hidden by the ivy. Possibly some of the variegated ivies would be useful for the same purpose, and the other day I purchased several dwarf specimens of a very pretty tree ivy with variegated leaves for placing in the receptacles in the boxes. The boxes can be faced with tiles to suit the taste. Those faced with rustic wood are also very pleasing." (See *Summer-houses.*)

Dressmaking.—Notwithstanding the almost incessant changes of fashion, there are certain general rules in the art of dressmaking that never vary, and which it may be well to point out for the instruction of those who are desirous of making their own dresses. In purchasing a dress always buy a little more than is required, this will come in usefully for repairing, altering and renewing the cuffs, &c., or perhaps it may be required for a new body. Also, if a dress is too scantily made it will never look well however expensive the material. In buying silk you can best ascertain its thickness by holding a part of it between your eyes and the light. If very stiff it is highly gummed, and therefore cannot wear well, as the gum will cause it to split and crack at the gathers. Soft thick silks, with both sides alike, cut out the most advantageously and wear the best. Figured or flowered silks look beautiful for a short time, but in consequence of their flossiness the sprigs soon begin to wear rough and the spaces between them seem to appear shrivelled and contracted. This is the case with most silks which have figures embossed or thrown up on the outside. What are called watered silks look after a while as if they had been literally watered or wetted all over.

To Cut Out the Body of a Dress.—In commencing a dress the first thing is to cut out the bodice-lining, which should be always made of good union or linen, as lining that is thin and coarse will stretch out of shape when the material is put on it, and shrink very much if wanted to wash. For a white dress, or any one that is to be washed, the lining must be of linen that is perfectly white, otherwise the brownish tint, however pale, will show through. For a dark silk or merino dress the lining may be of brown holland. A yard of linen will make a bodice for a person of moderate size, and it must be quite smooth when you cut it. The person to be fitted should wear at the time one of her best fitting dresses. Over the fore-body of this let the linen be pinned, placing it bias, and putting several pins at the shoulders, waist, and sides. Fold over at the bottom of the waist two very large pleats, slanting upward, and diminishing gradually to a point as they ascend to the bosom. If these pleats are small and narrow, the dress will be inevitably too tight across the front, compressing the bosom painfully, and making it look flat and contracted. This is a very common fault with dressmakers, who depend upon giving an artificial fulness to the bosom by means of wadding. The fore-body leaves off at the shoulder-seams, and after it is fitted the back should be done. The lining of the back must be cut straight way of the linen (not bias), and it must be pinned very smoothly on the back of the dress worn at the time by the person for whom it is intended, allowing sufficient everywhere for hemming in, and for outlet if the dress should afterwards be found too tight. The lining must be allowed longer in the waist than the model dress, as it takes up greatly in sewing on the skirt. For a person of hollow back and taper form, the side-seams should have a considerable slope inwards from the arm-hole to the lower extremity of the waist, otherwise the dress will not set well into the lower part of the back, even when made very tight. Where the waist is thick, the slope inwards should be less; and some figures require little or no slope. If the back of the person is rather round, or the shoulders very prominent (as they frequently become from habitually compressing the waist to excessive tightness) the body should be cut considerably longer behind, so as to allow sufficient space for the projection of the shoulders. When the back is flat and straight the body need be no longer behind than at the sides. Be very careful not to cut the body lining too short either behind or before, for to all figures a short waist is the most unbecoming. In cutting out the sleeve-holes notch them in front and allow them sufficiently easy, particularly just under the arms. Give the shoulders a considerable slope inwards towards the neck, otherwise the dress will set too loosely about the upper part. Next, with a piece of tape measure the length of skirt from the waist behind down to the heels, allowing sufficient for the hem and facings. After the lining has been fitted and cut out over the model dress, take it off and baste it together; also basting down the large pleats. Then let it be tried on and fitted a second time upon the corsets only. This is the time to remedy any faults in the cutting out or basting together. If it is found too loose about the upper part of the back, slope it in a little more towards the neck. If too tight, let it out sufficiently by opening the shoulder-seams. Should the lowest part of the back be too loose, take it in a little at the side-seams under the arms. If the waist is too tight, let it out at the side-seam of the fore-body; or it may be necessary to let it out at the back and the fore-body. A dress, to fit well, should have no wrinkle whatever under the arms, or indeed in any place where it ought to be perfectly smooth. A body will frequently set badly not because it is too loose, but from the sleeve-hole being so small that the dress cannot be got on sufficiently, causing it to hang off and wrinkle down. When this is the fault, the remedy, of course, is to enlarge the sleeve-holes. When sleeve-holes are found too tight, cut them away just in front and under the arms, and then round them off nicely at the back. If left too tight when the lining is cut out, they will not be any looser when the dress is finished, as the ridge made by the seam in putting in the sleeve always fills up whatever space is allowed for the sewing. When the fitting of the lining is finished, do not, after stitching them down, trim off the inside folds of the large pleats, but allow them to remain uncut, in case it should at any time be found necessary to let them out for the purpose of enlarging the body. They can be made to lie perfectly flat by felling down the folded edge on the inside. In making the fore-body of a dress the silk or other material that constitutes the outside should always be cut precisely *bias;* otherwise neither the pleats nor gathers, nor indeed any part of the front can set well. To do this, fold one corner quite sharp, and make the middle of the fold lie exactly even. If the silk is not wide enough for a *perfect bias*, join it at the selvage to another selvage piece running just the same way. An imperfect bias causes the pleats to twist or warp and the whole to go wrong and unevenly. In cutting the outside of the fore-body, see that there is amply sufficient, both in length and breadth, for all the pleats or gathers, allowing it wider considerably at the top than at the bottom. If the dress is of the material that is to be washed, the upper part of the fulness should be gathered; as loose bias pleats cannot be ironed to look well, or even tolerably; the lower part of a gathered front may be stitched closely down. Wherever there are gathers in a dress, make them small, and stroke them neatly, as in making up linen. The pleats should be laid smooth and even, so that no part of them may rise or stand off even in the smallest degree. Baste or run them down to the lining, concealing the stitches of each pleat under the pleat that falls over it. If there is to be wadding at the bosom, you may insert it between the lining and the outside before you cord the neck. But the best way is to put it on after the body is finished. To do this, cut out two circular pieces of wadding of sufficient size, lay on each of them another round piece about an inch smaller in circumference, upon that put a third and fourth, fifth, and sixth round pieces, each diminishing in size till the last is not larger than a five-shilling piece. Baste each of these piles of wadding upon a circular piece of white glazed muslin; notching the edges of the muslin and turning them in. Then sew them to the lining of the body so as to have the wadded pieces next the corset, and not between the lining and the outside. In stitching down the lower part of the pleats (where they diminish in width towards the waist) make a second row of stitching on the extreme edge of each. A fore-body, to set off the figure, should fan very much, the pleats or gathers spreading full above so as to give breadth to the chest, and narrowing into a small compass at the bottom of the waist, where they meet in the centre. The space on each side of the pleats should sit quite smooth to the waist and be perfectly free from wrinkles. The outside of the stuff must be cut straight way of the stuff, like the lining. For a full back (they are sometimes in fashion) the lining must be tight; but the outside must be cut large enough to allow of gathers at the lower part and shoulders. A full back gathered into the middle of the neck rarely sets well; the gathers should fan from the shoulders down to the waist. Great care must be taken in making a full back not to let it puff out in the middle—a most disfiguring fault, and one to which full-backed dresses are very liable. The gathers should be small and nicely stroked. If the back is gathered, the sleeves and skirt should be gathered also. It is now usual to have no seams in the backs of dresses, except under the arms; but some persons still prefer having the form or shape designated by two narrow bias folds, beginning just below the middle of the back part of the sleeve-hole, and descending to the waist, where at their termination, the space between diminishes to about half a finger in width. These narrow bias folds are furnished with a cording. To put them on, baste them down on the back of the dress after it has been lined, giving them a slight curve, and then sew them on with the lining next to you; keeping the needle and thread on the lining side, and catching the under part of the bias fold as you take the stitches through. A cording must be let in at the shoulder where the fore-body is joined to the back. In putting whalebones into the body of a dress, use none that are not perfectly straight and even; if in the least crooked they will cause a drawing or puckering of the outside. It is usual to have whalebone up the middle of the front; one, or perhaps two, at each side of the fore-body, running in the same direction as the large pleats in the lining and extending up as far as the bosom, but not over it. Also a whalebone at each of the side seams and under the arms. It is not a good way to run in the whalebones between the lining and the outside of the dress, as their ends very soon wear through the outside. Make a case for each whalebone, by sewing a piece of strong twilled tape upon the body-lining; then slip in the whalebones, and secure them well at the ends. Finish the lower part of the body with a cording felled down on the inside, and finish the neck in the same manner. The covering for cord should be cut into long slips, all of them exactly crossways, otherwise they will pucker and not sit smoothly when sewn on. In sewing on cording, hold the dress next to you, take the stitches very short and close, and quite through. In plaid dresses or dresses with patterns on them the checks must be correctly matched in the seams of the skirt and bodice. Wherever there is a join it is better to cut off a portion from one piece or the other than to allow the checks to come wrong. A perpendicular stripe of a check should always go directly up the middle of the back, and the cross stripes should be made to match precisely. The same accuracy is to be observed in making a dress of a striped material. In sewing on hooks and eyes use very strong silk, and put the hooks on the right side and the eyes on the left. For the sleeves they should be of a smaller size. If instead of eyes you work loops in button-hole stitch, make them very strong, or they will soon wear out and break.

To Cut Out a Plain Skirt.—A dress skirt will not look well unless it is very full and wide; it should be long enough just to touch the ground. For a peson of moderate size, a yard and a quarter in length will allow something to turn up for the hem. A tall person may require a yard and a quarter and a half-quarter for a hem. A dress made of narrow silk, that measures but half a yard in width, will require eight in the skirt, but if the material is less than half a yard wide, the skirt should be nine breadths. Any material of three-quarters of a yard wide will take six breadths; if but half a yard and half a quarter in width, there must be seven. A tall person should wear a full skirt, measuring at least five yards round, if without flounces. A dress, if lined through, will look much fresher when turned than one that has not been lined. The lining should be very thin. After the breadths of the outside are all run up, measure those of the lining so as to fit exactly, and run them up also. Put the lining inside, whip the two raw edges together at the top, and baste the lining and outside together at the bottom. For the slit behind at the top of the skirt, hem down the outside upon the lining, securing it well at the termination, and taking care to turn in the selvage edge. Be also very particular in running up the breadths, or forming the sleeves, to take sufficient hold, so as to prevent even a thread of the selvage edge from appearing on the outside of the dress, as is frequently the case when seams are put together carelessly. It is well to notch with your scissors the selvage all along; otherwise the tightness of the extreme edge will draw up the breadths, and cause them to pucker at the seams. In sewing together the pieces for a frill, or a flounce to a silk dress, cut off the selvage entirely, and whip over the seams; for if the white edge is left on it will show at every join. If the skirt is pleated at the top, turn down an inch or two all along, and fix all the pleats exactly even, securing them for the present with pins, and afterwards basting them; leave a plain space directly in front of the fore-breadths. Take care not to have a seam on any of the top pleats, but fold all the seams underneath. The middle of the fore-breadth must come exactly to the middle of the fore-body, and the central gathers of the back-breadth must go precisely to the back-body. As the gathers are to be caught up and not whipped with a drawing thread, they cannot be made till after the body is sewn fast to the skirt, but enough must be left to make them very full. Having basted the body to the skirt, stitch or sew them very closely with a strong silk thread. In doing so stretch the body very tightly and hold the skirt rather easy. Then put on the gathers at the back of the skirt, catching them to the body as you go along, and securing each in its place with a seamed stitch taken over the first. When they are all in, take a large needle and a strong thread, with a large knot on its end, and run it through the whole of the gathers as they stand in a row on the inside, and draw the thread tightly. This will keep them compact, and make them set out well. If the skirt is not lined all through, put a stiffener in the upper part of the two back-breadths, and sew it on with the gathers when you are making them, whipping it first to the raw edge of the outside. This stiffener may be of a double piece of glazed muslin about a quarter and a half quarter in length when doubled, and in width the same as the two back-breadths. Unless they are extremely wide do not double it exactly in half, but leave one of the lower edges a little longer than the other. Scollop it all round with your scissors.

THE SLEEVE OF THE DRESS.—After you have fitted the body-lining, take the measurement for the sleeves by means of a piece of tape from the arm-pit to the wrist, allowing a little extra length, as it will take up in sewing. If the sleeve is too short in the inside of the arm it will give a very awkward appearance to the wrist, exposing it bare whenever the arm is in the least extended, besides feeling most uncomfortable. We have seen sleeves in which this defect (shortness of the under side) was so great, that after the dress was on it was impossible to raise the hand higher than the waist, the arms appearing as if skewered down to the sides. The remedy when the sleeve is too short is to put an addition to the cuff at the wrist, or else to take out the sleeve at the shoulder, rip it down the seams for about a half a yard, and then cut a piece from each side, which (though making the upper part of the sleeve narrower) will add something to its length under the arm when it is set in again. If the design of the sleeve will permit, it is perhaps best to increase its length by adding a cuff at the bottom, concealing the join under a band. If you wish the sleeve to set off very much from the elbow, cut it very long on the top of the shoulder, and give it a great curve along the inside of the arm. On the contrary, if you desire that it should hang straight, give the inside but very little slope. In cutting out the sleeves fold over the material into an exact bias; and if not wide enough at the top, cut a piece to join on, making both selvages to come together. This seam or join had best go at the back of the sleeve. When the material is very narrow, it is necessary to join the upper part of the sleeves both at the back and front. That side of a bias sleeve where the threads run straightway must be put front or next the fore-body; the crossway side must go next the back—this is very important to the set of the sleeve. The top or shoulder part must be rounded at the back, and hollowed a little at the front, where it is seamed in at the sleeve-hole. The linings should be cut out with the sleeves, and exactly of the same form and size. Coloured linings (unless of silk) are apt to rub off on the arm. White glaze linings are the best for the sleeves, if not for a washing dress; for a dress that *may* be washed, it is better that the linings should be separate from the sleeves, making them of cheap white cambric muslin. Gather these extra linings at the top into a band, and at the bottom into a wrist-band. They must not be so long as to appear at the outer lower slit of the outer sleeve. In setting on the sleeve, baste a cord all round the arm-hole, beginning and finishing at the side seam under the arm; then close-stitch the sleeve all round, leaving the cord to appear as a finish on the outside. Bands and their lining must be made crossway of the stuff. If intended to wash, it is best not to cord them at the edges, but to fell down the outside over a lining. Between the outside and the lining there should be a very stout stiffening of buckram. Cut all three perfectly even and baste them together till after the belt is finished. Line the flap or end that hooks over with a piece of the same material as the dress. If you cannot get a waist-band to match the dress exactly, get one that is rather of a lighter than a darker shade.

Dried Peas, Stewed.—Pick and wash one pint of peas, steep them in water for twelve hours, and put them into a pan with just enough water to cover them. Add one ounce of butter, and a teaspoonful of salt. Let them boil and then simmer till the peas are quite soft. Season with pepper and salt.

Dried Sweet Herbs, Preservation of.—After drying them in the usual manner in the shade, put each sort into a small box eight or ten inches long by five or six inches broad and six or eight inches deep; and by means of boards, of the size of the interior length and width of the box and a screw-press, press the herbs into cakes or little trusses about eight inches long by five inches wide and two inches thick. These carefully wrap up in paper; and being kept in a dry place they will be found to retain their aroma in as perfect a state as when they are put in the press for at least three years.

Drink, a Pleasant One.—Boil a quart of milk and a quart of water, with the top-crust of a penny loaf and one blade of mace, a quarter of an hour very softly, then pour it off, and when you drink it let it be warm.

Dripping, to Pot.—Take six pounds of beef-dripping, boil it in rain-water, strain into a pan, let it stand till cold, then take off the hard fat and scrape off the gravy which sticks to the inside; repeat this for eight times. When it is cold and hard take it from the water, put it into a large saucepan, with six bay-leaves, a few cloves, half a pound of salt, a quarter of an ounce of white pepper. Let the fat be all melted at a gentle heat, let it stand till it is hot enough to strain through a sieve into the pot; then cover it up to grow cold. The best way to keep any kind of dripping is to turn the pot upside down.

Drugs and their Uses.—To render the important section of our little work which we have devoted to *Medicines* (see page 265) more complete, we append an alphabetical list of some of the drugs most commonly used. In the above mentioned article we have dwelt upon the nature and uses of the different medicines; in this we give a few words about their effects, and the disease for which each is proper.

ÆTHER is usually given in cold water for asthma, cramp, and flatulence. Its effects are antispasmodic.

ALMONDS, EMULSION OF (see page 13). Usually given in cases of cough or strangury. Its effects are demulcent.

ALMONDS, OIL OF, is given in honey, and sometimes in place of the above.

ALOES, SOCOTRINE.—Made into pills, is given as a purgative in cases of extreme costiveness.

ALOES, TINCTURE OF.—Taken in water, as a purgative for costiveness and worms.

ALUM POWDER is given as an astringent in cases of flooding.

AMBER, RECTIFIED, OIL OF.—Taken in honey. Its effect is antispasmodic, and it is usually given for whooping-cough, hysteric fits, &c.

AMMONIAC, GUM.—In pills. It is an expectorant, given for chronic coughs, asthma, &c.

Ammoniac Gum, Milk of.—Given as an expectorant for coughs, &c., same as the former.

Antimonial Powder.—Given in honey, as a sudorific for inflammation, fever, pleurisy, &c.

Antimonial Wine.—Taken in water, as an emetic for the same purpose as the above.

Antimonial Wine (as an alterative). Taken in barley-water, its effects are sudorific. Is generally given for St. Anthony's fire.

Aromatic Confection.—Taken in cinnamon water, as an astringent and cordial for cramp in the stomach, purging, &c.

Aromatic Spices.—Given in water, as a stomachic for indigestion and flatulence.

Asafœtida Emulsion is anti-spasmodic. Given for asthma, hysterics, whooping-cough, &c.

Asafœtida, Tincture of.—Given for the same as the above in a little water.

Asafœtida, Volatile Spirit of.—Given for same and fainting-fits.

Asafœtida Pill.—Same as preceding.

Balsam of Copaiba.—Given in honey, is diuretic and balsamic; given for whites, gleets, gravel, &c.

Balsam of Peru, taken in honey, has a stimulating effect; for flatulence, asthma, &c.

Balsam, Traumatic.—Taken same as above, for same purposes.

Balsam Tolu, Tincture of.—Same as the above, and for chronic cough.

Bark, Peruvian, Powder, given in mint-water, is a tonic good for ague, indigestion, weakness, &c.

Bark, Peruvian, Decoction of.—Tonic, for relaxation and weakness.

Bark, Peruvian, Essential Salt of.—Taken in port wine, for same as the above.

Bark, Peruvian, Tincture of, is also used for the above purpose.

Baselic Powder, taken in honey, is a cathartic and vermifuge; taken in cases of dropsy, worms, and costiveness.

Calomel.—In a pill, as an alterative; taken in cases of foul ulcers, &c.

Camphire, given as a pill, is antispasmodic; given in convulsions, fits, and whooping-cough.

Camphire, Julep of, is a febrifuge and antispasmodic; given in nervous fever, &c. &c.

Canella Alba, Powder of.—Taken in mint-water, as a stomachic, for indigestion, &c.

Canella Alba, Tincture of, is also a stomachic, and taken for the same purposes as the above.

Cardamoms, Tincture of.—Taken in water in lieu of the above.

Cardamoms, Compound Tincture of.—Given in camomile tea, as a stomachic, for the same purpose as the previous.

Castor-Oil.—Given in mint-water as a purgative for colic, costiveness, &c.

Catechu, Tincture of.—Given in mint-water, as an astringent for chronic looseness, or flooding.

Chalk, Prepared.—Taken in mint-water, for the same purpose as the former.

Camomile Flowers.—Taken in mint-water, as a stomachic and vermifuge; useful in cases of indigestion and worms.

Camomile Ginger.—Given for cramp and gout.

Cinnamon Powder.—Taken for indigestion and flatulence.

Cream of Tartar.—Taken as an aperient and alterative in inflammation, eruptions of the skin, &c.

Colocynth Pill, as an active purgative, is useful in extreme cases of costiveness.

Dover's Powders.—As a sudorific and anodyne, given for rheumatism, recent colds, &c.

Elixir of Vitriol, as a stomachic, is given for indigestion, flatulence, vomiting, &c.

Electuary, Lenitive, is a gentle aperient, given for costiveness.

Epsom Salts.—The same as the previous.

FOXGLOVE POWDER is a violent purgative and emetic, given for dropsy.

FOXGLOVE, TINCTURE OF, is a sedative, taken in cases of consumption of the lungs.

GENTIAN, TINCTURE OF, taken in water, is a stomachic; given for indigestion, flatulence, &c.

GENTIAN, EXTRACT OF.—The same purpose as the former.

GINGER POWDER, taken in water, has a stimulating effect, and is good for flatulence, gout, and indigestion, as are also the lozenge and the tincture of ginger.

GUAIAC GUM, given in a pill, is a stimulant and sudorific; taken for rheumatism, gout, &c.

HARTSHORN, SPIRIT OF, acts as a stimulant, and is given in cases of convulsions, heartburn, and hysterics.

HEMLOCK, POWDERED, is a sedative, taken in mint-water or as a pill; is used in cancer, whooping-cough, &c.

HIERA PIERA is a purgative and stomachic, used for costiveness and flatulence.

HIERA PIERA, TINCTURE OF.—Given for worms, flatulence, &c.

IPECACUANHA POWDER.—Taken as an emetic.

IPECACUANHA WINE.—For same as the above.

IRON.—(See *Steel.*)

JALAP POWDER.—Active purgative; for costiveness, &c.

JALAP, TINCTURE OF.—Given for same as *Jalap Powder.*

KINO GUM, TINCTURE OF, taken in mint-water, is an astringent useful in looseness of the bowels.

LAVENDER, COMPOUND SPIRIT OF.—Taken in water as a cordial; useful in fainting-fits and hysteria.

LOGWOOD, DECOCTION OF.—As an astringent, given in cases of dysentery and looseness.

MAGNESIA.—As an absorbent, is useful in heartburn and acidity.

MANNA.—Gentle aperient in slight costiveness.

MUSK is antispasmodic, and is taken for convulsions, lock-jaw, &c.

MURIATIC ACID is an alterative; given for cutaneous eruptions and scrofula.

MYRRH POWDER is given in cases of green sickness, weakness, &c.

NITRE POWDER.—Taken in barley-water it is diuretic and febrifuge; given in cases of strangury, fever, &c.

NITRE, SWEET SPIRITS OF.—Given for same as the above.

NITRIC ACID is a tonic, and is taken in cases of diabetes, scrofula, &c.

NUTMEG, SPIRIT OF, is a carminative; taken for flatulence, cramp in the stomach, &c.

OPIATE CONFECTION, taken as a bolus, is an opiate given for purging, griping, &c.

OPIUM, PURIFIED, is an anodyne, given for acute pain, restlessness, and asthma.

PAREGORIC ELIXIR is an anodyne, given for asthma, pain in the bowels, &c.

PEPPERMINT, ESSENCE OF, is a carminative, given in cases of colic, pains in the bowels, &c.

POPPIES, EXTRACT OF WHITE, is an anodyne, given for spasms, acute pain, cough, &c.

POPPIES, SYRUP OF.—The same as the former.

QUASSIA, TINCTURE OF.—Taken in ginger-tea as a stomachic for indigestion, flatulency, &c.

RHUBARB POWDER, taken in mint-water, is an aperient useful in costiveness.

RHUBARB, TINCTURE OF, aperient and carminative for colic, costiveness, &c.

RHUBARB, BITTER, TINCTURE OF, taken in water, is an aperient and stomachic; taken for indigestion, flatulence, &c.

RHUBARB LOZENGES WITH GINGER. Useful for the same as the former.

ROCHELLE SALTS, taken in mint-water, is an aperient useful in costiveness.

SAFFRON, TINCTURE OF, taken in water, as a cordial, is a good remedy for lowness of the spirits.

SAFFRON, SYRUP OF, also useful for the same as the previous.

SALT, GLAUBER'S, given in mint-water, is useful as a purgative, and used in costiveness.

SALTS, EPSOM, used for the same as the above.

SALTS, CHELTENHAM, used for the same as the above.

SALTS, POLYCHREST, used for the same as the above.

SALTS, TASTELESS, gentle aperient, given also for costiveness.

SALT OF TARTAR, taken in mint-water, is an alkaline for heartburn, rickets, &c.

SALT OF WORMWOOD, also given for same as the above.

SARSAPARILLA POWDER, in mint-water, is an alterative for scrofula, &c.

SCAMMONY POWDER, taken in mint-water, is a strong purgative; given in cases of obstinate costiveness.

SENNA, INFUSION OF, taken occasionally, is an excellent purgative, useful to expel worms, and in cases of costiveness.

SENNA, TINCTURE OF, taken in water, is also good for costiveness and colic.

SOLUBLE TARTAR, taken in mint-water, is useful for costiveness and piles.

SPERMACETI POWDER, taken in honey, is demulcent; used in coughs, &c.

SPIRIT, MINDERERUS, taken in mint-water, is cooling and sudorific; useful in cases of inflammation, fever, pleurisy, &c.

SPIRIT OF VITRIOL is anti-spasmodic and carminative, used for nervous debility, flatulence, &c.

SPIRIT OF NITRE, taken in gruel or barley-water, is diuretic and febrifuge; useful for gravel, fevers, &c.

SPIRIT OF SALAMMONIAC, taken in water, is stimulating; useful in hysterical fits and fainting.

SPIRIT OF SAL-VOLATILE, useful also for same purpose as the previous.

SYRUP OF WHITE POPPIES is an anodyne, given for coughs, restlessness, fevers, &c.

SYRUP OF BUCKTHORN, a strong cathartic, useful in case of costiveness.

SYRUP OF GINGER is a carminative for flatulence and cramp in the stomach.

SQUILLS, POWDERED, is a diuretic and expectorant for dropsy, asthma, chronic cough.

SQUILLS, OXYMEL OF, in mint, for dropsy, chronic cough, and asthma.

SQUILLS, TINCTURE OF LOZENGES, for same purpose as the above.

STEEL, MURIATED, STEEL WINE, SALT OF STEEL, POWDER OF RED SULPHATE OF STEEL, given in water or wine, as a tonic for indigestion, rickets, worms, &c.

SULPHUR, FLOWERS OF, taken in honey twice a day, is an alterative and aperient, for cutaneous foulness, piles, worms, &c.

SULPHUR, MILK OF, for same purposes.

TARTAR EMETIC, in water, is an emetic, which must be used with caution.

TURPENTINE, VENICE, in honey, is diuretic; is useful in cases of gravel, gleet, and fluor albus. It is given in the form of pills.

TURPENTINE, SPIRITS OF, used for the same purposes, and also as an embrocation in rheumatism. It should be used with caution.

VALERIAN.—An infusion of this in water is given for headache, hysteria, and other nervous complaints.

VALERIAN, TINCTURE OF, and the VOLATILE TINCTURE OF, used for same purposes.

VITRIOL ACID, ELIXIR OF, taken in camomile tea, as a tonic.

VITRIOLIC ACID, commonly called oil of vitriol or sulphuric acid, diluted, the same as the previous.

WORMWOOD, CONSERVE OF, taken as a stomachic and vermifuge, for indigestion, worms, &c.

WORMWOOD, SALT OF, is an alkaline; given for heart-burn, rickets, &c.

WINE, ANTIMONIAL, taken as an emetic.

WINE OF IPECACUANHA, same as the former.

WINE OF RHUBARB is an aperient; excellent for costiveness and indigestion.

WINE OF STEEL, as a tonic, given for debility, green sickness, the whites, &c.

Dry Rot.—Chance, which often gives valuable information to observers, has pointed out a preventive of the rot in timber that promises to be both efficacious and cheap. It was found that the timber used about the copperas works of Whitstable, in Kent, continued in a sound state for many years, which the seafaring people of that place attribute to its being soaked in the liquor that runs from the copperas-stones, and were unanimous in thinking this would prove a complete preventive of dry rot; there is a greater reason to hope for a good effect from this, as the copperas liquor, by its sulphuric acid, has a decided action on every part of timber, somewhat analogous to that which charring has on its surface, by which it has been long known to be preserved where it would otherwise have decayed rapidly.

Ducks Stewed with Green Peas.—Truss the duck with the legs turned inwards, cut up some bacon into small pieces, and put them in a stewpan with a piece of butter. Roast the duck brown, take it out, add a little flour to half a pint of rich gravy or broth, shell a half a peck of peas and put them in, with some parsley, stuffing herbs, and an onion; when the duck is done strain part of the gravy, and the rest, with the peas, must be thickened with a little flour or butter; add a lump of sugar and some salt. The fat must be taken from the peas.

Ducks, Devilled.—Split the duck in half, and prick the flesh all over with a skewer, well pepper and salt it, add a little mustard mixed with Chutney sauce, and boil it. For gravy, take a gill of rich stock, a gill of white wine, a gill of ketchup and lemon pickle, and a spoonful of loaf-sugar. Warm all together, and serve over the duck hot.

Ducks, to Roast.—Take some sage-leaves, two or three small onions, and chop fine together, add equal proportions of bread-crumbs seasoned with salt and pepper, and mix well together. Put this into the body of the duck, and roast for an hour or more before a brisk fire. Serve with rich gravy and apple-sauce.

Dumplings.—Make a light dough as for bread, with flour, water, and a little yeast and salt; cover with a cloth and set it before the fire to rise for half an hour, then have a saucepan of water on the fire, and when it boils take the dough and make it into little round balls as large as a hen's egg, then flatten them with your hand, and put them into the boiling water. Take great care they do not fall to the bottom of the pot, for then they will be heavy, and be sure to keep the water boiling all the time. When sufficiently done, which will be in about ten or twelve minutes, lay them in a dish, and serve with sweet sauce or plain melted butter.

Dumplings, Hard.—Mix flour and water, with a little salt, like a paste; make them in balls as large as a turkey's egg, roll them in a little flour, and throw them into boiling water half an hour; well boil them. Butter may be mixed with the flour if desired, the same as if you were making a paste.

Dumplings, Norfolk.—Mix a good thick batter with flour, half a pint of milk, two eggs, and a little salt. Take a clean saucepan of *boiling* water, into which drop this batter, and boil them two or three minutes; then throw them into a sieve to draw off the water, turn them into a dish, and stir a lump of fresh butter into them. Eat them while they are hot, and you will find them very good.

Dutch Apple Pie.—Pare and cut into thin slices some good baking apples, and first removing the cores, place them at the bottom of a pie-dish. Strew sugar over them, and currants well cleaned and dried. Add the grated rind of a large lemon. Pare off the white part of the lemon, cut the pulp into thin slices, remove the seeds, and spread this over the currants. Then add some more sugar, candied lemon or orange and citron-peel cut into thin slices. Over these place a layer of apples, sugar them, add grated nutmeg, cover with paste, and bake moderately fast.

Dutch Cream.—Beat up the yolks of three eggs, gradually adding to them a pint of new milk. When well mixed add one pint of cream, two drachms of vanilla cut small, and five ounces of loaf sugar. Set the mixture on a slow fire, stirring with a wooden slice. When the cream adheres to the slice it is ready for use. Strain through a colander into a dish.

Dyeing.—Of old this process was a very tedious and troublesome one, requiring special attention and appliances, together with a degree of chemical knowledge not common. But now, thanks to the introduction of Judson's dyes, it is neither a long, nor an expensive, nor a difficult task. A ribbon, a feather, a soiled or faded dress can be dyed with a sixpenny bottle of dye and a basin of water with great ease, and ordinary care will ensure complete success. The following are the few and simple rules to be observed:—

1. Into an earthen basin put from two to four quarts of boiling water.

2. Now insert the goods, and soak them for one or two minutes; then

3. Lift them out of the water with a piece of stick.

4. Pour in half the contents of a bottle of dye.

5. Replace the goods in the dye-bath, and with a piece of stick in *each* hand move them briskly about, in order that creases and folds may be avoided, and that the colour may be distributed evenly over the surface of the article.

6. Add more dye if a deeper shade of colour be required.

7. From five to fifteen minutes is sufficient time for dyeing most descriptions of goods.

8. Articles may remain in the bath until all the colour is extracted from the water, if a large vessel be used, but they must be kept in motion. Use more water for large goods.

9. Lift the goods from the bath when adding more colour.

A little starch may be added to the dye-bath. The Magenta dye is very suitable for woollen goods, silks, feathers, &c., and one bottle of it is sufficient for dyeing twenty yards of bonnet-ribbon. The ribbons may be dried when dyed by wrapping them smoothly and lightly round a clean bottle, which is afterwards filled with hot water and placed near a fire. To obtain colours other than those sold by the makers two or more dyes may be mixed in varying proportions, and a very large variety of shades, tints, and colours obtained. These dyes are also used for a large variety of other purposes—for ink; for painting; for colouring confectionery; staining wood; illuminating; for glass-painting, &c. We would not advise our readers to attempt to dye anything very large, for although some of our lady friends have been successful in doing so on the first attempt many have failed, the process being then one which requires a degree of skill in its management which is not often the result of anything but much practice.

Dyspeptics, Preparation of Food for.—The following remarks are from Dr. Pereira's excellent book on the effect of the several processes of boiling, roasting, frying, &c., and the best mode of rendering food easy of digestion to dyspeptics, which we give, although on some points we have another opinion. The operations may be reduced to five in number—viz., boiling, roasting, broiling, baking, and frying. "Boiling, when properly conducted (see page 152), is the operation by far the best suited to the dyspeptic, the convalescent, and the sick. (?) In the case of vegetables, it effects the solution of gummy and saccharine substances, and the expulsion, wholly or partially, of volatile oil; while starch grains are ruptured and partially dissolved, and albuminous and fibrinous liquids coagulated. Over-boiling, however, proves injurious to certain substances—as to eggs, which are thereby hardened and rendered difficult of digestion; and to the gelatinous foods, which become by it both less digestible and less nutritious. Boiling renders potatoes more fit for use, not merely by promoting their digestibility and nutritive power, but also by extracting or destroying noxious matter in the tuber. Over-boiling, however, though it may promote their digestibility, probably lessens their nutritive quality. Foliaceous parts, such as of cabbages, greens, &c., require well boiling to render them digestible. Roasting, next to boiling, is the best method of preparing food for dyspeptics. It splits and renders more or less soluble starch grains, and therefore serves to make some vegetables more digestible and nutritive than they would be in a raw state; as apples and potatoes. It also coagulates the vegetable albumen. It deprives flesh of part of its water, liquefies the fat, which thereby partially escapes during the operation, coagulates the albumen, and corrugates the fibrine. It does not appear that it affects any change in the composition of the protenaceous constituent of meat. Roasted meat should be neither *over-done or under-done.* It is a popular opinion that it is much more nourishing when under-done; but this is probably an error, for the juice which is more abundant in the under-dressed meat, is almost entirely aqueous, and can possess very slightly nutritive qualities. Moreover, by the prolonged roasting, the water of the juice is evaporated, the nutritive matter almost entirely remaining in the cooked meat, the composition of the solid or dry matter of which is identical with that of raw meat. So that well-done meat probably differs essentially from meat under-dressed, in having a little less both of water and fat, while it has the additional advantage of being more digestible. By roasting, the gelatine is not extracted, as in the operation of boiling. Broiling effects the same changes in meat as those produced by roasting, but more rapidly, so that whilst the outside is scorched, the inside retains its juiciness. Broiled meat, like roasted meat, is more savoury, though, as we have said on another page, it is less fitted for delicate stomachs than boiled meat. A well-broiled mutton-chop, however, is for the most part an unobjectionable dish for a dyspeptic. Baking is a more objectionable process than any of the preceding. Though the general effects produced by it are analogous to those of roasting and broiling, yet meat so cooked is less fitted for delicate stomachs, in consequence of being more impregnated with empyreumatic oil. From experiments carefully made, it appears that baked potatoes are less nutritive than boiled ones. The dyspeptic will act wisely in avoiding the use of all baked foods, except, perhaps, baked amylaceous puddings, as puddings made with sago, tapioca, arrow-root, rice, &c. Frying is, of all culinary operations, the most objectionable; fried foods being more obnoxious to the digestive organs than foods prepared by any other method. The influence of heat on fatty substances effect various chemical changes in them, whereby they are rendered more difficult of digestion. In frying the heat is usually applied by the intermedium of boiling oil or fat. Fried oils give off, while boiling, carbonic acid, a little inflammable vapour, and an acrid volatile oil called acroleine, or acroleon,* while the fatty acids of the oils are in part set free." Cooked butter is more obnoxious to the stomach than cooked olive oil, which may be ascribed to the facility with which, under the influence of heat, the acrid volatile acids of butter are set free.

Earache.—This troublesome complaint is sometimes occasioned by some foreign substance getting into the ear, or by exposure to cold, or by the forming of an abscess. Dip a piece of wool into a little sweet oil, and place it into

* Acroleine is probably generated by the decomposition of the glycerine. Its vapour most powerfully and painfully affects the eyes. Whole classes of medical students have been obliged to leave a lecture-room to avoid the irritating effects of acroleine vapour developed during the distillation of a couple of ounces of olive oil.

the ear. The progress of this painful complaint may often be checked by means of a large poultice of bread and milk, with a little fine oil added. This should be applied as warm as possible, and renewed every three or four hours. At the same time an aperient medicine should be taken. A little warm oil of laudanum dropped into the ear sometimes gives relief, and may be used before the application of a poultice. When suppuration appears, a little warm milk and water should be carefully used for its removal with a syringe several times a day. A remedy which has been strongly recommended is the following:—Boil a fig for five minutes, wrap it in a piece of rag and put it into the ear, binding it on with a handkerchief round the head. When the earache is very severe and of long-continuance, put a small blister behind the ear in addition to one of the above remedies, or a leech may be applied to the same part.

Early Rising.—Dr. Kitchener, in his "Essay on Early Rising," says: "There is no time spent so stupidly as that which inconsiderate people pass in a morning between sleeping and waking. He who is awake may be at work or play. He who is asleep is receiving the refreshment necessary to fit him for action; but the hours spent in dozing and slumbering are wasted without pleasure or profit. The sooner you leave your bed, the seldomer you will be confined to it. When old people have been examined in order to ascertain the cause of their longevity, they have uniformly agreed in one thing only, that they '*all* went to bed,' and '*all rose early*.'" (See also *Air in the Morning*.)

Ear-wax assists the hearing, and is so bitter and offensive to all insects that the fear of ear-wigs, &c., entering the ears is to a great extent unnecessary. Instances of insects entering the ear are, however, not altogether unknown, although it is difficult to account for their doing so. (See the next column.)

Earwigs. — A quantity of bean-stalks, about six or eight inches long, without a joint, placed where the earwigs abound, form excellent traps for these troublesome pests of the garden. Search the pieces of stick once a day, or oftener. By blowing strongly at one end, the insect which harbours therein comes out and can be destroyed. Small pots and lobster shells may be used for the same purpose, but these are unsightly, while the sticks may be very readily hid away from sight.

Earwigs in the Ear.—If one of these insects *should* crawl within the ear, and a piece of apple is applied to the ear the insect will crawl upon it, it being fond of apples; or some drops of sweet oil, oil of almonds, or olive oil may be dropped into the ear, which will instantly kill this or any kind of insect. Insects are deterred from attempting to penetrate the ear by the offensive bitterness of the wax it contains, but they sometimes get in, and are unable, although desperately anxious, to escape.

Eau Sucrée.—A favourite French drink, consisting of sugar and water with a little orange-flower water.

Eau Vulnérable.—On the Continent this is regarded with great favour for its value in curing bruises. To make it, take a handful of sage with equal quantities of fennel, thyme, wormwood, rosemary, marjorum, basilic, lavender-flowers, hyssop, rue, and vervain, and infuse them in six quarts of spirit of wine at 26°. Cover down the jar and let it remain fifteen days; then strain off, squeezing the plants, and filter through a little animal charcoal.

Eels afford light nourishing food, but they are generally considered better from this point of view when fried than when boiled. They should be well seasoned. They are sometimes salted, in which condition they are very wholesome eating.

Eels.—Wash them very clean, and cut them in pieces. Season them with pepper and salt, flour them, and fry them in butter. Let the sauce be a plain melted butter, with the juice of a lemon, or a little fish sauce may be added. (See page 173.)

Eels, Collared.—Take your eel and cut it open, take out the bones, cut off the head and tail, lay the eel flat on a board, shred some sage as fine as possible, and mix it with black pepper, add grated nutmeg, and salt, to be spread all over the eel, roll it tightly round up in a cloth with tape. Set some water on to boil in a saucepan, with pepper, salt, mace, five or six cloves and a bay leaf or two; put in the backbone, head, and tail well together; then take these out and put the eel into the same water, and boil the liquor till there is enough to cover it. Take it out and pour the liquor over the eel in the cloth, and keep it thus until you wish to use it.

Eel-pie, to Make.—Make a rich pie-crust, and clean, gut, and wash enough eels to fill the dish; season with salt, pepper, mace, &c., to your taste; put in as much water as the dish will hold, and cover it with the paste.

Eel Soup, how to make.—Take eels according to the quantity of soup you wish to make. One pound of eels will make one pint of good soup; so to every pound of eels put a quart of water, a crust of bread, two or three blades of mace, a little whole pepper, an onion, and a bundle of sweet herbs. Cover them closely, and let them boil till half the liquor is wasted. Then strain it, and toast some bread and cut it small; lay the bread into a dish, and pour in your soup. If the soup is not rich enough you must let it boil till it is as strong as you would have it. This soup can be made as strong as meat-soup. A little burnt sugar may be added to brown it.

Eels, to Broil.—Take a large eel, skin it and well wash it, open the belly, cut it into four pieces; take the tail-end, strip off the flesh, beat it in a mortar, season it with a little grated nutmeg, pepper, and salt, a little parsley and thyme, a little lemon-peel, an equal quantity of bread-crumbs rubbed in butter, then mix it all with the yolk of an egg, roll it up again, and fill the three pieces of belly with it. Cut the skin of the eel, wrap the pieces in, and sew up the skin. Broil them well, and serve with melted butter and anchovy sauce. (See page 173.)

Eels, to Spitchcock.—Split a large eel down the back and joint the bones. Cut it into two or three pieces; melt a little butter, put in a little vinegar and salt; allow the eel to lay in this for two or three minutes, then take the pieces up one by one, turn them round with a fine skewer, roll them in bread-crumbs, and broil them to a fine brown. Let your sauce be plain butter, with the juice of a lemon.

Eels, to Stew.—Skin, gut, and wash them very clean and free from sand. Cut them in pieces about a finger's length; put water just enough to cover them; put in also a bundle of sweet herbs, an onion stuck with cloves, a blade or two of mace, and some whole pepper tied up in a muslin rag. Cover closely down, and allow them to stew slowly. Look at them occasionally; put in a little piece of butter rolled in flour and a little chopped parsley. When you find they are quite tender and well done, take out the onion and spices, and salt according to taste. Then dish them up with salt.

Egg Flip.—Beat two or three eggs and three ounces of sugar well together; warm a pint of ale or porter, but do not let it get too hot, to curdle the eggs; mix the eggs and beer well together by pouring them two or three times from one vessel to another; add a glass of any kind of spirits, gin generally being used; grate some nutmeg and ginger over the top, and the flip is ready for use.

Egg Pie.—Boil twelve eggs hard, and chop them with one pound of beef suet, or marrow shred fine. Season them with a little cinnamon or nutmeg beat fine. Add one pound of currants washed and picked, and two or three spoonsful of cream, mix all these together, and fill the pie. When it is baked stir in half a pound of fresh butter, and the juice of a lemon.

Egg Sauce for Roasted Chickens.—Melt the butter thick and fine; chop two or three hard-boiled eggs, put them into a basin, pour the butter over them, and leave some good gravy in the dish.

Egg Soup.—Beat the yolks of two eggs in a dish with two ounces of butter. Take a tea-kettle of boiling water in one hand and a spoon in the other. Pour in a quart by degrees; and keep stirring it well all the time till the eggs are well mixed and the butter melted. Then pour it into a saucepan, and continue to stir it until it begins to simmer. Take it off the fire and pour it between two vessels out of one into another, till it is quite smooth and has much froth. Set it on a fire again; keep stirring it till it is quite hot, then pour it into a soup-dish and send it hot to table.

We give another recipe—a German one—for egg soup. Take a pint of water, beat up the yolk of an egg with the water, put in a piece of butter as big as a small walnut, two or three knobs of sugar, and keep stirring it all the time it is on the fire. When it begins to boil, bruise it between the saucepan and a mug till it is smooth, and has a great froth; then it is fit to drink.

Eggs and Asparagus.—Lay some buttered toasted bread on a hot dish, butter some eggs thus:—Take six eggs, more or less as you have occasion, beat them well, put them into a saucepan with a good bit of butter, a little salt, keep beating them with a spoon till they are thick enough, then pour them on a toast; in the meantime boil some grass tender, cut it small and lay it over the eggs. This makes a pretty supper-dish or a side-dish.

Eggs as Food.—Raw eggs are gently laxative, and are found to be serviceable in jaundice and obstructions of the liver. Eggs have the peculiar quality of singularly affecting some stomachs, while on others they do not produce the slightest uneasy sensation. The white of an egg closely resembles the lymph of the blood; the yolk is an animal mucilage. Eggs yield a mild, demulcent, and strengthening food, but when boiled to hardness they are very indigestible. They are most digestible when they are boiled so long as is necessary to slightly coagulate the greater part of the white without depriving the yolk of its fluidity.

Eggs, Broiled.—Cut a toast round a quartern loaf, brown it before the fire, lay it on your dish, butter it, and very carefully break six or eight eggs on the toast, and take a red-hot shovel and hold over them. When they are done, squeeze a Seville orange over them, grate over it a little nutmeg, and serve it up for a side-plate.

Eggs, Cold Boiled.—To render these warm again without spoiling put them into water which is made hot very gradually, and take them out before the boiling point is reached.

Eggs, Fricasseed.—Boil eight eggs hard, take off the shells, cut them into four quarters; put a little butter into a stewpan, let it melt, shake in a little flour, stir it with a spoon, then put in your eggs, throw a little nutmeg over all, a little salt, a good deal of shred parsley. Shake your pan round; pour in a little cream, toss the pan carefully, that you do not break the eggs. When your sauce is thick and fine, take up your eggs, pour the sauce all over them, and garnish with lemon.

Eggs, Pickled.—When eggs are plentiful, boil three or four dozen in a saucepan until they are boiled hard. The shells should be carefully removed and the eggs laid carefully in large-mouthed jars, and pour over them scalding vinegar well seasoned with allspice, some ginger, and a few cloves of garlic. When cold cork the jars tightly, and in a month the eggs are fit for use. This is a cheap pickle where eggs are plentiful, and for piquancy cannot be outrivalled.

Eggs, Preserving.—Mr. John Madden, writing to the *Field* on the subject of preserving eggs, gives the following information upon this important subject:—"Obtain some quicklime, and slake it with water, taking care that when cold the lime-water is not thicker than old milk. We pour the lime-water when cold into a brown earthenware vessel, with a cover or lid upon it; we then put in as many fresh eggs as the vessel will hold, taking care that the eggs are covered with the water and the cover kept on the jar. If your correspondent will try this simple method, he will have no hard yolks or any bad eggs. I may say that we preserved hundreds of eggs last year in the same way, and we cannot remember having a single bad one." Salt has also been strongly recommended for preserving eggs:—"Take jars or mustard kegs perfectly dry; put a thick layer of dry salt at the bottom, lay as many eggs on this as you can, cover with another layer of salt, and so on till your jar is filled, placing a thicker layer of salt at the top, shake it gently, and press down; cover with brown paper, brushed well over on the inside with flour-paste, which has had a piece of Scotch soda about as large as a walnut boiled in it; keep in a dry but not hot place. The eggs, if fresh when put down, will keep good for several months." We quote another way:—"Put quicklime into a large pan, pour boiling water on it (taking care of your face during the operation), stir it round until it is the consistency of thick cream. Let it stand a day or two, and the mixture is fit to use, and will keep good for some weeks. Put your eggs into any pans or jars you may have, stir up the lime-water, and pour it over the eggs to cover them entirely. You can fill your pans, layer by layer, as the eggs come in. When full, see that the eggs are entirely covered with the mixture. Keep them in a very dry place. In a short time the lime will settle in a crust over the eggs. When you want to use them, pour some water on the top, and it will soften the lime, so as to enable you to take out the eggs without breaking them. I have seen this plan tried for many years; and eggs preserved in the spring keep good till Christmas or later." Another observes, "In the Western States of America, it used to be the practice with some of the French creole dealers in eggs, &c., to get a barrel, fill it with fresh eggs; they then poured in melted hog's lard, suet, or other fat, till the barrel was perfectly full. By this means all the interstices between the eggs were filled up, and when the lard cooled the whole formed a solid mass; and the barrel could then be rolled about like any ordinary merchandise without risk of breakage. Eggs were thus sent by rail or steamer down the Mississippi for hundreds of miles to New Orleans and other large towns for sale. Arrived at their destination, the eggs were dug out and used as wanted. The lard also was disposed of in its turn. I was informed that eggs packed in this way would keep perfectly fresh and good for several months, which I can quite believe, seeing that the air would be completely excluded; and, even after meeting with considerable rough usage in transit, I heard it was very seldom that any loss was sustained." Not being practically experienced in any way of preserving eggs, we give the modes which authorities have spoken most highly of.

Eggs Ragout.—Boil twelve eggs hard, take off the shells, and with a little knife very carefully cut the white across long-ways, so that the white may be in two halves and the yolks whole; be careful neither to break the whites nor yolks. Take a quarter of a pint of pickled mushrooms chopped very fine, half an ounce of truffles and morels, boiled in three or four tablespoonfuls of water; save the water; chop the truffles and morels very fine, boil a little parsley, chop it fine, and mix together with the truffle-water you saved. Grate a little nutmeg in, a little mace; put it into a saucepan with three spoonfuls of water, a gill of red wine, one spoonful of catchup, a piece of butter as large as a walnut rolled in flour. Stir all together and let it boil. In the meantime get ready your eggs, lay the whites and yolks in order in your dish, the hollow part of the whites uppermost that they may be filled. Take some crumbs of bread, and fry them brown and crisp, as you do for larks, which will fill up the whites of the eggs as high as they will lie. Then pour in your sauce all over, and garnish with fried crumbs of bread. This makes a good supper-dish or side-dish.

Eggs served with Tripe.—Boil some eggs hard, take off the shells and cut them in four quarters. Put a little butter in a stewpan, let it melt, shake in it a little flour, stir it with a spoon, then put in your eggs, throw a little grated nutmeg over, a littlesalt and a good deal of shred parsley. Shake your pan round, pour in a little cream; toss the pan round carefully, that you do not break the eggs. When the sauce is thick and fine, take up your eggs, pour the sauce all over them, and garnish with lemon.

Eggs, to Dress, with Bread.—Take a penny loaf, soak it in a quart of milk for two hours, or till the bread is soft; put to it two tablespoonfuls of orange-flower water, or rose-water, sweeten it, grate a little nutmeg; take a dish and butter the bottom of it, break in as many eggs as will cover the bottom of the dish, pour in the bread and milk, set it in a tin oven before a fire, and half an hour will bake it; it should be done in a slow oven.

Eggs, to Force.—Get two cabbage-leaves, scald them with a few mushrooms, parsley, sorrel, and chervil; and chop them very fine with the yolks of hard-boiled eggs, seasoned with salt and nutmeg; then stew them in butter. When they are done enough put in a little cream, then pour them into the bottom of a dish. Take the whites and chop them very fine with parsley.

Eggs, to make a Pretty Dish of.—Boil six eggs hard, peel them and cut them into thin slices; put a quarter of a pound of butter into a stewpan, then put in the eggs and fry them quickly; about seven or eight minutes will cook them. You must be careful not to break them; throw over them pepper, salt, and nutmeg; lay them on your dish, pour out all the fat, shake in a little flour, and have ready two shalots cut small. Throw them into the pan, pour in a quarter of a pint of white wine, a little lemon-juice, and a little piece of butter rolled in flour; stir all together till it is thick. If you have not sauce enough, put in a little more wine, toast some more thin bread three-corner-ways, and lay round your dish, pour the sauce all over, and send it to table hot. You may put sweet oil on the toast if agreeable.

Eggs, Boiling.—The egg must be always quite covered with boiling water, which should be kept in that condition. A new egg requires four minutes boiling; a stale one three.

Elder Brandy.—Pick the berries when fully ripe. Have ready a press for drawing off the juice, and four hair-cloths somewhat broader than the press; lay one above another, having a hair-cloth between each layer, which must be laid very thin and pressed a little at first, and then more, till the press be drawn as close as possible. Now take out the berries, and press all the rest in like manner. Then take the pressed berries, break out all the lumps, put them into an open-headed vessel, and add as much liquor as will just cover them. Let them infuse for seven or eight days; then put the best juice into a cask proper for it to be kept in, and add two gallons of malt spirits to every twenty gallons of elder-juice, which will effectually preserve it from becoming sour for two years at least. A little sugar and a few cloves make a great improvement in the brandy.

Elder Ointment.—Take of olive oil one pint, pork lard three pounds, elder flowers four pounds, white wax four ounces, and oil of lavender half an ounce; melt together. This ointment is more usually made by boiling the elder flowers in lard, and straining off the fat while warm. Elder-flower ointment is a well-known old domestic remedy for ulcers.

Elder Trees.—It is not generally known that the buds of these trees make an excellent pickle.

Electrical Pistol.—This is a machine contrived for exploding a mixture of inflammable air—hydrogen, and common air, oxygen—by the electric spark, when the force of explosion drives out the cork, or other solid body, with some violence. Each time that the pistol is fired a minute quantity of water is formed (see *Hydrogen Gas*), and if the experiment is frequently repeated with the same pistol, its internal surface becomes very sensibly moistened. In iron foundries, and in manufactories where other metals are melted, very serious accidents have happened from only small quantities of water getting accidentally into contact with the heated metal. If only a few drops of water happen to be in the mould, which is to receive the melted metal, a most violent explosion is sure to ensue as soon as the metal comes in contact with it. The fluid metal is thrown about in every direction, and the workmen, of course, are dreadfully burnt. The effect here is much greater than it would be from the mere conversion of the water into vapour, and it is now ascertained that it arises from the decomposition of the water, and consequent formation of inflammable and pure air; a few drops of water affording a very large volume of air.

Electrical Varnish.—This very useful good varnish is made by dissolving red or black sealing-wax in spirits of wine. It is generally used by philosophical instrument-makers.

Enamelled Leather. — To polish this, mix two parts of the best cream with one of linseed-oil, making each lukewarm in a small pipkin over the fire. The leather must first be thoroughly cleaned from dust, and the polish applied with a sponge.

Encaustic Tiles.—These being frequently used in halls and passages, we may hint that to preserve them at their best, and make them last, they should be washed at least twice a week with skim milk, instead of soap and water.

Endcliffe Biscuits. — Rub a quarter of a pound of butter into two pounds of flour, dissolve one teaspoonful of volatile salts in a teacupful of hot milk taken from three quarters of a pint, the remainder of which must be put into a saucepan with one pound of crushed lump sugar. Mix altogether, adding half an ounce of caraway seeds. Roll rather thin, cut out the biscuits with a tin cutter, prick with a fork, and bake them in a moderately hot oven.

Endcliffe Buns.—We are indebted for the following to the authoress of a little work on "Vegetarian Cookery," who has also given us certain useful hints on cooking vegetables, of which we have in several instances availed ourselves: — Take eighteen ounces of flour, six ounces of sugar, four ounces of butter, half an ounce of baking powder, one egg, six ounces of currants or sultana raisins, and half a pint of new milk. Rub the powder into the flour, then rub in the butter, adding the sugar, currants or raisins, the egg well beaten, and the milk. Mix altogether, and bake in tins in a rather hot oven, first sifting over it a little powdered sugar.

Endive, French way, to Cook.—Take some fine white endive, three heads, lay them in salt and water for two or three hours; take a hundred of asparagus, cut off the green head, chop the rest as far as is tender, lay it in salt and water; take a bunch of celery, scrape and wash it clean, cut it in pieces about three inches long, put it into a saucepan with a pint of water, three or four blades of mace, and some whole pepper tied in a rag Stew it till quite tender, then put in the asparagus, shake the saucepan, and let it simmer until the grass is done enough. Take the endive out of water, drain it, leave one large head whole, the other leaf by leaf, put it into a stewpan, add to it a pint of white wine, cover the pan close; let it boil till the endive is just enough done, then put in a quarter of a pound of butter rolled in flour, cover it close, shaking the pan often. Take it out, lay the endive in the middle, and with a spoon take out the celery and grass, and lay round the other part of the endive over that, then pour the liquor out of the saucepan into a stewpan, stir it together, season it with salt, and have ready the yolks of two eggs, beaten up with a quart of cream and half a grated nutmeg. Mix this with the sauce, keep it stirring all one way till it is thick, then pour it over the endive, &c., and send it hot to table.

Epileptic Fits.—Place the patient on a sofa or bed, or, should it occur in the street, place a rug or something of the kind under the head, removing quickly everything tight about the throat and chest. To avoid injury to the tongue, a cork or piece of wood should be placed between the teeth. To the head apply vinegar and water, or cold water.

Epsom Salt is a combination of magnesia with sulphuric acid, and is found in a variety of natural waters. By adding an alkali to a solution of this salt in water, the magnesia is precipitated in a pure state, forming a white impalpable powder.

Espagnole.—This famous sauce is prepared in the following way:—Take some slices of veal and lean ham (Westphalia is the best), and lay them in a stewpan; cover them to about half the thickness of the meat with stock broth; add some mushrooms, parsley, and green onions. Let the whole "sweat" on a stove over a brisk fire, taking care it does not burn. When the broth is reduced one-half, thrust a knife into the meat that the gravy may run out, then stew the glaze more gently. Keep stirring and turning the meat, and when the glaze is of a fine red colour let it settle to the bottom. Next moisten with some stock broth, let the whole boil for half an hour, skim off all the fat, and strain it through a tammy. Great judgment must be exercised in apportioning the necessary articles, which will depend on the taste; for as the flavour proceeds from the seasoning, any error or neglect in this respect will cause a deficiency. Remember that the sauce, when on the fire too long, loses its proper taste, and acquires a strong and disagreeable one.

Essence of Mushrooms.—Sprinkle salt over newly-gathered sound mushrooms. Three hours after mash them well together. On the next day strain off the liquor, and boil it down to half, adding a few white peppercorns and a little mace. This is preferable to mushroom catchup, but it does not keep so well.

Evaporation by Heat.—The conversion of water into steam by heat is a familiar illustration of evaporation by heat, of which we need say nothing here. Liquids while evaporating absorb heat, and it is for this reason that ether, which requires comparatively little heat to convert it into vapour, is used to relieve the pain of a scald or burn. Ether is converted into vapour at 96° Fahr. Water, which requires 212° Fahr. to convert it into steam, is often sprinkled about a room in summer weather to cool the air, and it does so by withdrawing the heat which is absorbed during its evaporation. The refreshing coolness of a summer shower is due to the same cause. (See *Air*.) Wind aids evaporation by removing the vapour more rapidly. Grass allowed to remain uncut in the garden, or dead leaves allowed to accumulate on the paths, promote cold by retaining moisture, and consequently absorbing heat. Wet feet and wet clothes absorb heat by evaporation, and by rapidly lowering the natural temperature of the body, so affect the circulation as to injure the health more or less seriously. A damp bed for the same reason is an extremely dangerous one to sleep in. Salt in the water retarding evaporation, sea-water consequently does not have the same effect as other water does. The rapidly revolving wheels of certain machines would catch fire if they were not kept constantly wet, in order that the heat might be kept down by evaporation. Tea poured into a saucer grows cool more quickly than it does in a cup, because, having a larger surface, evaporation proceeds more rapidly. Thick clothing worn while taking active exercise, by which the perspiration is increased, is often unhealthy, because it retards evaporation, and so increases the heat of the body beyond its natural standard.

Executors and Trustees.—The executors or trustees appointed by will may act or not as they please. In the event of their refusal the will is administered by the officers of the Court of Chancery. If, however, they accept the office, they are legally regarded as the authorised representative of the deceased, and take his place in regulating expenditure, disposing of goods, paying and receiving moneys due, &c. If through neglect or inadvertence an executor should not pay the deceased's creditors in the following order, he is held responsible. An executor is bound to pay away the estate, a reasonable time having elapsed in which to arrange its details, as follows :—1. The funeral expenses and the cost of proving the will. 2. Debts due to the Crown. 3. Debts due on judgment obtained at law, or on decrees made by the Court of Chancery, and debts due on recognisances. 4. Debts on bonds, covenants, and the like, not under seal, and rent due. 5. Debts on unsealed written contracts, tradesmen's bills, and wages. 6. Legacies. 7. The residuary legatee. An executor may relinquish his position even after he has partly administered, but in that case he will be called upon to account satisfactorily to the Court of Chancery for what he has done.

Exercise.—On other pages of this little book we have shown, from various points of view, the vital importance of keeping the muscular system healthy and vigorous. Exercise is one of the best means of achieving such ends. Every part of the animal system is so intimately and curiously interwoven with every other part that causes affecting one affect the whole. If the muscular action becomes enfeebled for want of proper exercise and development, the digestive powers suffer, and a loss of appetite ensues. The necessary work of animal combustion (see *Digestion* and and *Food*) does not go on with its proper vigour, the blood circulates slowly (see *Blood*), the respiration grows imperfect (see *Respiration*), indigestion sets in, and all its long train of attendant diseases and complaints begin more or less seriously to threaten life. (See *Indigestion.*)

VARIOUS KINDS OF EXERCISE.—Although the kind and degree of exercise should be varied to suit the special constitution concerned, the main object should be to bring the whole of the muscular system into action with special reference to such muscles as by the accidents of occupation or position are weak for want of proper development. Walking agrees with almost everybody, but the exercise obtained by it is chiefly confined to the muscles of the loins and those of the lower limbs. Shuttlecock, rowing, fencing, boxing, and other sports, on the other hand, bring into action the muscles belonging to the upper parts of the body. Excessive fatigue should, however, always be avoided. Riding is excellent exercise, its special advantage being that of not hurrying the respiration. It calls almost all the muscles into play, and is extremely favourable to the proper circulation of the blood. Dancing is a very useful exercise, and would be more so if it were not associated with the heated and dust-laden air of ballrooms. Certain handicrafts, such as carpentering, turning, &c., afford useful exercise. Gymnastic exercises, provided they be suited to the constitution, not over-indulged in, and not too violent, are very valuable. Excessive perspiration, it must be remembered, is injurious, nor must it be forgotten that exercises suitable for the strong and robust may be very unsuitable for others whose constitutions are of a different kind. Bodily exercise, judiciously regulated, strengthens the whole body, removes the causes of certain disorders, gives a proper tone to the system, and enables it to resist contagion. In children it promotes growth in its best and most proportionate degrees, for beauty and health are more intimately associated than many people imagine. Jumping, climbing, running, and wrestling are all good in moderation, and, in excess, all equally bad. For the delicately-constituted, exercises of this description should be carefully planned, with a view to this or that special case. For strengthening the muscles of the chest fencing is an excellent exercise. Shuttlecock benefits the trunk, chest, and arms. It should be played with both the left and the right hands, then the spine derives most benefit. It is also a good plan to use a battledore in either hand, and strike with each alternately. Dumb-bells used in moderation, and when they are not too heavy, or when the exercises are not too difficult, are very useful. When they are too heavy, mischief is done. Reading, singing, and reciting aloud exercise certain important muscles to an extent which few people dream of. The lungs may be exercised both directly and indirectly. Indirectly by means which quicken and deepen the respiration, and, as in the above exercises, directly. Walking up-hill is a capital exercise for strengthening the lungs, giving expansion to the chest, promoting free circulation, and more completely oxygenating the blood. (See *Respiration* and *Blood*.) For the same reason, playing on wind instruments is often found beneficial if indulged in by one free from anything like active pulmonary disease. Throwing the arms and shoulders back, and while in that position slowly inhaling the open air, is to be recommended for young persons, who would find great benefit from its daily practice. The loud laughter and noisy voices of children serve the same beneficial ends. In our papers on digestion, respiration, and the blood, we have endeavoured to show how essential everything tending to improve the circulation is to the establishment and preservation of health and happiness. When any kind of pulmonary disease exists, speaking, reading, and singing aloud ought to be indulged in very little, or not at all, for the same reason as a weak or sore joint is benefited rather by rest than exercise. When the lungs are inflamed—say by a cold—their exercise is likely to increase the mischief. At such times everything which hurries the breathing is to be avoided.

Exercise of Children.—Without a proper degree of exercise, all our care in feeding and clothing infants will not succeed to our wishes till, by due degrees, a child is brought to bear a good deal of exercise without fatigue. It should be pushed forward and taught to walk judiciously, but soon, so that at the end of twelve months it may (if healthy) be capable of walking alone. It is a common error to suppose children are not to be put on their legs because they are weak, or at least bent or crooked. Daily experience shows crooked legs will grow in time strong and straight by frequent walking, and that disuse makes them worse. The walks should be increased gradually every day, till they can go two miles without weariness, which they will very well be able to do in three years, if they are properly accustomed to it. From this daily exertion they will, from the impulse of their own vigour, soon be found running, leaping, and playing all day long. Thus a dull, heavy child becomes playful and sprightly, and acquires good habits and permanent health.

Horse Exercise.—The exercises of horseback, however, are most particularly useful where there is a tendency in the constitution to pulmonary consumption, either from hereditary or accidental causes. It is here beneficial as well through its influence on the general health as more directly on the lungs themselves.* There can be no

* Dr. Bull.

doubt that the lungs, like the muscles of the body, acquire power and health of function by exercise. During a ride this is obtained, and without much fatigue to the body. The free and equable expansion of the lungs by full inspiration necessarily takes place. This maintains their healthy structure. By keeping all the air-passages open and pervious it prevents congestion in the pulmonary circulation, and at the same time provides more completely for the necessary chemical action on the blood, by changing, at each act of respiration, a sufficient proportion of the whole air contained in the lungs. All these objects are of great importance, and they are all capable of being promoted, more or less, by the means in question. Avoid drinking cold water after violent exercise in hot weather. Why cold water should not be drank after such exertion is fully explained in our remarks on wasting sweats and the cause of sweats. (See page 369.)

Expansion by Heat.—In our paper on *Heat* and its effects (see page 220), we have explained how it causes air to expand or grow lighter. A familiar illustration of this may be observed in roasting chestnuts. When they have been made sufficiently hot, the air and moisture in them expand, and being unable to escape, force their way violently through the thick rind, which bursts with a loud crack. Under the same influence even a stone when put into the fire flies into pieces. Heat acts upon air by driving its particles farther apart from each other; in this way stone and chestnut skins are alike torn into fragments. From a bottle of ale placed before a fire, the cork will sometimes be forced out by the expansion by heat of the carbonic acid, and for this reason beer when placed before the fire froths more. In our article on *Balloons* we have shown how heat acts in inflating it. Gases expand under the influence of heat in equal ratio. Hot air ascends up a chimney in consequence of the lightness, which is due to its expansion. It is expansion by heat which causes ice to melt into water, and water to become steam. The kettle sings because the heated air is escaping unequally, and it does not sing when it boils, because the air is expanding equally. Water is increased in bulk by heat, just as air is, and hence it boils over. As it grows cold again it contracts. Iron expands by heat, and for this reason iron hoops used for tubs by coopers are put on hot, so that as they grow cold and contract they may hold the pieces of the tub more securely together. The cracking of iron stoves when heated is due to this cause. The expansion of mercury by heat is utilised in the action of the thermometer. A glass is frequently broken by hot water being poured into it, because of its unequal expansion, the inside expanding suddenly with heat instead of gradually while the outside surface is cold. Lamp-glasses often break in consequence of this unequal expansion by heat. Glass is, as we have explained elsewhere, like china, a bad conductor of heat, and the heat of the inner surface permeates it so slowly that the outer surface is not affected by the heat which expands the inner surface, and is consequently torn asunder. A glass tumbler must not, therefore, be put upon a hot stove. All bodies, whether in the solid, fluid, or gaseous state, are more or less expanded in every direction by the application of heat; unless in some instances where there seems to be a chemical change in the nature of the substance, as in the baking of clay, where there is a contraction in all directions, instead of expansion, which seems to arise from a semi-fusion, during which there is an alteration in the arrangement of the particles, approaching somewhat in its nature to the crystallisation of salts. As bodies in general expand when heated, so do they contract when cooled; but to this there is an exception in the freezing of fluids, where, in consequence of the new arrangement in their particles, there is always a considerable expansion. The force with which water expands when in the act of congelation is immense. Muschenbroeck, who made experiments on this subject by freezing water in metallic globes, found the force sufficient to burst one of brass, that would have required a force equal to 27,700 lbs. to produce the same effect. It is by this means that huge fragments of rocks are separated; the water that penetrates into the fissures expanding with such force during congelation as to break off the corners and projections. The same circumstance is sometimes taken advantage of in splitting slate. The Collywestern slate is dug from the quarries in large blocks; these are then placed in an opposite direction to what they had in the quarry, and the rain is allowed to fall upon them; it penetrates the fissures of the slate, and the first sharp frost freezes the water, which, expanding with its usual force, splits the slate into thin layers. Farmers benefit by this great principle. The benefit that a frost is known to afford to ploughed land is effected by the expansion of the water breaking and crumbling down the clods of earth. The expansion of a solid body by heat may be instanced in iron and other metals. If a cylinder of iron that exactly fits a ring, so as just to pass through it, be heated until it becomes red-hot, it will not then pass through the same ring; but if you immerse it in cold water, or wait till it is cool, it will pass through the ring with the same facility as before. We have shown that this fact is taken advantage of by coopers in fastening the staves of a cask with iron hoops. The sparks of fire which fly with a crackling noise from burning wood is due to the expansion of air in the pores of the wood. In timepieces, again, this expansion of metals is the cause of slight errors; the vibration, or time of oscillation, of a pendulum is regulated by its length; the longer the rod the slower the vibration. In the summer, therefore, the rod being lengthened by heat, the pendulum oscillates less quickly, and the clock goes slower than in winter; and this is the case with all clocks made in the same way. To rectify this error, timepieces intended to be very accurate are made with what is called the "gridiron pendulum," which was invented on the principle that different metals are expanded by heat at different degrees. Brass, for instance, expands twice as much, and zinc three times as much as iron, by the same increase of temperature. In the gridiron pendulum, therefore, there are two rods of different metals, connected by a crossbar, so proportioned in length, and so disposed, that while the expansion of one elevates the height, that of the other tends to depress it. The pendulum, therefore, constantly remains of the same length, and the effects of expansion or contraction in the rod are counteracted. In the glass manufactories the expansion and contraction of glass by heating and cooling is a frequent source of inconvenience and expense. It is naturally a very fragile article, and if cooled or heated very suddenly is known to crack and break to pieces; hence the necessity of what is called annealing, which is the exposing of new-made glass to be very gradually cooled. In precisely the same way that a bladder filled with air, when wet, will crack in drying, by the tendency of its particles to contract, whilst the air within remains in the same state of expansion. Hence, then, it is that when the annealing of glass is not well performed, the particles on the surface may be contracted so much more than those of the internal parts, as to give the glass an irregularity in its texture, but not so much as to cause a fracture. Such glass appears sound, and it is therefore saleable, but is ever after less able to bear sudden alternations of heat and cold. This is the cause why so many glass vessels crack the first time that hot water is poured into them, or are otherwise exposed to sudden heat. Ingenious modes of breaking glass in any required direction, such as are practised by chemists, are founded on this circumstance, by which means broken glass vessels are very ingeniously fashioned and fitted for a variety of uses. One mode is to dip a piece of thread or string in spirits of turpentine; wrap it round the glass in the direction that you require it to be broken, and then set fire to it. Another mode is to draw a red-hot skewer across the glass in the desired direction; and a third is to wrap a red-hot wire round the glass, and if it does not immediately crack, to throw cold water on it whilst the wire remains hot. The two former modes depend upon the sudden expansion, and the last upon the sudden contraction of the particles upon the surface of the glass.

The expansion of fluids by heat is much greater than that of solids. This is made very evident by heating spirits or other fluid in a glass vessel that has a long and narrow neck; as the heat is increased, the fluid is expanded, and it consequently rises in the neck of the vessel. This expansion of fluids has been very usefully applied in the construction of the thermometer, an instrument so common as to need no description; the liquor contained in the tube is expanded by heat, and contracted by cold, and consequently rises and falls; which rising and falling is rendered very sensible to the eye by making the bore of the tube, which may be compared to the neck of the vessel in the former experiment, very small in proportion to the bulb, which may be considered as the body of the vessel.

We are growing tedious, but before we leave this subject we must notice a peculiarity of water in respect to expansion. Within a certain range of temperature water follows the general rule of expanding by heat and contracting by cold; but beyond this range it is affected in the opposite way. When heat is applied to water at 32°, it gradually contracts till it arrives at 40°, whereas in the same situation other bodies expand. But after it has reached 40°, it follows the general law, and is dilated by the further application of heat. When boiling water is gradually cooled, it regularly contracts, until the temperature again arrives at 40°; the peculiarity we refer to is shown in its expansion as it is further cooled. This peculiarity prevents the sudden congelation of large masses of water, so that in lakes and rivers portions of the water always retain sufficient warmth to preserve the lives of the animals inhabiting it. (See *Freezing*, page 199.)

The expansion of gases, air, or gaseous fluids by heat may be instanced in the simple experiment of holding a half-blown bladder before the fire. As the air in the bladder becomes heated it expands, and the air, which before only half filled it, then distends it to its utmost tension. It is on this principle that heated bodies are enabled so readily to part with their heat to surrounding objects, and that so just an equilibrium is preserved in temperature. When any part of the air is heated by the sun's rays on the earth, or by any heated body, it expands, and of course ascends, whilst other particles of air rush in to supply its place; hence we have wind, and thus heat transmitted from one place to another becomes more uniformly equal. The draughts of air perceived in rooms where large fires are burning consist of these currents of air rushing in to supply the place of expanded air escaping up the chimney. It is by facilitating the egress of the heated air that rooms are properly ventilated (see *Ventilation*); and by contriving means to prevent its escape, that stoves and hothouses are able to preserve their increased temperature.

Eye.—To explain vision and the construction of the eye without diagrams and with the amount of space at our command, is not by any means an easy task. The eye is a kind of camera, with lens, dark chamber, and focussing screen in wonderful completeness and perfection. It consists mainly of the cornea, the iris, the pupil, the humours, the sclerotic coat (or tunic), and the retina. The *cornea* is the transparent exterior covering; the *iris* is that portion which we term blue, black, brown, or grey; the *pupil* is a circular opening; and the *retina* is a net-work, formed by the optic nerves, which line the back interior of the eye-ball. The *humours* are the vitreous, the aqueous, and the crystaline. The aqueous humour is in the interior and posterior chamber of the eye; the vitreous humour forms the principal portion of the globe; and the crystaline humour is the lens of the eye placed immediately behind the pupil. The sclerotic coat is a dense fibrous membrane, which invests four-fifths of the globe, and receives the cornea in exactly the same way as that in which the bevelled edge of a watch case receives a watch glass. The white of the eye is due to the presence of the mucous membrane. If the cornea of the eye is too prominent, or too convex, the result is an inability to see distant objects distinctly or at all; if it is too flat, near objects are indistinctly seen. If the humours are not healthy, the vision becomes defective. (See *Indigestion.*) With age the humours of the eye gradually contract, and the cornea, sinking inward, becomes flatter. Hence the vision of near-sighted people improves with age. On page 316 the subject of *Radiation* will give a few hints as to the way in which such lenses as the eye possesses receive rays of light and bring them to a focus on the retina. To shorten this focus is the purpose served when long-sighted or aged people wear double *convex* glasses; to lengthen it is the purpose which the near-sighted have in wearing double *concave* glasses. (See also *Tears.*) It is important that spectacles should so fit that the centres of the lenses are opposite the pupils of the eyes.

Faded Writing, to Restore.—To accomplish this, cover the letters with prussiate of potash, with the addition of a diluted mineral acid; upon the application of which the letters change very speedily to a deep blue colour of great beauty and intensity. To prevent the spreading of the colour, which by blotting the parchment detracts greatly from the legibility, the alkali should be put on first, and the diluted acid added upon it. The method found to answer best has been to spread the alkali thin with a feather or a bit of stick cut to a blunt point. If then the corner of a bit of blotting-paper be carefully applied near the letters, so as to imbibe the superfluous liquor, the staining of the parchment may be in a great degree avoided. Care must be taken not to bring the blotting-paper in contact with the letters, because the colouring matter is soft whilst wet, and may be easily rubbed off. The acid chiefly employed is muriatic, but both the sulphuric and nitric succeed very well; they should be so diluted as not to be in danger of corroding the parchment.

Fainting Fits.—A person in a fainting fit should be laid perfectly flat, ammonia or some other stimulant should be applied to the nose, and as soon as the patient can swallow a small dose of brandy and water or sal volatile and water may be given. If the extremities are very cold, hot flannels or hot bottles of water should be applied to the feet and legs.

Farinaceous Food. — Wheat, barley, sago, chestnuts, beans, potatoes, &c., are classified as farinaceous. Farinaceous food, although much recommended for invalids, is often injurious. A weak stomach is frequently made still more feeble by the long and exclusive use of farinaceous food. It should always be combined with a little animal food given either as a solid or in the form of gravy. Of all farinaceous food the best is probably gruel. When passing through a course of farinaceous diet, if the invalid should find a perceptible increase in the clammy or metallic sensation in the mouth, it may be taken as an indication that this diet is enfeebling the stomach, and that a slight change towards animal food must be made. (See *Diet* and *Indigestion.*)

Fat.—When examined under the

microscope the fat of any kind of animal is found to consist of a congregation of what are called fat-cells, which lie amidst the filaments of the areolar or cellular tissue, the most extensively diffused of all the tissues of the human body; and are found everywhere in the network of tissues composing the living body. Fat, however, is not a component part of the living organs, for the nerves and blood-vessels do not run through its cells. Therefore the fat itself is not susceptible to feeling, and if a pin could be passed into it without piercing the skin there would be no sensation to make the owner of it conscious of what had been done. Matter contained in the fat-cells has various names. When melted down it is called tallow. In another form it is known as lard. When it is the refuse of fat it is called grease or kitchen stuff. When hard, we call it suet; when soft and separated from milk, it is called butter; when liquid, oil. Fat is composed of eleven parts of carbon, hydrogen ten parts, and oxygen one part; and its use in the animal system is to give those beautiful gradations of contour possessed by the properly-developed human figure; to keep in the heat, of which it is a bad conductor (see *Heat*); to serve as a store of spare fuel for an emergency (see *Animal Heat*), for which reason it contains both carbon and hydrogen (see *Combustion*), which are the elements we employ for lighting and heating; and to secure the proper nourishment of the animal body. Fat-cells surround every tissue, and where there is a deficiency of fat there also will be found a deficiency of other tissues. In a case of consumption, where the body wastes rapidly away, the daily administration of oil—usually cod-liver oil—is found to be very beneficial. As the fat is deposited the tendency to develop those tissues on which bodily strength depends is increased. (See *Consumption.*) Animals are always thinner in winter than in summer, when their food is more abundant and contains less of the heating properties, for then, as Dr. Lankester said in one of his lectures on food, they have used "the store of fuel put upon their backs." An excessive accumulation of fat in certain parts of the body, generally induced by indolence and by the more extensive use of fat-producing food (see *Diet*), interferes with the vital energies, and unfits the body for a proper degree of exertion.

Feathers.—To scour feathers, cut up into small pieces four ounces of white soap, and dissolve them in four pounds of moderately hot water in a large basin. Beat this into a lather with rods. Two bundles of the feathers, tied with packthread, are then introduced, and rubbed well with the hands for five or six minutes; then wash them well in water as hot as the hand can bear. To bleach them, they are immersed in hot water mixed with Spanish white, after which they are washed in three waters in succession. To render the ribs more pliant, scrape them with the edge of a piece of glass. To make the filament curl, pass them in the required direction over the edge of a blunt knife. Goose feathers for beds should be selected for their softness, elasticity, and lightness. They should be well dried either by the sun or before a fire, and lightly beaten to dust away loose particles. The feathers of the eider-duck are unfit for beds, as from being slept upon they lose their elasticity, but they are excellent for making soft, light, warm coverings for beds during the winter.

Feet, Offensive. — Take one part muriatic acid with ten parts of water, and with this mixture well rub the feet every night before going to bed.

Fennel, how to Pickle.—Set spring water on the fire, with a handful of salt. When it boils, tie your fennel in bunches, put them into the water, give them a scald, and lay them on a cloth to dry. When cold, put in a glass, with a little mace and nutmeg, fill it with cold vinegar, lay a bit of green fennel on the top, and over that a bladder and leather.

Fennel Sauce.—Boil till tender equal quantities of parsley and fennel; draw the water well away; chop very fine, and serve with melted butter.

Fermentation is the term used to signify those changes that take place in dead animal and vegetable matter when exposed to the action of the air, and kept at a certain temperature. If the saccharine or sugary principle predominates in the substances employed, the produce will be a spirituous liquor, and the process is called spirituous or vinous fermentation. When the mucilaginous or glutinous matter abounds, vinegar is formed, and the process is then termed acetous fermentation. Substances that have already undergone the spirituous, will very often pass to the acetous fermentation, particularly if kept warm, and at the same time exposed to the air. Lastly, when the gluten, or jelly, exists in considerable quantity, as in animal matter, that kind of fermentation termed putrefaction is sure to take place, and the product here that is characteristic of the kind of fermentation is ammonia, or volatile alkali, such as the common smelling salts. We shall in this place confine our attention to the vinous or spirituous fermentation, during which there is evolved a very considerable quantity of carbonic acid gas, or fixed air. This is the process by which we obtain spirits of all kinds, as rum, brandy, gin, and also every kind of wine, cider, perry, or beer. In making any of these liquors, it is necessary that a quantity of spirit should be formed, and the process is in all alike. Wine is made of the malt or pure juice of grapes, or of the juice of other fruits diluted with sugar and water in order to dispose it to the vinous fermentation. The mixture should be kept at a heat equal to about 70° of Fahrenheit; hence the advantage of making wines in warm weather. It now soon becomes turbid, and air-bubbles are seen to rise to the surface, which are the carbonic acid gas, or fixed air. This on being entangled in the fermenting matter, causes part of it to rise to the surface in the form called yeast or barm. A sediment is at the same time gradually deposited; and as the bubbles at the top burst and let fall the matter that it was entangled in, the wine is left clear and transparent, fit for casking. That it is carbonic acid gas that is thus extricated during the vinous fermentation is proved, first, by holding a lighted candle or piece of lighted paper over the fermenting liquor, when it will be instantly extinguished; and next, by half emptying a bottle of lime-water in the same situation, and then shaking the remainder, which will thereby become white and turbid. After the wine is casked the fermentation still goes on, though in a much slower degree, and a deposition of the tartrate of potash—cream of tartar—contained in the juice of the grape takes place. The carbonic acid gas that is now extricated, not being able to escape, is absorbed by the liquor, and gives it a briskness and that pleasant sharpness to the palate which it then has, instead of the flat, insipid taste which all wines have when first made. The same slow fermentation, accompanied with a deposition of tartar, and formation of carbonic acid gas, continues after the wine is in bottles, and occasions the difference between old and new wine. In some liquors the fermentation and consequent formation of carbonic acid gas is much more considerable than in others, as in champagne wine, in perry, or in cider; and hence their sparkling appearance and effervescence when uncorked. The quantity of gas formed in these cases is so great as only to be retained in combination with the liquor under great pressure; and this pressure being removed by uncorking the bottle, part of the carbonic acid immediately assumes its gaseous form and flies off. As the briskness of all wines depends upon the presence of carbonic acid gas, they will always prove flat and insipid, either when the fermentation is so moderate that sufficient carbonic acid is not formed, or when that which is formed is allowed to escape. The former case never occurs when the saccharine matter sufficiently abounds, and attention is paid to keep the liquor sufficiently warm. When, from want of this, it has happened, the fermentation must be promoted by adding more sugar and a small quantity of yeast. Wines are more frequently flat in consequence of the gas being allowed to escape when formed, and this both in the casked and bottled state. The same may be said of other liquors, as cider, perry, and more particularly beer. The casks should always be filled, or nearly so, and the tighter they are the better. The greater the resistance that is afforded to the newly-formed gas, the more will be absorbed by the liquor, and the pleasanter it will be to the palate. In consequence of its being necessary to make an opening to let in air when a barrel is tapped, the carbonic acid gas is allowed to escape, and the beer or other liquid soon becomes flat, particularly if the orifice is not closed. Beer that is thus rendered flat may be made much more palatable again by impregnating it with carbonic acid gas. An easy mode of doing this in the barrel might, perhaps, be contrived; but for small quantities to be impregnated as it is required for the table nothing will answer better than an apparatus used for making seltzer-water. In bottling every kind of cider, beer, wine, &c., great care should be paid to the corking. The gas, as it is formed, exerts great force to escape, and if the cork does not fit very accurately it will be sure to make its way out. The liquor will then never acquire the briskness and sharp taste that it ought to have. It is always better to lay bottled liquor on the sides than upright, for then the gas must pass through the liquor before it can escape; and besides this the cork is kept wet and swelled, and is much less liable to decay, which would thus communicate an unpleasant taste to the liquor.

Ferneries.—The glass cases, or ferneries as they are called from having ferns mostly growing in them, are, from their size, capable of much embellishment. The plants may be arranged in pots, as in a common greenhouse, or, much better, slanting shelves may be made of slate or stone, and, projecting some distance from the wall, earth is rammed behind them. Besides this are two other methods usually combined, the lower part being formed into a kind of ornamental rockwork, the upper part covered with the rough bark of trees nailed on, in patterns as we have indicated in our instructions for the making of rustic summer-houses (see page 325), and little plants stuck in every cavity capable of holding earth. The larger kinds of ferns suitable for the purpose will be found in the damper parts of woods and commons; *Aspidium Filix-mas* may be found in abundance in most hedgerow ditches, where the root may be dry in winter, never therefore in the ditches which intersect marshy land. *Scolopendrium vulgare*, *Blechnum boreale*, *Asplenium Filix-fœmina*, or lady-fern, and *Polypodium vulgare* are also ferns which may be commonly met with. The latter grows mostly on old trees and on the summit of tall hedge-banks, and the lady-fern, as Sir Walter Scott says, may be found

> "Where the hedgerow is the greenest,
> Where the fountain glistens sheenest,
> Where the mountain dew lies longest,
> There the lady-fern grows strongest."

A large variety of ferns may be found by Londoners in Caen Wood and on Hampstead Heath; some choice varieties come from swampy ground around Tunbridge, from near Dorking, Reigate, Bristol, and Sheffield. Some fine specimens are also met with in damp situations in Derbyshire, Lancashire, Cheshire, and the mountainous parts of the lake countries. Ingleborough, Cumberland, and Berwickshire are particularly rich in ferns. Peculiar kinds are found in the mountains and woods of Wales and Scotland and in Ireland, particularly in the neighbourhood of the Morne and Connemara mountains, Powerscourt Waterfall, and Killarney.

Figs.—These are very nourishing and digestible; they abound in saccharine matter, but when eaten alone are apt to produce flatulence. A little bread or other mealy substance will correct this tendency.

Figs, to Improve Dried.—Figs, when they are brought to table, are commonly covered with a scurf, composed of a mealy sugary substance, very disagreeable to the teeth. The way to get rid of this scurf, and render the figs as plump and clear-skinned as when they are newly gathered from the tree, is first to keep them in a cool and rather moist cellar, for twenty-four hours before using; and, secondly, just before presenting them at table, to put them into a receiver and exhaust the air. After remaining there two minutes, they should be taken out, and gently brushed, when they will be found perfectly plump and clear-skinned.

Filberts.—These are pectoral and nourishing by virtue of their oily nature, but are binding, in consequence of their earthy principle. Eaten too freely they produce flatulence and indigestion. (See also *Dessert Fruits.*)

Filter, an Economical.— Put a piece of sponge into the hole of a large flower-pot, fill the pot three parts full with equal portions of charcoal and fine sharp sand, the pieces of charcoal to be about the size of peas. Over this lay a piece of fine flannel or linen large enough to cover the sides of the pot. Pour the water into the top of the cloth, and it will pass out perfectly clean through the sponge at the bottom.

Filters, Ransome's. — These consist of hollow vessels composed of a very porous indestructible artificial stone, formed of sharp quartzose crystals, which are now known to be the most powerful arresters of suspended matter in water. They only require to be fixed in the cistern or other vessel containing the water or other liquid to be filtered, being supported on rests a few inches from the bottom of the vessel, so that the grosser sediment may fall below, and the entire surface of the stone be presented to the water, which, by passing through the stone into the interior of the filter, is at once cleansed of all foreign matters which had previously been suspended in it, and may be drawn off, as occasion requires, always fresh and sparkling. For hints on the importance of purity in water see page 155.

Fire-balls.—It is well known that several substances not combustible, such as clays when mixed with sea-coal in certain proportions, give more heat when subjected to the action of fire than burning coal will produce alone. All bodies, those which are incombustible as well as others, while burning, throw off in every direction heat, or rather calorific (heat-producing) rays, which generate heat wherever they are received or absorbed. These calorific rays when thrown off by different bodies heated to the same degree, are not all alike, although common observation would not suffice for the detection of the differences. For instance, the sides and back of an open chimney fireplace composed of fire-bricks or firestone heated to redness, would throw off into a room incomparably more heat than the grate full of the best coals burning most brightly could give, the reason being that the burning coal does not send off so many calorific rays as the red-hot brick or stone does. (See *Fuel*, *Combustion*, *Radiation of Heat*, and *Specific Heat.*) Shallow grates so placed as to assist in making hot the sides and backs formed by these bricks give out more heat at a less cost for fuel than grates of a different kind and construction. When the grates have not the advantage of fire-bricks at their back and sides, fire-balls are often used. These may be made of any kind of well-burnt brick, but the best are made of pounded crucibles—hard common brick reduced to a coarse powder, mixed up with moistened Stourbridge clay. Common clay is sometimes used. A single layer of these balls is placed at the bottom of the grate, and on this the fire is kindled. Other balls are put on with the coals, care being taken to mix the fire-balls and coal well together in order that the heat of the burning fuel may be conveyed to each ball by contact. Such a fire will send into a room a greater quantity of radiant heat than an ordinary coal fire gives, at an expense of one-third less at least; indeed, the saving has been calculated at more than one-half. These balls will last several years, and amongst their other advantages is that of causing cinders and even ashes to be almost entirely consumed, owing to the combustion being more perfect and the heat more intense.

Fire-bricks, to Make.—These may be made as follows:—Mix well together with water one bushel of small coal, two of sand, and half a bushel of common clay; form into the shape of balls or bricks, and put them aside to dry and harden.

Fire, How to Light a.—First clear out the grate, removing the cinders with the hand, and raking out the ashes with the poker. Place a few cinders, not too small, at the bottom of the grate; over these place the paper, and on the paper your sticks of fire-wood, the largest sticks on the top. Strew lightly over these a few good cinders, some small first, and afterwards some larger ones. Then put small round coals in, and over these a shovel or two of smaller coal; not, however, putting too great a weight upon the top, for then when the wood has burnt freely and gives way, the small coal will put the fire out. A fire lighted by this plan will require no after attention, and in ten minutes you will find your fire an excellent one. It is well to dry the wood over-night to avoid the unpleasant smell arising from the smoke of damp wood while burning.

Fire-irons, to Clean.—Mix together a tea-spoonful of oil of vitriol, a table-spoonful of sweet oil, half a pint of spirits of turpentine; put them into a bottle, and cork it tightly. When you want to use it, mix this liquid with sufficient finely-powdered rotten-stone to make a soft paste, and with a soft woollen cloth rub it on the shovel, tongs, poker, &c., or on the bars of the grate, if you wish to brighten them. Having rubbed it on well, wipe it off with a soft cloth of linen or cotton, and then polish with dry rotten-stone and leather. Another way, which is sometimes recommended, is the following:—Dip a piece of flannel in oil, and then in emery powder No. 3. Rub hard and quick, then polish with a leather and some powdered rotten-stone.

Fish as Food.—Fish affords comparatively little nourishment, and their fat is more insoluble and indigestible than that of any other animal, and turns rancid with peculiar readiness. Acid sauces and pickles, because they are calculated to resist putrefaction, render fish more wholesome and digestible; while butter has a tendency to increase its indigestible character. Spice and salt aid the stomach to digest fish by stimulating the fibres of the stomach. Fish, when dried in the open air and afterwards boiled soft, is quickly digested; but salted and smoked fish are indigestible, and afford but little nutrition. Fish, with flesh of a tender kind, are less indigestible than those which are more solid and tougher, and some of the former have very little to be said against them as food, as the reader will perceive by what we have said of eels, &c., under other heads.

Fish, to Choose.—Most fish can be known to be in good condition by the colour of the gills, the facility with which you can open them, the hanging or keeping up the fins, the standing or sinking of their eyes, and by the smell of their gills.

TURBOT is chosen also by thickness and plumpness, and if the belly is a cream colour, it is good; but if the belly is of a bluish white, and the fish is thin, it will eat watery.

COD and CODLINGS may be chosen by the thickness towards the head, and the whiteness of the flesh when cut.

LING.—Choose that which is thickest in the neck, and the flesh of the brightest yellow.

SKATE AND THORNBACK.—These are chosen by the thickness, and the she-skate is the sweetest, especially if large.

SOLES.—These are known by their stiffness and thickness, and the belly should be of a cream colour.

STURGEON should cut without crumbling, and if the veins and gristles have a bright blue colour where they appear, and the flesh a perfect white, then conclude it to be good.

FRESH HERRINGS AND MACKEREL.—If the gills are of a lively shining redness, their eyes stand full, and the flesh is stiff, then they are good.

LOBSTERS.—Choose those which are heaviest, if no water is in them; if fresh, the tail will spring when pulled; if full, the tail will be full of hard reddish-skinned meat. (See also page 194.)

PRAWNS, SHRIMPS, AND CRABS.—The two former, if stale, will be limber, and give a kind of strong smell, with a fading colour; the latter will be limber in the joints and claws, their red colour turned blackish and dusky, and will smell badly under the throat.

PLAICE AND FLOUNDERS.—If they are stiff, and their eyes be not sunk, or look dull, they are new; the contrary when stale. The best sort of plaice look bluish under the belly, and have bright red spots on the back.

PICKLED SALMON.—If the flesh feels oily, and the scales are stiff and shining, and it comes off in flakes, and parts without crumbling, then it is new and good, and not otherwise.

PICKLED AND RED HERRINGS.—For the first open the back to the bone, and if the flesh be white and oily, and the bone white, or a bright red, they are good. If red herrings carry a good gloss, part well from the bone, and smell well, then conclude they are good.

Fish, to Preserve in Oil.—Place the fish in a jar, cover them with salad oil, and tie them up air-tight.

WITH SUGAR.—Fish may be preserved in sugar as well as salt, and will keep for a longer period, and will leave no unpleasant sweet flavour. Kippered salmon is excellent, and any fish done this way is preferable to smoked or salted; but if desirable, equal quantities of sugar and salt may be used.

WITH CREOSOTE.—Put two or three drops of creosote in some water, and let the fish soak in it for five minutes. This will give the fish a smoky flavour.

Flies.—Half a pint of boiling water poured upon a quarter of an ounce of quassia chips, and sweetened with sugar or treacle, will destroy flies, and is perfectly harmless if taken by children in mistake. Another plan is that of mixing half a tea-spoonful of black pepper in powder, and one tea-spoonful of brown sugar with a table-spoonful of cream. This is usually put into plates.

Flimmery Hartshorn.—Boil half a pound of the shavings of hartshorn in three pints of water till reduced to a pint, then strain it through a sieve into a basin, and set it by to cool; set it over the fire, allow it to dissolve, and add to it a pint of thick cream, scalded and grown cold again; add a quarter of a pint of white wine and two spoonfuls of orange-flower water; sweeten it with sugar, and beat it for an hour and a half, or it will not mix well, nor look well. Dip your cup in water before you put in the flimmery, or else it will not turn out well. It is best to let it stand two days before you turn it out. When served, stick pieces of blanched almonds cut in narrow lengths on the top. You may eat them either with cream or wine.

Floating Island.—Take a quart of cream, put to it sufficient sugar to make it very sweet, pour in a gill of sherry, grate in the rind of a lemon, and beat the cream till it is a thick froth; then, as carefully as you can, pour the cream from the froth into a dish. Take a French roll, or as many as you want, cut it in thin slices, put a layer of that as lightly as possible on the cream, then a layer of currant jelly, then a very thin layer of roll, then hartshorn jelly, then French roll, and over that whip the froth which you took off the cream, very well mulled up, and lay at top as high as you can; heap it, and round the rim of the dish. Set it round with fruit or sweetmeats according to your fancy.

Florendine of Oranges or Apples, A.—Get half a dozen of Seville oranges, save the juice, take out the pulp, lay them in water twenty-four hours, change the water two or three times, then boil them in three or four different waters; then drain them from the water, put in a pound of sugar, and the orange juice. Boil this to a syrup, take care not to let them stick to the saucepan, and set it by for use. When you use them, lay a puff paste all over the dish, boil ten pippins pared, quartered, and cored, in a little water and sugar, and slice two of the oranges, and mix with the pippins in the dish. Bake it in a slow oven, with crust as above, or bake only the crust, and lay in the ingredients.

Flounder-pie, how to Make.—Get some flounders, wash them, clean and dry them in a cloth, just boil them in a little water, cut off the meat clean from the bones, lay a good crust over the dish, and lay a little fresh butter in the bottom of the dish, and on that the fish; season with pepper and salt to taste. Boil the bones in the water the fish was boiled in, with a small piece of horse-radish, a little parsley, a very little bit of lemon-peel, and a crust of bread. Boil it till there is just enough liquor for the pie, then strain it, and put it into your pie; put on the top crust, and bake it.

Flour, Hasty Pudding.—Take a quart of milk and four bay-leaves, set it on the fire to boil, beat up the yolks of two eggs, and stir in a little salt. Take two or three spoonfuls of milk, and beat up with your eggs, and stir in the milk; then with a wooden spoon in one hand, and the flour in the other, stir it in till it is of a good thickness, but not too thick. Let it boil, and keep it stirring; then pour it into a dish, and stick pieces of butter here and there. Take out the bay-leaves before you stir in the flour.

Flour Paste, to Prepare.—Boil flour in water until it is thick and glutinous; but if required for binding books or paper-hanging, a fourth of the weight of flour of powdered resin; or if required stiff, strong gum arabic or size may be added.

Flour Paste which will Keep Good.—Dissolve about an ounce of alum in a quart of warm water; when cold add as much flour as will make it the consistence of cream, then strew in it as much pounded resin as will stand on a shilling, and two or three cloves; boil it to a good consistency, stirring all the time. It will keep for twelve months, and when dry may be softened with water.

Flour Pudding, to Make.—Take a quart of milk, beat up eight eggs, put four of the whites, mix with them a quarter of a pint of milk, and stir into that four large spoonfuls of flour; beat it well together. Boil six bitter almonds in two spoonfuls of water, pour the water into the eggs, blanch the almonds, and beat them in a mortar, then mix them in, with half a large nutmeg and a teaspoonful of salt; then mix in the rest of the milk, flour the cloth well, and boil for an hour; pour melted butter over it, and sugar, if you like it, thrown all over. Observe always, in boiling puddings, that the water boils before you put them in the pot; and it is also a good plan, when the pudding is done and taken from the boiling water, to dip it in a pan of cold water to prevent it sticking to the cloth.

Flour, Wheaten.—Wheat, as a staple article of diet in the form of flour, is of great importance. When wheaten flour is mixed with lard, butter, and other fatty matter, as it is in making puddings, pie-crusts, &c., it is not so digestible as it is when the oleaginous matter is added after cooking. When exposed to heat the starch contained in the flour combines with the oil to form a compound which is difficult of digestion. Although this is a matter of less importance to healthy persons of strong digestive powers, yet it is well worth the consideration of the valetudinarian and dyspeptic. (See also *Bread.*)

Flowers, how to Make Conserve of any Sort of.—Take rose-buds, or any other flowers, and pick them, cut off the white part from the red, and put the red flowers and sift them through a sieve to take out the seed; then weigh them, and to every pound of flowers put two pounds and a half of loaf sugar. Beat the flowers pretty fine in a stone mortar, then by degrees put the sugar to them, and beat it well until it is incorporated together; then put it into gallipots, tie it over with paper, over that a leather, and it will keep seven years.

Flummery.— Put three-quarters of a pint of oatmeal to steep in water for twenty-four hours, then pour that off and repeat the water, allowing it again to remain the same time. Strain it through a sieve, and boil it till it is as thick as batter, keeping it well stirred. When strained, sweeten to taste, and add a little orange-flower water. It is good eaten with cider, milk, cream, or wine.

Fomentations.— In cases of sprains or other affections where heat has to be applied, pieces of thick flannel are used dipped into the hot liquid, and applied one after the other. In colic, obstinate cases of constipation, and other affections of the bowels, hot fomentations are recommended. They are also used in cases of gout and quinsy when it is necessary to bring the tumour to a suppuration. An excellent fomentation to relieve acute pain is composed of two ounces of white poppy heads and half an ounce of elder flowers boiled in three quarters of a pint of water until the latter is reduced to a quart. In cases of dysentery, flatulent colics, retchings to vomit, an aromatic fomentation may be employed, made with half an ounce of Jamaica pepper boiled in red wine. A strengthening fomentation for application to weak parts may be composed of oak bark one ounce, granate peel half an ounce, alum two drachms, and of water in which a red-hot iron has been repeatedly thrust until it gives the water a strong taste, three pints. The bark and peel must be boiled in the water until the quantity has evaporated one-third, after which it must be strained, and the alum dissolved in it. Cold fomentations are useful in sprains when the inflammation has subsided. The best way of applying them is that of putting a thick bandage upon the part, and continually pouring cold water upon it.

Food, Lobsters as.—Lobsters, although highly nutritious, often prove indigestible. They are sometimes eaten hot, but generally when cold. Potted, they afford an excellent relish, and they are sometimes put into a pie, which they make very rich. In addition to the directions for selecting lobsters, on page 192, we add the following:—Lobsters are at their best from April to August, although good samples of the larger kind are found from October until May, when they begin to spawn, and are not so good for food. If the lobsters are freshly caught and alive, the claws will have a strong quick motion when you put your fingers on the eyes and press them. It is usual to select them by their weight, the heaviest being the best. If the sides of the shells yield to moderate pressure, they are not good. If you find the tails of ready-boiled lobsters are flabby, and when pulled open do not spring back, reject them. The male lobsters, which have the finest flavour when boiled, with firmer flesh and a deeper red colour, may be known by the narrow back part of their tail being less broad than that of the female, and by the two uppermost fins within that part being stiff and hard, instead of soft. The female is generally larger than the male, and has spawn or eggs under the tail. Some vendors of lobsters—especially itinerant ones—boil them a second, or even a third time, to sweeten them, and so render them saleable. Such lobsters are very bad food indeed, and few can eat them with impunity. The best lobsters are not the largest, but, as a rule, those of a medium size, and they should not be too old. When the shell is encrusted, it is a sign that they are aged fish. For making lobster sauce the female lobster is usually preferred to the male.

Food for Women.—It is generally allowed that women require a smaller quantity of food, and food of a less stimulating nature than men require.

Food, Temperature of.—As a good general rule, the food we eat should not be in temperature much above or below that of the stomach. If the food is taken too hot, the stomach becomes enfeebled, especially when it is distended with a large quantity of heated fluid, such as tea and coffee. Taking anything in the stomach very cold is also injurious, and under some circumstances dangerous. Many well-authenticated instances of fluid taken cold into the stomach after exercise in warm weather, when the temperature of the body has been raised above its ordinary degree, causing death, are on record.

Food, Effects of taking Improper.—Nature appears to be extremely jealous of admitting nutriment of baneful qualities into the blood-vessels, and even into the stomach. If food be putrid or putrescent, or, in other words, deficient in organic principles (animal or vegetable), the stomach refuses it; and, if it finds its way there, the most violent nausea and vomiting ensue, till the deleterious matter is ejected. But if, notwithstanding the vigilance of nature, the contaminated food pass out of the stomach into the lower bowels, the gall-bladder contracts, and pours out a large portion of bile, to facilitate the escape of pernicious ingredients; but if, notwithstanding all those efforts of nature, a portion only of the putrescent food arrives at the mouths of the vessels which take up the digested food, instead of receiving it, they become inflamed, swelled, and consequently shut up against its intrusion. The glands also which occur in the course of these vessels (called mesenteric glands by anatomists), become swollen, and obstruct the vessels by their pressure. Supposing, however, that these inflammations and swellings are not sufficient to keep out every particle of the improper nutriment, and that a portion forces itself, through every obstruction, into the blood, a violent fever is the result; which is the last effort of nature to expel the deleterious matter; and, if she do not succeed in this, death is the inevitable consequence.

To Force a Leg of Lamb.—With a sharp knife carefully cut out all the meat, and leave the skin and fat on it; make the lean you cut out into forcemeat, thus:—To two pounds of meat, add three pounds of beef suet cut fine, and take away all the skin of the suet and meat; then mix with it four spoonfuls of grated bread, eight or ten cloves, five or six large blades of mace dried and beaten fine, half a large grated nutmeg, a little pepper and salt, a little lemon-peel cut fine, a very little thyme, some parsley, and four eggs; mix all together, put it into the skin just as it was, in the same shape, sew it up, roast it, baste it with butter, cut the loin into steaks, and fry it nicely. Lay the leg in the dish, and the loin round it, pour a pint of good gravy into the dish, and send it to table.

To Force a Tongue.—Boil it till tender, and when cold, cut a hole at the root-end of it; take out some of the meat, chop it with as much beef suet, a few pippins, some pepper and salt, a little mace beaten fine, some nutmeg, a few sweet herbs, and the yolks of two eggs. Chop it altogether, stuff it, baste it with butter, and dish it up. Have for sauce a good rich gravy.

To Force the Inside of a Sirloin of Beef.—Take a sharp knife, and carefully lift up the fat of the inside, take out all the meat from the inside of the bone, chop it fine, take a pound of suet and chop fine, about a pound of crumbled bread, a little thyme and lemon-peel, a little pepper and salt, half a grated nutmeg, and two shallots chopped fine; mix all together, with a glass o red wine, then put it into the same place, cover it with the skin and fat, skewer it down with fine skewers, and cover it with paper. Do not take the paper off till the meat is on the dish. Take a quarter of a pint of red wine, two shallots shred small, boil them, and pour into the dish, with the gravy which comes out of the meat. Spit your meat before you take out the inside. You may do a rump of beef in the same way, only lift up the outside skin, take the middle of the meat, and do as above directed. Put the forcemeat into the same place, and skewer it close with fine skewers.

Forcemeat Balls, how to Make.—Take half a pound of veal, half a pound of suet, cut fine, and beat in a marble mortar or wooden bowl; shred a few herbs fine, a little dried mace, and beat fine; a small grated nutmeg, a little lemon-peel cut fine, a little salt or pepper, and the yolks of two eggs. Mix all well together, then roll them in round balls, and some in little long balls; roll them in flour, and fry them brown. If they are for white sauce, put some water in a saucepan, and when it boils put them in, and let them boil for a few minutes, but never fry them for white sauce.

Foreign Culinary Terms.—We give a few of those most commonly used by our professed cooks:—

ASPIC.—A savoury jelly.

ASSIETTE.—Small *entrées* not more than a plate will contain.

AU-BLEU.—Applied to fish so dressed as to have a bluish appearance.

BAIN-MARIE.—An open vessel which has a loose bottom for the reception of hot water. It is used to keep sauces nearly at the boiling-point without reduction or burning.

BARDE.—A thin slice of bacon fat placed over any substance specially requiring the assistance of fat without larding.

BAVAROISE À L'EAU.—Tea sweetened with syrup of capillaire, and flavoured with a little orange-flower water.

BAVAROISE AU LAIT.—Made in the same way as the above, but equal quantities of milk and tea.

BÉCHAMEL.—(See page 40.)

BLANC.—White broth used to give a more delicate appearance to the flesh of fowl, lamb, &c.

BLANCH.—Placing anything on the fire in cold water until it boils, and after straining it off, plunging it into cold water for the purpose of rendering it white. Used to whiten poultry, vegetables, &c.

BLANQUETTES.—A *fricassée* usually made of thin slices of white meat, with white sauce thickened with egg-yolk.

BLIGNET.—Fritter anything enveloped in butter or egg and fried.

BOUILLI.—Beef very much boiled, and served with sauce.

BOUILLIE.—A French dish resembling that called hasty-pudding.

BOUILLON.—The common soup of France.

BRAISE.—Meat cooked in a closely-covered stewpan to prevent evaporation, so that the meat retains not only its own juices, but those of any other articles, such as bacon, herbs, roots, and spice put with it.

BRAISÈRE.—A saucepan with ledges to the lid, so that it will contain firing.

CALLIPASH.—The glutinous portion of the turtle found in the upper shell.

CALLIPEE.—The glutinous meat of the turtle's under shell.

CARAMEL.—Boiled sugar. (See page 82.)

COMPOTE. — Stewed fruits served with syrup. There are also compotes of small birds.

CONSOMMÉ. — Strong, clear gravy obtained by stewing meat for a considerable length of time.

COULIS. — A rich brown gravy, which is used for colouring, flavouring, and thickening certain soups and sauces.

CROQUETTES.—A savoury mince of fish, meat, or fowl, made with a little sauce into various shapes, rolled in egg and bread-crumbs, and fried crisp.

CROUSTACLES. — Also known as Dresden patties. They are composed of mince encased in paste, and moulded into various forms.

CROUTON.—A sippet of bread fried, and used for garnish.

DAUBIÈRE.—An oval stewpan.

DÉSOSSER.—To bone.

ENTRÉE.—A corner-dish for the first course.

ENTREMET.—A side-dish for the second course.

ESCALOPES.—Collops.

"EN PAPILLOTE."—The pieces of paper greased with oil and butter, and fastened round a cutlet, &c., by twisting it along the edge.

FAGGOT.—A small bunch of parsley and thyme tied up with a bay-leaf.

FARCE.—Forcemeat.

FEUILLETAGE.—Puff-paste.

FLAMBER.—To singe fowl after picking.

FLANCS.—The side-dishes of large dinners.

FONCER.—To put in the bottom of a saucepan slices of bacon or ham, &c.

FRICANDEAUX may be made of any boned pieces of veal chiefly cut from the thick part of the fillet, and of not more than two or three pounds weight.

GÂTEAU.—A pudding or cake.

GLACE.—Stock boiled down to thickness of jelly, and used to improve the appearance of braised dishes.

HORS-D'ŒUVRES.—Small dishes of sardines, anchovies, and other similar relishes.

LARDON.—The piece of bacon used in larding.

LIAISON.—The mixture of egg and cream used to thicken white soups, &c.

LIT.—Thin slices in layers.

MAIGRE.—Without meat.

MARINADE.—The liquor in which fish or meat is steeped.

MATELOTE.—A rich fish stew, with wine.

MENU.—The bill of fare.

MERINGUE.—Light pastry made of sugar and the white of eggs beaten to "snow."

MIROTON.—Small thin slices of meat about as large as a crown piece made into ragoûts of various kinds, and dished up in a circular form.

MOUILLER.—To add broth, water, or other liquid while the cooking is proceeding.

PANER.—To cover with bread-crumbs fried or baked food.

PÂTÉ À LA ROYALE.—Take a sweetbread boiled, mince into it a few mushrooms, and a little ham cut very thin, pepper and salt it to your taste; then add a little veal broth, butter and cream, and put it on a gentle fire to boil and thicken. For the paste make a puff one, cover the bottom with a piece of bread, and lay the cover on, brush on the top with the yolk of an egg, and bake them in a quick oven.

PIQUER.—To lard with strips of bacon fat, &c.

POELÉE.—Stock for taking the place of water in cooking.

PURÉE.—The process consists in pounding the meat or fish in a mortar until it becomes a paste, or in stewing roots or pulse in boiling water until they are of a pulpy consistency, after which they are pressed first through a cullender, and afterwards through a hair-sieve, after which they may be thinned with broth and formed into soups of various kinds.

QUENELLES.—Forcemeat of various kinds composed of fish or meat, with bread, yolk of egg, and some kind of fat, seasoned in different ways, and either spread upon rolled meat, or formed into balls, and fried either as garnish to *entrées* or to be served separately.

RAGOÛT.—A rich sauce, with sweetbreads, mushrooms, truffles, &c., in it.

REMOULADE.—Salad-dressing.

RISSOLE.—A mince of fish or meat enclosed in paste, or formed into balls and other shapes. Used either as side-dishes or garnish. (See also *Fricassées*.)

ROUX.—A mixture of butter and flour used for thickening white soups or gravy.

SALMI.—A hash of game cut up and dressed when only half roasted.

SANTON.—To dress with sauce in the saucepan by keeping it in motion.

SAUTÉ.—A ragoût.

SAUTER.—To dress in a stew-pan with sauce, repeatedly moving it about.

VELOUTÉ.—Material used to heighten the flavour of soups and made dishes.

VOL-AU-VENT.—A light puff paste, cut round or oval, enclosing any delicate mince-meat.

Foul Air.—(See *Air*, *Respiration*, *Indigestion*, *Drainage*, and *Exercise*.)

Fowl à la Braise.—Truss the fowl with the legs turned into the belly, season it both inside and out with beaten mace, nutmeg, pepper and salt; put a layer of bacon at the bottom of a deep stewpan, then a layer of veal, and afterwards the fowl; then put in an onion, two or three cloves, a bundle of sweet herbs, with a piece of carrot; then put at the top a layer of bacon, another of veal, and a third of beef. Cover it close, and let it stand over the fire for two or three minutes, then pour in a pint of broth or hot water; cover it close, let it stew an hour, afterwards take up your fowl, strain the sauce, and after you have skimmed off the fat, thicken it with a little piece of butter. You may make what sauce you please.

Fowl, Cold, or Pigeon Redressed.—Cut them into four quarters, beat up an egg or two, according to what you dress; grate a little nutmeg, salt, pepper, parsley, crumbs of bread; beat all well together, dip them in this batter, and have ready some hot dripping in a stewpan, in which fry them a fine brown. Have ready some good rich gravy, thickened with a little flour, mixed with some catchup. Lay the fry in a dish, and pour the sauce over. Garnish with lemon and a few mushrooms, if you have any. A cold rabbit eats well done thus.

Fowl or Turkey Stewed.—Lay four clean skewers at the bottom of the pot, lay the bird upon this, put in a quart of gravy, a bunch of celery cut small, with two or three blades of mace; let it stew slowly till there is just enough for sauce, then add a good piece of butter rolled in flour, two spoonfuls of red wine, two of mushroom catchup, and season it with pepper and salt. Lay the bird on a dish, pour the sauce over, and send it to table.

Fowl or Turkey Stewed in Celery Sauce.—Take a large fowl, put it into a saucepan, put to it a quart of good gravy or broth, a bunch of celery washed clean and cut small, with some mace, cloves, pepper, and allspice tied loosely in a muslin cloth; put in an onion or a sprig of thyme. Stew these slowly till tender, then add a piece of butter rolled in flour, take up the fowl, and pour the sauce over it. An hour will cook a large fowl or small turkey, but a very large one will take two hours to do slowly. If it is overdone or dry it is spoiled. Take out the spice, onion, &c., before sending it to table. A neck of veal done this way is very good, and will take about two hours' cooking.

Fowl Stuffed with Chestnuts.—Roast some chestnuts, peel them carefully, and bruise them in a mortar; parboil the liver of a fowl, cut about a pound of ham or bacon, and pound all together in a mortar; add chopped parsley, sweet herbs, mace, pepper and salt, mixed together, and put into the fowl and roast it. For sauce, take some more roasted chestnuts, well peeled, and put into some good gravy, with a little white wine, and thicken it with a piece of butter rolled in flour. Lay the fowl on a dish, and pour the gravy over it. Garnish with lemon.

Fowl, to Force.—Cut the skin down the back, and carefully slip it up, so as to take out all the meat; mix it with one pound of beef suet, cut small and beaten in a marble mortar; take a pint of oysters cut small, two anchovies, one shallot, a few sweet herbs, a little pepper, a little nutmeg, and the yolks of four eggs; chop all together, and lay this on the bones, draw over the skin, and sew up the back. Put the fowl into a bladder, and boil it an hour and a quarter. Stew some oysters in good gravy, thickened with a piece of butter rolled in flour, take the fowl out of the bladder, lay it in a dish, and pour the sauce over it. Garnish with lemon.

Fowl, to Marinate.—Take a large fowl or turkey, raise the skin from the breast-bone with your finger, then take a veal sweetbread and cut it very small, a few oysters, a few mushrooms, an anchovy, some pepper, nutmeg, lemon-peel, and a little thyme chopped all together; mix with the yolk of an egg, and stuff it between the skin and flesh, but take care you do not break the skin. Then stuff what oysters you please into the body of the fowl. You may lard the breast of the fowl with bacon if you like. Paper the breast and roast it. Make rich gravy, and garnish with lemon. A few mushrooms may be added to the sauce.

Fowls Dressed German Way.—Take a fowl or turkey, stuff the breast with what forcemeat you may prefer, and fill the body with roasted chestnuts peeled; put them in half a pint of good gravy, with a little piece of butter rolled in flour. Boil these together with some small turnips and sausages cut in slices and fried or boiled. Garnish with chestnuts. Ducks may be done in the same way.

Fowls or Pigeons, to Pot.—Cut off the legs, draw them, and wipe them with a cloth; season well with pepper and salt, put them in a pot, with as much butter as you think will cover them. When melted and baked very tender, drain them very dry from the gravy, lay them on a cloth, and that will suck up the gravy. Season them again with salt, pepper, and mace beaten fine, and put them close into a pot. Take the butter, when cold, clear the gravy, set it before the fire to melt, and pour over the birds. If you have not enough, clarify some more, and let the butter be an inch thick above the birds. Thus you may do all sorts of fowls; wild fowls must be boned.

Fowls, Time taken in Roasting them.—Allow three-quarters of an hour for a large fowl, half an hour for a middling-sized one, and for small chickens twenty minutes. The fire must be clear and brisk when they are put down.

Freezing.—Water freezes when the air is lowered to a certain temperature called the freezing-point (32°), the process of freezing being due to the cold air absorbing its warmth. Water, therefore, freezes from the surface downward. The property of nearly all liquids is to contract as they grow cold; but amongst the exceptions to this rule is water, which contracts only until it reaches the temperature of 40° Fahrenheit, below which it expands or becomes lighter, being converted into crystals which pack less closely than the particles of water do. It is by virtue of this most important quality that a day's frost does not suffice to turn all our river and lake water into vast masses of ice, which could never be dissolved. At a small depth water always retains a temperature of 40°, because when its temperature sinks below this point, it ascends to the surface, and there freezing remains until it is melted. A piece of ice—frozen water—is lighter than the same bulk of water in a liquid state, because of its expansion by freezing. It is to this expansion of water that we owe the bursting of water-pipes, water ewers, and the splitting of tiles, stones, and rocks. (See page 184.) To it is also due the refreshment of the earth by the admission of dew, rain, and gases favourable to vegetation. Extreme cold causes water to expand, as we have already explained that extreme heat does (page 183). Running water freezes more slowly than still water, and shallow water freezes more readily than deep water. Salt water never freezes until it is four or five degrees below the freezing-point of fresh water; for which reason salt dissolves ice. (See page 184.) Some lakes rarely freeze, because their water is supplied from the bottom by springs. Water may be frozen artificially by wrapping a bottle of it in cloths kept constantly saturated with ether. (See *Evaporation.*) There are various ways of freezing water, however, the most curious of which is perhaps that by which it may be frozen even in a red-hot vessel. This vessel should be of platinum. When it has been made red-hot, pour into it first a little water, and then some liquid sulphurous acid. Turn the vessel over, and the ice will fall out. Ice is used for various purposes—for cooling wines and summer beverages; for confectionery, and in medicine. In the latter case, its chief uses are externally to retard inflammation, stop bleeding, to render parts of the body insensible to pain; and internally to check vomiting, or hæmorrhage. It is also given in typhus and other fevers. For confectionery ice-pails are sold, full directions for the use of which will be given to the purchaser. (See *Ices.*) Many years ago a very remarkable discovery was made near Oswego. This was a frozen well. Professor Silliman, in attempting to solve this extraordinary and difficult problem, observes:—"At the depth of more than sixty feet, water ought not to freeze at all, as it should have nearly the same temperature as that film of the earth's crust, which is at this place affected by atmospheric variations, and solar influence, being of course not far from the medium temperature of the climate. Could we suppose that compressed gases, or a greatly compressed atmosphere were escaping from the water, or near it, this would indicate a source of cold; but as there is no such indication in the water, we cannot avail ourselves of this explanation, unless we were to suppose that the escape of compressed gas takes place deep in the earth, in the vicinity of the well, and in proximity to the water that supplies it. Perhaps this view is countenanced by the flame of the candle at the depth of thirty feet, being blown to one side, thus indicating a jet of gas which might rise from the water as low as its source; and even if it were carbonic acid, might not extinguish the candle while descending, as the gas would be much diluted by common air; although in the progress of time, an accumulation of carbonic acid gas might take place at the surface of the water, sufficient to extinguish the flame of a candle."

French Beans, how to Dress.—The beans should be shred as finely as possible, and cut in half; let them remain a short time in salt and water, put them into boiling water with a little salt, and when they are cooked they will be tender. They should not be covered while cooking.

FRENCH BEANS, HARICOT.—Take a pint of seeds of French beans which are dried for sowing; wash them clean, and put them into a two-quart saucepan, fill it with water, and let them boil two hours. If the water wastes away much, you must put in more boiling water to keep them boiling. In the meantime take almost half a pound of nice fresh butter, put it into a clean stewpan, and when it is all melted and done making a noise, have ready a pint basin heaped up with onions peeled and sliced; then throw them into a pan, and fry them a fine brown, stirring them about that they may be all alike. Then pour off the clean water from the beans into a basin, and throw the beans all into a stewpan; stir them all together, and throw in a large tea-spoonful of beaten pepper, two heaped full of salt, and stir all together for two or three minutes. You may make this dish of what thickness you think proper, either to eat with a spoon or otherwise, with the liquor you poured from the beans. When it is of the thickness you prefer, you may take it off the fire, and stir in a large spoonful of vinegar and the yolks of two eggs beat.

French Beans, to keep for Twelve Months.—Take some young beans that have been in dry weather. Have ready a stone jar, clean and dry; lay a layer of salt at the bottom, and then a layer of beans, then salt, and then beans, and so on, till the jar is full. Cover them with salt, and tie a coarse cloth over them, and a board over that, and then a weight to keep it close from all air. Set them in a dry cellar, and when you use them take some out and cover them close again. Wash those you take out very clean, and let them be in soft water twenty-four hours, shifting the water often; when you boil them do not put any salt in the water.

French Biscuits, to Make.—Weigh an equal quantity of flour, sugar, and eggs, beat the whites of the eggs to a froth, then whip in half an ounce of candied peel cut very fine and thin, and beaten very well; then by degrees whip in the flour and sugar, then slip in the yolks, and with a spoon mix well together. Then shape the biscuits on fine white paper with a spoon, and throw sugar over them. Bake them in a moderate oven, and when done, cut them off with a knife, and lay them in boxes for use.

French Cement.—Gum-water thickened with starch powder. It keeps for a long time, and only requires to be damped to re-dissolve it.

Fricassee, Brown.—Skin a rabbit or fowl, cut it in pieces, and rub them over with the yolks of eggs. Have ready some bread-crumbs, a little beaten mace and nutmeg mixed together, and then roll them in it; put a little butter into a stewpan, and when it is melted put in your meat. Fry it a fine brown, and take care that it does not stick to the pan; then pour the butter from it, and pour in half a pint of gravy, a glass of red wine, a few mushrooms, or two spoonfuls of the pickle, a little salt, if wanted, and a piece of butter rolled in flour. When it is of a fine thickness, dish it up and send it to table.

Fricassee, White.—Take two chickens or rabbits, skin them, and cut them in pieces. Lay them in warm water to draw out the blood, and place them on a clean cloth to dry; put them into a stewpan with milk and water; stew them till they are tender, and then take a clean pan, put in half a pint of cream, and a quarter of a pound of butter; stir it together till the butter is melted, but you must be sure to keep it stirring all the time, or it will be greasy; and then with a fork take the chickens or rabbits out of the stewpan, and put into the saucepan to the butter and cream. Have ready a little spice, a few mushrooms, shake all together for a minute or two, and dish it up. If you have no mushrooms, you may put a little walnut liquor; this will give it a pleasant tartness. This is a good sauce for a breast of roasted veal.

Fried Celery.—Boil the celery until it is nearly tender, then divide the roots and dip them into batter in the way described above; fry to a light brown, and serve with brown sauce (for which, see page 71).

Fried Egg Sandwiches.—Boil new eggs six minutes, season with salt and pepper, fry in butter, and when cold cut into small square pieces, to be placed between bread and butter.

Fried Scorzonera.—Take off the tops of the scorzonera, wash well and scrape off the tops; boil it until it is tender, and then dip it in a batter made with two eggs, a quarter of a pound of flour, and one teacupful of water, and season with salt and pepper. Fry it, lay two or three of the roots together, and serve with brown sauce. (See page 71.)

Fried Turnips.—Select some good firm turnips, pare and wash, dry and cut them into thin slices; season with salt and pepper, dredge with flour, fry till brown and tender, and serve with fried onions and brown sauce. (See *Brown Sauce.*)

Frost-bitten Hands or Feet.—When the hands or the feet are frost-bitten or benumbed from the effects of cold, the parts should be rubbed with camphorated spirit, applied with the utmost gentleness, so as not to irritate the surface by violent friction. When the first effects of cold are removed, it will be proper to apply cold poultices, for warm applications are to be carefully avoided. When parts are frost-bitten in Russia, the common practice is to restore the circulation by rubbing them with snow.

Frosted Potatoes.—To remove the effect of frost from potatoes, strip off their skins, and cut the large ones into two or more pieces. Then throw them into cold water with a handful of salt, and allow them to remain in it a considerable time. Put salt into the water in which they are afterwards boiled.

Fruit Preserving without Sugar.—The fruit must be gathered thoroughly dry, and put immediately into clean dry bottles, and corked tightly and wired to prevent them flying. The bottles must be laid sideways with hay between them, in a cistern which is filled three parts full of cold water. A steam-pipe is introduced, and the water is heated by this means to 200 degrees, when the pipe is stopped and the whole left to cool, after which the bottles are removed and packed in a cellar like wine. If the fruit is not bottled on the day it is gathered, the bottles will burst and the fruit spoil. Fermentation is frequently caused, when bottles are kept in closets or cupboards, from the variation in temperature. Boiling water may be used instead of steam, if more convenient.

Fruit, to Preserve for Exportation.—Suffer the fruit to hang on the tree until as late as possible in October, or till hard frosts have loosened the stalk, and they are in danger of being blown down by winds. They are then to be gathered from the tree by the hand, and carefully laid in baskets. New and tight well-seasoned flour barrels are considered the best. The baskets being filled in gathering, should be cautiously lowered in the barrels and emptied. The barrels when filled are to be gently shaken, and the head carefully pressed down to its place and secured. This pressure is necessary, as it prevents them rattling when moved. No straw or shavings should be placed at the end, for it causes mustiness and decay. They should then be removed to the north side of a building, near to a cellar, protecting them from the sun and rain by a roof of boards, whilst they are exposed to the air on all sides. A chill does not injure them, but when the frost is severe roll them into the cellar, which should be dry and airy. The barrels should never be tumbled or placed on the head. Apples keep best when grown in dry seasons and on dry soils.

Fruits when in Season.—JANUARY.—Apples, almonds, nuts, pears, grapes, medlars.

FEBRUARY.—Apples, grapes, pears.

MARCH.—Apples, pears, strawberries (forced).

APRIL.—Apples, pears, cherries (forced), apricots (for cooking).

MAY.—Apples, gooseberries, apricots (green), melons, cherries, pears, currants (for cooking), strawberries.

JUNE.—Apples, melons, apricots, nectarines, cherries, peaches, currants, grapes, pears, gooseberries, pine-apples, strawberries.

JULY.—Apples, peaches, apricots, pears, cherries, pine-apples, gooseberries, plums, melons, raspberries, nectarines, strawberries.

AUGUST.—Apples, mulberries, cherries, nectarines, currants, peaches, figs, pears, filberts, pine-apples, gooseberries, plums, grapes, strawberries, melons.

SEPTEMBER.—Currants, melons, filberts, pears, grapes, peaches, hazelnuts, plums, lazeroles, quinces, medlars, pine-apples, morello cherries, walnuts.

OCTOBER.—Apples, medlars, bullaces (black and white), peaches, pears, figs, quinces, filberts, services, grapes, walnuts, hazelnuts.

NOVEMBER.—Apples, medlars, bullaces, pears, chestnuts, services, grapes, walnuts, hazelnuts.

DECEMBER.—Apples, medlars, chestnuts, pears, grapes, services, hazelnuts, walnuts.

Fuel, or what the Americans call firing, usually consists of either wood, charcoal, coal, coke, and peat.

WOODS of various kinds, if burnt under the same conditions of weight and dryness—the pores of dry wood are filled with air (oxygen)—are found to afford equal degrees of heat. Dryness is an essential quality of good fuel, as the presence of moisture prevents the oxygen of the air from penetrating the material burnt. If a piece of wood is damp, heat is wasted in the evaporation of the water it holds, and the combustion is also slower and more imperfect. A piece of wood containing, say, 25 per cent. of water, contains only 75 per cent. of fuel, while the conversion of the water into steam (see *Evaporation by Heat*) will require one twenty-eighth part of its weight. Hence damp wood is of less value as fuel by 28 parts in 100. According to their different natures, wood still contains from 20 to 25 per cent. of water twelve months after it has been felled and cut up. Even when it has been kept for a long time in a dry place, it never contains less than 10 per cent. of water, although this may of course be reduced by heat. If dried too much, its value of fuel suffers from another cause, namely, the commencement of carbonisation, or loss of hydrogen. (See *Hydrogen* and *Carbon.*) It has been assumed that one pound of artificially dried wood will raise thirty-five pounds of water from the freezing to the boiling point. It is better to buy wood by measure than by weight, as its bulk is very little increased by the moisture which has such an important bearing upon its value as fuel.

CHARCOAL. — Different charcoals afford under equal weights equal quantities of heat. One pound of charcoal will, on an average, raise seventy-three pounds of water from the freezing to the boiling point. If exposed to the air, charcoals acquire moisture, and are then inferior in the heat-giving property. Such charcoal may be known by its burning with flame, as pure charcoal does not. (See page 109.) Charcoal radiates heat in the degree of one-third to the whole of the heat it emits. For the following mode of making charcoal we are indebted to the *Gardeners' Chronicle* of 1844, contributed to them by a correspondent, who says :—"The following method of making charcoal, which I have adopted with complete success, may be useful to your amateur readers, who, like myself, want the article, and can find nobody in the neighbourhood who knows how to make it. I cut up a quantity of wood into billets of about eighteen inches long, and placed three or four wheelbarrowfuls upon a handful of straw and a few dry sticks, and set fire to the straw. As the wood began to ignite I surrounded it with sods from the side of the road, tolerably dry, and common road dirt (throwing on the latter in lumps, so as not completely to exclude the air), until the wood was covered all over. Soon the whole heap was burning together, and as the fire made its appearance through the dirt, or rather as the dirt became burnt, I threw on more dirt. At night I added as much as I thought would be burnt by the following morning, and thus the heap was kept burning for several days. Upon clearing away the burnt earth I found the wood I had used for lighting the fire completely charred, but not a stick consumed. Thus I have accomplished two objects by one operation. I have made charcoal as well as a regular professor of that art, and have also prepared a capital compost of burnt earth and sods. I have made several heaps since I first made the attempt, and have not failed in a single instance. The wood I used is black poplar, as I happened to have it by me; I also gave the preference to this material from having read lately in the *Chronicle* that the lightest wood made the best material." Charcoal being useful in so many ways, the above is worth making a note of. A little charcoal placed on a fire where a chop is to be grilled a few minutes before, imparts a fine flavour to the meat. Charcoal powdered is useful as a dentifrice and as a cure for headache. Charcoal is commonly recommended for the preservation of meat in hot weather; but here much mischief may be done, for the idea that charcoal will preserve meat from decomposition, or, at least, keep it in such a condition as to render it fit for food, is a belief as ill founded as it is popular. Charcoal can mask but not prevent decomposition : its action on decomposing matters is most simple: a large quantity of the oxygen of the air is stored up in the pores of the charcoal; with this oxygen the offensive gases come in contact, and are by it rendered quite odourless and innocuous. Meat, therefore, that has been kept for some time in the presence of charcoal may be perfectly odourless, and, as far as the sense of smell goes, perfectly sweet, yet it may still be far advanced in the process of decomposition. Indeed, it is stated by many that charcoal, far from staying decomposition, actually increases it. In the case of meat it acts simply as a deodoriser, but not as a preventive to decay.

COAL.—We have on page 123 fully described the various kinds of coal in use, so that the careful housewife may know how to select fuel of this nature. She may there read how this coal is known to be bad as fuel, and why another kind is better; that this gives smoke and flame with very little heat, and how another warms a room or cooks her food more effectually and more cheaply. Under the heads of *Coal*, *Carbon*, *Combustion*, *Oxygen*, and *Hydrogen*, she may learn how the fire is fed, how its heat is wasted or preserved, and how it may best be distributed for warming those who sit by it. You see, therefore, that in endeavouring to explain certain scientific matters, we have put before you a simple class of facts affording hints of the most valuable and the most practical nature, such as save money, increase comfort, and preserve health. The great value of all fuel resides in the degree of heat it gives. The heat-giving constituent of coal—carbon—varies from 75 to 95 per cent. Coal radiates more heat than charcoal. One pound of good pit-coal will upon an average heat sixty pounds of water. Small coal gives out three-fourths of the heat afforded by large coal. (See *Coal.*)

COKE.—The heating power of good coke is to that of pit-coal as 75 to 69, and is equal to nine-tenths of that of wood charcoal.

TURF OR PEAT.—One pound of this fuel will raise from twenty-five to thirty pounds of water from the freezing to the boiling point. Its value depends upon its compactness and freedom from earthy matter. Its radiating power is as 1 to 3 of the whole heat it emits in burning. These facts are of course useful; but perhaps the best and simplest way of discovering the respective heating powers of various kinds of fuel is by testing them with ice; thus—

1 lb. of good coal liquifies	....90 lbs.	of ice.
,, coke	95	,,
,, wood charcoal	..94	,,
,, wood	52	,,
,, peat	19	,,
,, hydrogen gas	..370	,,

Fuel, Waste of.—The domestic waste of fuel is a highly important subject. It is believed, said Mr. Bramwell, in the Mechanical Section of the 1872 Meeting of the British Association, that out of the total of ninety-eight or ninety-nine millions of tons of coal which in 1869 were retained for home use, eighteen and a half millions of tons, about one-fifth of that quantity, were consumed for domestic purposes. We all of us know so intimately the way in which coals are burnt for domestic purposes that it will seem an idle waste of time to describe it. We put a grate immediately below and within a chimney, and, as this chimney is formed of brickwork, by no possibility can more than the most minute amount of heat be communicated from the chimney to the room. On this grate we make an open fire. Fire cannot burn without air, and we provide no means whatever for the air to come in to the fire. This is a provision that not one architect or builder in a thousand dreams of making. The consequence is that the unhappy fire has, as it were, to struggle for existence. In a well-built house especially has it to struggle, for the doors and windows shut tightly. The result is that the fire is always smoking, or is on the verge of smoking. We breathe the noxious gases, and we spoil our furniture and pictures; nevertheless, happily for us, the fire does succeed in getting supplies of air which, even although insufficient for the wants of the chimney draught, do renew the air of the room. If, to satisfy the demands of the chimney, and to stop its smoking, a window is left a little open or a door is set ajar, we complain of draughts and we complain of the unhomely look caused by sitting in a room with an open door; so that there we are, with an asphyxiated fire, our smoky fireplaces, and our draughty rooms. Moreover, the fire, being immediately below the chimney, the main part of the conducted heat inevitably goes up it and is wasted, leaving the room to be warmed principally, if not entirely, by radiated heat (see page 316); and we do and suffer this that we may see the fire and be able to poke it. I must confess that if there was no cure for the evils I have described other than the closed stoves of the Continent, with the invisible fire and with the want of circulation of air in the room, I would rather put up with the whole of our present domestic discomforts, and even with the loss of heat, than resort to the closed stove as a remedy. But there are modes by which freedom from smoke, freedom from draught, efficient ventilation, and utilisation of the heat, may all be combined with the presence of the visible, pokable fire. Some may recollect the paper that was read at the Norwich meeting of the British Association, in 1868, by Captain Douglas Galton, in which he so clearly described his admirably simple invention of fire-grate. This consisted in putting a flue to the upper part of the fire-grate, which flue passed through a brick chamber formed in the ordinary chimney, which chamber was supplied with air from the exterior of the room by a proper channel, and then the air, after being heated in contact with the flue in the chamber, escaped into the room by openings near the ceiling, so that the room was supplied with a copious volume of warm fresh air, which did away with all tendency to draughts from the doors and windows, and, moreover, furnished an ample supply for the purposes of ventilation and combustion. (See *Ventilation*.) These fireplaces have been but little used in England, from a cause which, as I believe, stands in the way of the adoption of improvements generally. The merits of these fireplaces were at once acknowledged by the French, who made the most careful and scientific investigation of their working; and they found that with such fireplaces three times the effect was obtained from a given weight of coal that could be got with those of the ordinary construction. No doubt there are many other plans by which the same end as that attained by Captain Galton may be arrived at, and yet we go on year after year building new houses, making no improvement, exposing ourselves to all the annoyances, and, worst of all, wasting the precious fuel. Assume that we were to set ourselves vigorously to work to cure this state of things, can it be doubted that in ten years' time we might halve the consumption per household, and do that not only without inflicting any discomfort, or depriving the householder of any gratification, but with an absolute addition to warmth and an increase of cleanliness, a benefit to health, and a saving of expense? Moreover, it must be remembered that, with the imperfect combustion of domestic fires, large volumes of smoke are poured into the air. We know how much freer from smoke town atmosphere is in summer-time than it is in winter-time, and this simply on account of the smaller quantity of coal that is burnt. Suppose that we could reduce the total consumption, both in summer and in winter, by fifty per cent., what an enormous boon that would be even in the one matter of a pure atmosphere.

Fumigating.—On examining the foul building or apartments requiring fumigation, it is necessary to estimate both the amount of surface exposed to the infectious vapours and the capacity of it. The surface of the walls, &c., of the place impregnated with infectious matter will absorb more or less of it in degrees proportionate to its nearness to or remoteness from the source of infection, and also in degrees proportioned to the nature of the infection. The materials usually employed are common salt, oxide of manganese in powder, and oil of vitriol. Professor Faraday used for a case of extensive fumigation the following mixture:—One part, by weight, of common salt, and the same of the oxide of manganese, with two parts of oil of vitriol previously mixed with one part by weight of water, left till cold. The mixture is to be made in a flat vessel of common earthenware. Such a mixture may be considered, added the Professor, as liberating all the chlorine that it can afford gradually but perfectly without the application of any extraneous heat, and it is therefore very proper for extensive fumigation. To remove close, unpleasant smells from apartments, put one spoonful of common salt and a little powdered manganese in a flat earthen saucer, and add at four or five different times a wineglass of strong sulphuric acid. Place this on the floor of the room, retire and close the door. For full directions on all matters relating to the fumigating of sick rooms, we cannot do better than refer our readers to a practical series of papers on this subject in "Cassell's Household Guide."

Fumigating Pastiles.—Recipes for making these are excessively numerous: we give two of the best:—1. Gum benzoin, olibanum, frankincense, and mastic, of each one ounce; charcoal, one pound and a half; gum tragacanth, four drachms, and water sufficient to make the mixture, when pounded, into a paste. 2. Gum benzoin and styrax, of each four ounces; sandal-wood and labdanum, of each one ounce; charcoal, twenty-four ounces; mix with gum-water to form the paste.

Fungi Spores.—To explain the nature of these things, suppose we have before us a plate of stale, mouldy apple-sauce. The mould upon it is a plant. The drops of amber or jet which cap the slender threads are "spores," which form some of the myriad dust-particles visible in every sunbeam which penetrates even the cleanest and most frequently dusted room. Wherever air or water can go these minute spores are to be found. Those of parasitic fungi like "rust" and leaf "mildew" sometimes even circulate in the sap of the plant affected. To kill them is a task of the utmost difficulty. They endure the extremes of heat and cold without suffering injury, and retain their vitality under the most unpromising circumstances. They are formed of mere cells, without organ, and are the simplest known forms of organic existence. Seeds of higher organisms have distinguishable parts—the colyledons and the germ or point of growth—but spores have neither. Their mode of vegetating is extremely obscure. In the algæ it has been watched, and found to be merely a multiplication of cells similar to the first. But different orders do not germinate in the same way, and little is yet known of the method of the fungi, which grow mostly at night, and in some substance little less transparent than water. Its capacity for growth is all that renders a spore more organic than a crystal. But that is everything. This very little cell, like a seed or an egg, contains within itself, hidden beyond all chance of discovery, that fixed law of development which makes each of these primitive beginnings grow "after its kind." This formative principle is everywhere operating, intensely active, invariable, constant, potent, but intangible and invisible as a thought. It mocks at the power of the microscopist's lens, and defies the most subtle of chemical investigations to find within that simple cell that mysteriously great and wonderful principle which men call life. (See page 109.)

Furniture, Renovating and Repairing, &c.:—

FURNITURE POLISH.—Take one pint of linseed-oil, two ounces of yellow rosin, eighteen ounces of bees'-wax, and two ounces of borage-root, or alkanet-root. Melt these all together by a gentle heat, and strain it while hot through linen. Make into balls when cold.

FURNITURE CREAM.—Dissolve an ounce of pearlash in a little water, and by heat dissolve two and a half ounces of white wax, then add one quart of water by degrees. Another:—Boil together in five pints of rain-water two ounces of soap, half a pound of bees'-wax, and one ounce of pearlash. The two above recipes may be diluted by water, and thus used in a liquid state. The water evaporating, leaves the wax as a polish.

OIL FOR FURNITURE.—One gallon of linseed-oil, twelve ounces of alkanet-root, and two ounces of rose-pink mixed together. Another:—In one and a half pints of linseed-oil boil four ounces of resin. Another:—Dissolve, by a gentle heat, some yellow bees'-wax in oil of turpentine, till of the consistence when cold of a jelly. A little red ochre may be mixed with it.

FRENCH OIL FOR FURNITURE.—To one pint of linseed oil, one ounce of shellac varnish, two drachms of alkanet-root, and half an ounce of gum arabic. Put together in a bottle in a warm place, and strain at the end of a week. To use the above, wind a piece of flannel, carpet, or wadding round a stick, and cover the roll with a piece of fine muslin or soft linen, say doubled several times, and tie it on strongly with a piece of twine; then hold this wad to the mouth of the bottle and shake it, which will sufficiently moisten the wad, then proceed to rub the furniture in a circular manner, doing but a small surface at a time. Afterwards polish with a silk handkerchief.

TO REMOVE INK-STAINS FROM UNPAINTED WOOD.—When a desk or bench or floor is stained with ink, cut a lemon and rub the spots with it; then wash it off with warm water. Vinegar is a tolerable substitute for lemon-juice to remove ink-stains from boards. A strong solution of either citric or tartaric acid will also remove the stains without injuring the wood.

TO REMOVE INK FROM MAHOGANY.—Mix a small teaspoonful of oil of vitriol with a large tablespoonful of soft water, dip into it a piece of clean flannel, and rub it on the ink-spots lightly and quickly, till they disappear; then wash it off with a little milk, and rub it dry. Or you may wet a little citric, tartaric, or oxalic acid, and rub it on the ink-spot, washing it off immediately after the ink has disappeared.

Furs, How to Preserve.—Furs are subject to injury by several species of moths, whose instinct leads them to deposit their eggs at the root of the fine hair of animals. Linnæus mentions five species that prey upon cloth and furs, of which *Tinea pellionella*, *T. vestionella*, and *T. tapetzella* are the most destructive. No sooner is the worm hatched than it eats its path through the fur, and continues increasingly destructive until it arrives at its full growth, and forms itself a silken covering, from which in a short time it again emerges a perfect moth. Another cause of the decay of furs is the moisture to which they are so often exposed, and by allowing the skin to remain damp, from which the delicate structure of the fine fur is sure to receive serious damage. This fact makes the leather manufacturer wet his skins and keep them in a damp cellar, in order to facilitate the removal of the hair, which can then be readily pulled out. It follows, therefore, that for the preservation of furs dryness is essential. After exposure to damp or rain furs should therefore be dried at a moderate distance from the fire. Before putting furs by for the summer they should be carefully combed and beaten with a small cane. During the summer they should be kept well wrapped in dry brown paper, or in a box secure from the incursions of moths, and taken out occasionally to be dried—if at all damp—and again well shaken, combed, and beaten. With these precautions the most valuable furs may be preserved uninjured for many years. (See *Moths* and *Insects.*)

Game, Eating of.—We may here give our epicurean friends a gentle hint. In eating game those parts are the most tender and delicious which are exercised the least by the locomotive habits of the bird. For instance, in the woodcock and snipe the legs, which are merely used as their supporters, are juicy and tender, while their wings and breast (pectoral muscles) being abundantly exercised, are more tough, dry, and strong. (See *Beef.*)

Game, Tainted.—When birds are tainted, pick and draw them as quickly as possible, and immerse them in new milk. Allow them to remain in it till the next day, when they will be sweet and fit for cooking. Throw the milk away afterwards, as it is in an unfit state for any other use whatever.

Games with Cards.—To Make a Certain Card Jump out of the Pack and Run on the Table.—Take a pack of cards, and let any one draw a card they please; put it into the pack so that you may know where to find it at your pleasure. Put a small piece of wax under your thumb-nail, to which fasten a hair, and the other end of the hair to the card. Spread the cards open on the table, and desire the one chosen to jump out, which you may readily accomplish by means of the hair.

How to Tell a Person any Card he Thinks of, and Convey it into a Nut.—Take a nut, in which burn a hole with a hot bodkin, and with a needle break and extract the kernel. Write the name of a card on a piece of paper, and roll it up hard and put it in the shell. Stop the hole with wax, which rub over with a little dust, that the puncture may not be seen, then let some one draw a card; you must take care it be that which is written on the paper. Desire him to break the nut, in which he will find the name of the card he has drawn.

To Shuffle Cards in such a Manner as to Keep a Certain Card at the Bottom.—In shuffling the cards, let the bottom card be always a little before, or, which is best, a little behind all the rest of the cards; put it a little beyond the rest before, right over your forefinger, or else, which is the best, a little behind the rest, so that the little finger of the left hand may slip up and meet with it. At the first, shuffle as thick as you can; and at last, throw upon the board the bottom card, with as many more as you would preserve for any purpose, a little before or behind the rest, and be sure to let your forefinger, if the pack be laid before, or your little finger, if the pack be laid behind, always creep up to meet with the bottom card; and when you feel it you may there hold till you shuffle over again, which being done, the card which was first at the bottom will come there again. Having perfected yourself in this manner of shuffling, you may accomplish anything you please with packs of ten, twelve, or twenty cards, always leaving the particular card at the bottom, however frequently you may shuffle the pack.

To let Twenty Persons Draw, and to make Each Person Draw the Same Card.—Let any person draw a card from a pack and put it in the pack again, but where you know it may be found when required. Shuffle the cards, as before directed, then let another person draw a card, and be sure he takes the same the other did. Proceed in the same way with all the persons but the last, who is to draw another card, which also return to the pack, and shuffle till you have brought both the cards together. Then showing the last card to the company, the other will show the trick.

To Change a Pack of Cards into Various Pictures.—Take a pack of cards, and paint upon the white side of half the pack any kind of figures, as men, women, birds, flowers, &c.; then paint the other half of the cards, on that side on which the spots are, in the same way as the other half; so, between them both, you will have a complete pack of all pictures; and when you perform the trick, you must show the cards but half-way.

Garden, Hints for.—The following brief hints will be found useful for amateur gardeners :—

SHOOTS AND SUCKERS are the thin branches rising from the top of the root of shrubby plants ; these are taken off from the parent stem, so that a piece of the root of that parent may come away with each sucker. They are then cut down till only two or three *eyes* or buds are left, and the pieces so prepared are planted sufficiently deep in the ground, and covered up from the sun and air by a hand-glass with mats. They soon strike root and grow, and are then carefully transplanted into the places where they are to remain.

CUTTINGS are pieces of a young branch or side-shoot taken off with a sharp knife and cut down till only five or six buds are left ; these being planted about one half of their length in the earth, roots will grow out of the buds under ground and from between the bark and wood at the bottom. They do not strike root so soon as suckers, and therefore require to be kept longer covered and frequently watered ; but the tree ultimately produced from a cutting is better than one produced from a sucker. Cuttings, therefore, are usually preferred for propagating fruit trees.

LAYERS.—The mode of propagating by layers is applied to those trees of which cuttings do not *strike* readily. It consists in bending down a branch gently and laying a portion of it in a trench dug in the ground to receive it. The branch is kept down in the earth by forked pegs of wood or by stones laid upon it. Roots spring out of the knots of the portion so buried, and while these are forming the branch continues to derive nourishment from the parent stem. When a sufficiency of new roots are grown the branch may be cut off close to the ground, to separate it from the original plant, and can be transplanted to the situation where it is wanted. The most important mode of propagating particular varieties of fruit trees is by *budding* or *grafting*. The former is done by cutting a bud out of the tree to be propagated and inserting it in a slit made in the bark of a *stock* or the stem of another tree of the *same species* of plant. The operation is a delicate one, for it is essential that the *liber* or inner barks of the bud and of the stock should be in accurate contact.

GRAFTING is applying a short cutting of the subject to the stock, so that a perfect contact may exist between the libers and the two parts. The bud, or the graft, must be bound round and covered over with clay at the point of junction, to exclude the air and allow of a perfect union of the two parts ; when this has taken place, the bud or graft will grow into a branch, and in time form a head on the original stock, which will produce fruit of the same kind as that of the tree which was to be propagated.

FRUIT TREES are cultivated either as *standards*—that is, as single isolated trees—or as espaliers, or trained against a wall. Standard trees are growing into disuse in all good gardens, as not allowing of the necessary care and cultivation, nor of the fruit being so conveniently gathered.

ESPALIERS are trained against wooden frames, which allow of the sun and air getting to both sides of the plant ; but training against a wall is preferred for the tenderer fruits, as peaches, nectarines, &c., because the wall affords shelter from the north wind, the plant being always put on the southern side. The back of the wall retains the heat of the sun, and thus acts as a stove in forwarding the growth and ripening the fruit. Another advantage of training fruit trees up a wall is that they may then be covered over with old canvas or bunting to protect them from frosts, or with nets to keep birds from getting at the fruit when it is ripening. The art of *training* a tree properly requires considerable skill and knowledge ; it is done by pruning the shoots as they form yearly, so as to leave buds which will afterwards grow in the right direction, and produce a regular form in the tree; but this form must be often modified either to retard growth of a branch which is too active, or to forward one which is backward; and this is effected by following the laws which regulate the distribution of the sap in the plant. The branches are trained and fixed against the wall by means of shreds of woollen cloth. (See *Leather-Oiling*). There are a few plants cultivated for their fruits, which, being originally brought from warmer climates, require constant shelter in this country; but as no vegetable will thrive or ripen its fruit without abundance of light, the buildings erected for the purpose of protecting these exotics must consist chiefly of glass.

Hotbeds, &c. — Melons and cucumbers are raised on hotbeds with glass-light frames, but pine-apples and grapes require greater and more constant heat to bring them to maturity than a simple hotbed and frame can supply. The *pit* in which pine-apples are forced resembles the plain frame and lights in general form, only it is altogether larger, and the upright sides are built of brick, with a *flue* or long horizontal chimney running round it inside, leading from a furnace, the mouth of which is on the outside of the back wall. The fire being lighted in this furnace, the hot air passes through the flue and warms the interior of the pit, and finally passes up an upright chimney. The rectangular central pit left within the flue is filled with old tanner's bark, and in it the pots containing the plants are sunk. The hot-houses in which grapes are reared are constructed on the same principle, only on a larger scale, so that persons can walk round them. The vines are planted out of doors against the front walls of the house, and the stems being brought through holes the branches are trained to iron wires fixed to the beams of the glass roof, so that the grapes may be as near the light as possible. The greater part of the space in the house being thus left unoccupied is generally devoted to rearing exotic tender plants either for the beauty of their flowers or for the sake of their singularity. Within the last few years buildings of this kind have been warmed by means of steam raised in boilers and passing through iron pipes within the hot-houses or pits.

Greenhouses and Conservatories are erections of a similar kind, but constructed with more taste, so as to be agreeable to the eye as well as useful. They are provided with flues or pipes for warming them in winter. (See page 221.)

Insects in the Garden. — From the variety of useful suggestions contained in an old report of the Parisian Society of Agriculture, we select the following:—Coal tar, diluted with water, affords the best and most economical preservative against the mischief occasioned by the ravages of the lanigerous fly. It is to be sprinkled over such trees as are infested with that insect.

Hemp.—It is found that hemp is not of itself prejudicial to other crops; but, like other plants, if it be suffered to remain too long upon the ground, it injures the productive powers of the latter with respect to certain descriptions of produce.

Cutting Branches. — The above society is of opinion that the shortening of the branches imparts additional vigour to fruit trees, and that the removal of the large vertical shoots is in general of pernicious effect.

A Cause of Decay.—It is well known that trees die away when their roots come in contact with the roots of decayed oak trees. The cause of this seems to be that certain dead roots are susceptible of a cryptogamic vegetation, which is propagated by contact, and destroys healthy vegetation.

Caterpillars, to Destroy.—To fifteen gallons of water add a pound and a quarter of common soap, the same quantity of flowers of sulphur, and two pounds of mushrooms (the poisonous kind). Put the whole over a moderate fire and keep it stirring. Caterpillars, grubs, &c., watered with this liquor immediately perish. This recipe is said to come from Germany, where it has extraordinary success.

MOLES, TO POISON.—Collect earthworms, kill them, and mix them with the powder of nux vomica. After the mixture has remained in a heap twenty-four hours, strew a few of the worms in the holes and paths of the moles.—*Bulletin Universel.*

FRUIT TREES, PRESERVING.—About the beginning of February have every part of peach and nectarine trees unnailed and well washed with the following composition, applying it with a paint brush to every part :—Soot, quicklime, Scotch snuff, and sulphur vivum, one pound of each put into a large water-pot full of soap-suds and urine. Let the mixture stand two or three days after stirring it, and it then will be fit for use. This composition is useful for preserving the trees as well as killing the insects. It causes the trees to look as green the summer after it has been applied as a coating of manure makes a pasture-field look the summer after it has been dressed.

GARDEN SEEDS.—The vitality of seeds prepared for keeping is more frequently injured by excessive drying than by any of the ordinary accidents to which they are liable. All dealers in seeds, especially grass seeds, have to complain of this. When damp they will not keep, and are generally put on the top of a kiln to dry off the external moisture; but if the process be suffered to go beyond this, and the natural moisture of the seed is much trenched on, it will be as white and fine and full of farina as before, but it will not grow. Onion and other seed kept over the year loose in drawers or in paper parcels will not vegetate. When kept in this way, even for a few weeks, onion seeds have been known to lose in weight more than an ounce in the pound. Most gardeners have noticed that after a long continuance of hot dry weather the best of seed will either not germinate at all or will do so very weakly. These facts prove that seeds are much injured by the drying action of the air; and when set aside for preservation, in our cool climate, they should be excluded from the air as much as possible, and not exposed in vessels pierçed with holes for the admission of air, as is commonly done.

GARDEN WALKS.—There are, as you know, some neighbourhoods in which a good binding gravel is not always procurable, and as a good substitute there is a kind of cheap asphalte which any one can make for himself where coal-tar can be obtained. To do this procure a quantity of road-sand or similar powdery material (finely-sifted lime rubbish will do), and let it be thoroughly dried, so that it feels like dust when handled. Sift out the cinders from the finer parts, which should then be thoroughly dried. These materials must be carefully mixed in the proportion of two parts of road-sand to one part cinder siftings. You must next proceed to make some tar in a caldron boiling hot; then with a shovel mix the whole together as mortar is mixed, and when it reaches a stiff paste spread it on the garden path or greenhouse floor. In order to receive it the ground should be well trodden down to make it hard and level. The asphalte for this kind of coarse work may be laid on two or three inches thick, then powdered over with coarse sand; finally the roller may be passed over the path two or three times. The sand will prevent the roller sticking to the asphalte. If the cinder siftings and asphalte are not used in a dry condition they will ooze out in places, when some more sand must be applied and again rolled. Walks or floorings done in this way will last a long time. (See also page **221**; *Hoeing*, *Ants*, *Evaporation*, *Soils*, *Insects*, *Lawns*, *Light*, *Moss*, *Plants*, *Salt*, *Lettuce*, *Potatoes*, &c.)

Gargle for a Sore Throat.—Mix five grains of tannic acid, four drachms each of tincture of myrrh and honey of roses, and eight ounces of boiling water. Use this gargle frequently.

Gargle for Relaxed Throat.—Take twenty drops of muriatic acid, two ounces of honey of roses, and mix these with six ounces of barley-water. This is an excellent remedy for simple sore throat caused by relaxation of the uvula and tonsils.

Gas Meter.—A dry meter is preferable to a wet one, because there is no water to be affected by frost in winter, and because in the latter, if the water-level be too low more gas will pass than can be registered. If the meter be tilted forward the gas will pass without being registered at all, as some of the gas companies have found to their loss.

Gas, Regulation of.—The pressure of gas should be regulated at the meter, not at the burner; for if the pressure is too great, and the flame is reduced at the burner, much of the gas will escape unburnt, and serve no purpose beyond that of increasing your gas-bill, rendering the atmosphere of your room poisonous, and so injuring your health more or less seriously.

Gateau de Riz, Napolitain Glace.—Take four ounces of Carolina rice, wash it well, and put it in a stewpan with a pint of milk, a pint of good cream, a pinch of salt, and two ounces of sugar. Let the rice swell well in this. When tender enough to give way between your fingers add a stick of good vanilla, and boil it a single minute, then let it get cold. When cold take all the cream that remains liquid and put it in a stewpan with the yolks of six eggs; if there is not cream enough add to it a little milk. Turn this on the fire with a wooden spoon, and when the eggs are well done and the mixture very thick let it cool. Mix with this a pint of double-whipt cream, and after mixing the cream with the custard taste if sweet enough. Do not make it too sweet. Then take some out in a basin, and put it into the rice only, not into the freezing pot; then mix together the rice and the cream, take out the vanilla, and put all the rest into the freezing pot; work it well in the ice. When well frozen put it in ice moulds that shut on both sides; put them in the pail with salt all round the ice. At dinner time dip the mould in cold water, and push the ice off the mould on the dish on which you serve it, and cover the gateau with the cream that you have put by in the basin. This dish is a remove of toast, and one of the very best things ever made.

Gateau de Pommes.—Take half a pound of lump sugar, put it into half a pint of water, and let it boil till it will candy. Then add one pound of apples pared and cored, and the peel and juice of a lemon. Boil these together until quite stiff, put into a mould, and turn out when cold. Serve in a dish with a custard round. About a quarter of an ounce of isinglass makes this quantity.

Gelatinous Food.—(See *Diet.*) The white flesh of young animals and that of certain fish, animal jelly, &c., represent this class of food.

Gentle Laxative for Children. — Tartrate of potash two scruples, powdered rhubarb one scruple, manna one drachm, spirits of nutmeg half a drachm, cinnamon-water two ounces; mix. Dose, from a dessert-spoonful to two tablespoonfuls, according to age.

German Money.—One of the greatest difficulties the visitor to Germany has to encounter is the money. There is North German money and South German money. The former consists of thalers, silver groschen, and pfenniges; the latter of florins and kreutzers. As, however, at Wiesbaden and in the neighbouring country both coinages are used, we give our readers the following table, which we hope may be of service:—

English. £	s.	d.		French. Fr.	Cts.		N. German. Thlrs.	S.gr.		S. German. Fl.	Kr.
1	0	0	...	25	0	...	6	20	...	11	40
0	17	1	...	21	55	...	5	21	...	10	0
0	16	0	...	20	0	...	5	10	...	9	20
0	15	0	...	18	75	...	5	0	...	8	45
0	12	0	...	15	0	...	4	0	...	7	0
0	10	0	...	12	50	...	3	10	...	5	50
0	8	6	...	10	25	...	2	25	...	5	0
0	6	0	...	7	50	...	2	0	...	3	30
0	4	0	...	5	0	...	1	10	...	2	20
0	3	0	...	3	75	...	1	0	...	1	45
0	2	0	...	2	50	...	0	20	...	1	10
0	1	8	...	2	15	...	0	17	...	1	0
0	1	0	...	1	25	...	0	10	...	0	35

As regards the copper money, it will be convenient to remember that, with respect to North German money, an English sixpence is equal to five silver groschen, and that one groschen has to do duty for our penny. On the other hand, there are sixty kreutzers in a florin, and three kreutzers are about equal to our penny. English and French gold, as well as French and Belgian silver, is, however, current in all parts of Germany. Prussian bank-notes of 1, 5, 10, 25, 50, 100, and 500 thalers, issued by the Government, are of the same value as gold or silver, and are received everywhere in Germany with equal favour.

German Silver, to Clean.—After using, it should be immediately washed well and wiped dry with a soft cloth. Once a week let it be washed in soap-suds, and then cleaned with a little whiting or prepared chalk mixed with whisky or spirits of wine, so as to form a stiff paste, which should afterwards be brushed off. Should this metal become discoloured or spotted by vinegar or other acids, wash it first, then clean it with sweet oil or rottenstone. Spoons of German silver are useful for many common purposes, particularly when making sweetmeats, &c.

Gilding Edges of Mounts, Albums, &c.—Leaf-gilding on paper is done by first applying a coat of gum, or fine size, then the leaf-gold, and burnishing with agate. Bound books are lettered without size, by laying the gold on the leather and imprinting with hot brass types. Gold powder is often used for vellum gilding, especially for imitating mediæval MSS., and also for scroll and arabesque work. It is made by amalgamating gold with mercury, and then distilling off the latter. The proportions are one of gold and eight of mercury. It can also be made by precipitating gold from its solution in aqua regia by a solution of pure sulphate of iron. Gold powder is used too in japanners' gilding. The edges of leaves of *carte-de-visite* mounts or books are gilded while in the cutting press, by applying a solution of isinglass in spirits, and laying on the gold when sufficiently dry. French workmen apply to the edges fine size and gum-water, and then Armenian bole mixed with powdered sugar-candy by means of the white of an egg. When this is dry it is rubbed smooth with a wet rag, which moistens it sufficiently to take the gold.

Gilt Chandeliers, Candle Branches, &c., to Clean.—Having first wiped off the dust from the articles to be cleaned, make a strong sud of the finest white soap and soft lukewarm water, and dipping into it a clean sponge, wash carefully every part of the gilding. Then, with a strong small brush (a tooth-brush, for instance) go lightly into all the crevices and hollows, and most delicate parts of the work with the soapsuds, taking care not to rub too hard. When you find that the water has become dirty, replace it with some other. Finish by drying.

Gilt Picture-frames, how to Clean them.—The following is a good method: Take one drachm (about as much as will lie on a shilling) of soft soap and mix it gradually with half a pint of soft water—*i.e.*, rain-water, or water that has been boiled and allowed to get cold; put the mixture into a bottle and shake it well up, then add half a wine-glassful of spirits of hartshorn, and again well shake the ingredients. The gilt frame that is to be cleansed may now be brushed over with this liquid, taking care, however, to use for that purpose the very softest camel-hair brush that can be procured. After the liquid has been on the frame a minute or two, using a slight brushing to the dirtiest and most intricate parts of the work, it should be freely washed off with plenty of clean soft water, and allowed to dry spontaneously. The drying, however, should be accelerated by placing the frame in a draught or where the sun shines on it. Next day the bright parts of the work may be very slightly rubbed with a new wash-leather, which will enhance their brilliancy. Pictures and glasses should be taken out of their frames during the cleansing process.

ANOTHER METHOD.—Mix up fifteen grains of a solution of chlorine, with forty five grains of white of eggs, and then wash the frame with a soft-haired brush dipped into the mixture. Afterwards varnish the frame with wood-gilders' varnish, which can be obtained of any colourman. The solution of chlorine can be purchased cheaply at the apothecary's.

Ginger.—This is the woody root of the *Gingiber officinalis*, a native of South-eastern Asia and the adjoining islands, and was long since cultivated in the West Indies. The plant is nearly allied to the arrowroot tribe. The young roots make an excellent preserve. It is valuable as a medicine, and is as wholesome as so powerful a stimulant can be.

Glass. — TO MEND BROKEN GLASSES.—Get some cloves of garlic (you may obtain them at any seedsman's or druggist's), tie them up in a rag, lay them in a tin pan, and pound them with a hammer to get out the juice. Then stick the broken glasses firmly together, stand the articles on a plate, there to remain for a fortnight. The broken lid of a pitcher can be also mended in this way.

Glass, to Gild.—Grind together equal quantities of chalk and red lead. and mix with linseed oil. Coat the glass with it, and when it is in the condition called tacky, lay on leaf-gold in the usual way with the aid of a gilder's knife, cushion, and squirrel-tail brush, &c. (these tools may be had for a small sum of most artists' colourmen). When *thoroughly* dry, the gold may be burnished.

Glass Transparencies for Windows.—(See page 311, *Transferring Prints.*)

Glucose, or Sugar of Fruit, sometimes called grape sugar, differs from cane sugar in the larger quantity it contains of the elements of water in chemical combination.

Glue.—RICE GLUE.—Mix together rice-flour and cold water to a thick paste, pressing out all the lumps with a spoon and making it very smooth. Then dilute it with a little more water (altogether you may allow a tablespoonful of rice-flour), and boil it slowly as long as you would boil starch, stirring it frequently; when done set it to cool. Use it for pasting fine paper, and for any ornamental articles made of pasteboard.

GLUE, COMMON.—In making glue—which should always be at hand—the best way of proceeding, which is important when its full strength is required, is the following:—The glue, as bought, should be broken up small, just covered with cold water, and allowed to soak for a few hours. It should then be placed near the fire and allowed to simmer. The addition of a few drops of linseed oil will improve it; and, when made, it should be kept in a dry place, as damp will totally destroy its tenacity, and render it useless. It is remarkable how often this fact, so universally known, is so often entirely lost sight of.

GLUE, LIQUID.—An excellent liquid glue is made by dissolving glue in nitric ether. The ether will only dissolve a certain amount of glue, consequently the solution cannot be made too thick. The glue thus made is about the consistency of treacle, and is doubly as tenacious as that made with hot water. If a few bits of india-rubber cut into scraps the size of a buckshot be added, and the solution allowed to stand a few days, being stirred frequently, it will be all the better, and will resist the dampness twice as well as glue made with water. M. Knaff recommends this glue to be made by placing three parts of glue, broken into small pieces, in eight parts of water, and adding, after the expiration of some hours, a pint of hydrochloric acid, and three-quarters of a pint of sulphate of zinc, and keeping the whole at a moderately high temperature for ten or twelve hours. Thus prepared it is always in a liquid condition, and may be used for joining almost all kinds of materials, including glass.

Glue Stiffening.—For stiffening dark chintzes or calicoes, take a piece of glue as large as the palm of the hand, break it in pieces, and put them in a saucepan, with three quarts or a gallon of rain-water. Set the saucepan over a fire and let it boil until the glue is melted. Take it off and put the glue into a pan, and when lukewarm it is fit for use. Put the material into the pan and work it about until it has taken the glue-water. Squeeze it well, open it out, and dry as quickly as possible. After which, sprinkle it, and dry it quickly.

Glue—Turkish or Armenian Cement.—The jewellers of Turkey, who are mostly Armenians, have a singular method of ornamenting watch-cases, &c., with diamonds and other precious stones by simply glueing or cementing them on. The stone is set in silver or gold, and the lower part of the metal made flat or to correspond with the part to which it is fixed; it is then warmed gently, and has the glue applied, which is so very strong that the parts thus cemented never separate. This glue, which will strongly unite bits of glass and even polished steel, and may of course be applied to a vast variety of useful purposes, is thus made:—Dissolve five or six bits of gum mastic each the size of a large pea in as much spirits of wine as will suffice to render them liquid, and in another vessel dissolve as much isinglass (previously a little softened in water, though none of the water must be used) in as much French brandy or good rum as will make a two ounce phial of very strong glue, adding two small bits of gum albanum or ammoniacum, which must be rubbed on ground glass till they are dissolved; then mix the whole with a sufficient heat; keep the glue in a phial closely stopped, and when it is to be used set the phial in boiling water. Good cement made in this way is as strong and thick as carpenter's glue.

Gluten.—This tough, elastic substance is composed of carbon, oxygen, hydrogen, and nitrogen. When it is contained in bread in greater quantity than usual, a greater degree of heat is required to get rid of an excess of water, and the more nourishing it becomes. Gluten is found most abundantly in corn that has been grown in warm climates. It is owing to the large quantity of this substance in Italian flour that paste made with it is sufficiently tenacious to be drawn out into vermicelle.

Gluttony.—As the stomach was never intended to do all the work that ignorance or a depraved appetite so commonly provides for it, the exquisitely perfect machinery, which in different parts of this book we have described, soon gets out of order from excessive eating, which is in fact at least as mischievous, if not actually more so, than excessive drinking If we could see the effects of the former—the crowd of diseases, the myriad ghosts of those who died early, and all the varied horrors which are so frequently associated with deaths and diseases—we should cry out as loudly against gluttony as we now do, and justly, against drunkenness. Temperance in eating and drinking is, when combined with the judicious selection of food and drink, the real source of health, and those are wise who know this and act upon their knowledge. Happiness consists more largely than many people imagine in eating and drinking wholesome things in proper quantities. The process of digestion ought always to be easy and pleasant, and it is not a bad old rule always to finish a meal before the food has lost its relish. The kind, quantity, and quality of a man's aliment ought to bear a just proportion to the strength of his constitution, the amount of exercise he takes, and the condition of his digestive organs. If he can immediately after dinner write, or walk, or go about his ordinary business or pleasure; after supper sleep soundly and rise in the morning free from fever, with no bad taste in his mouth, refreshed and cheerful, he may be tolerably sure that his diet is well regulated, and that he has not exceeded in eating or drinking the bounds of temperance. (See p. 220.)

Glycerine.—At one time regarded as refuse, glycerine is now applied to a variety of important uses. It contains large quantities of carbon and hydrogen, and has therefore been recommended as a good substitute for cod-liver oil. Its application to the skin prevents chapping in winter weather; it is used to preserve animal matter from decomposition. Used with carmine as a cosmetic, it gives the cheeks a bloom resembling that of youth and health, and there are various other uses to which it is applied.

Gold, how its Value is Estimated.—Goldsmiths usually indicate the purity of the gold they sell in the following manner. Perfectly pure gold, they suppose divided into 24 parts called carats. Gold of 24 carats therefore means pure gold; gold of 23 carats, means an alloy of 23 parts gold, and one of some other metal, and so on. The number of carats mentioned indicates the pure gold, and what that number wants to 24, indicates the quantity of alloy.

Gooseberries as Food.—These have less acid than either raisins or currants, and if the skins are not eaten, they are perhaps more wholesome. When used green for preserves and pies they are cooling and refreshing.

Gooseberry Vinegar is preferred for many purposes on account of its pleasant taste and smell. The process is as follows:—To every quart of moderately ripe gooseberries add three quarts of water, and bruise the fruit well; stir up the whole and let it stand for twenty-four hours, then strain it through a canvas bag; one pound of brown sugar must be added to every gallon of the liquor, which, being well mixed up, should be put in a cask or vessel to ferment. Raspberry vinegar is made in the same way, and proves very useful in families.

Grain Tin.—This is the most pure of all kinds of tin; more so than block tin. Pure tin has a white colour, and crackles peculiarly when twisted. Tin is but little acted upon by air and water.

Gratin of Lobster.—Procure a good sized lobster, cut it in half, detaching the head from the body, take out all the meat, and save the shell; cut the meat into slices, then put a tablespoonful of chopped eschalots in a stewpan, with a piece of butter the size of two walnuts, pass them a few minutes over the fire; add a tablespoonful of flour (mix well in), half a pint of milk, stir over the fire, boiling about five minutes; then add the lobster, which season with a little cayenne, salt, chopped parsley, and essence of anchovies; stand it again upon the fire, stirring till boiling; then stir in the yolk of an egg; take the pan off the fire, fill the shell of the lobster, sprinkle breadcrumbs over, with a little butter; put in the oven for twenty minutes; dish on a napkin and serve.

Grease for the Hair.—Soak half a pound of clear beef marrow and a pound of unsalted fresh lard in water two or three days, changing and beating it every day; put them into a sieve; and, when dry, into a jar, and the jar in a saucepan of water on the fire. When melted pour it into a basin, and beat it up with two spoonfuls of brandy; drain off the brandy, and then add essence of lemon, bergamot, or any other scent.

Grease, to Remove from Cloth.—A dilute solution of potash is usually recommended for this purpose, but if incautiously applied it is apt to injure the fabric of the cloth. Stains, sometimes caused by the wax of burning candles, or those arising from contact with wet paint, may be easily removed by either sulphuric ether or pure spirits of turpentine. The following preparation has been strongly recommended to us for this purpose:—Take four ounces of very pure spirits of turpentine, one ounce of sulphuric ether, and the same quantity of spirits of wine; mix in a bottle, which must be well and quickly corked to prevent evaporation. This mixture is rubbed on the grease stain with a piece of clean rag, and if the stain is not too old it will at once remove it. If it does not, replace the piece of rag after you have wetted it with the mixture, and rub a hot iron over it. Camphine oil is sometimes used for this purpose. When a stain of paint is fresh, rubbing the spot hard with the wrong side of the cloth will remove it. (See *Cloth*, pp. 118 and 121.)

Greengages, to Candy.—Dip the stalks and leaves in white wine vinegar, boiling, then scald them in syrup; take them out and boil them to candy height; dip in the fruit, and hang them to dry downwards before the fire or in the sun. Take the plums, after boiling them in a thin syrup, peel off the skin, candy them, and afterwards hang them up to dry.

Grindstones.—The following hints about grindstones are from a practical mechanic:—1st. Do not waste the stone by running it in water; but if so, do not allow it to stand in water when not in use, as this will cause a soft place. 2nd. Wet the stone by dropping water on it from a pot suspended above the stone, and stop off the water when not in use. 3rd. Do not allow the stone to get out of order, but keep it perfectly round by the use of gaspipe or a hacker. 4th. Clean off all greasy tools before sharpening, as grease or oil destroys the grit. 5th. Observe—when you get a stone that suits your purpose, to keep a sample of the grit by you in order that you may show it to the dealer to select by; a half-ounce sample is enough.

Gum, to Improve It.—All gums, when they are used for cement, become so dry and hard after a time that labels and other objects cemented to polished surfaces by means of them crack and fall off. This difficulty may be prevented in several ways. A little brown sugar dissolved in the mucilage will do it, and so will a drop or two of glycerine. Beware, however, of adding too much of the latter, for if you do your mucilage cannot be made to dry sufficiently to adhere.

Gum Tragacanth.—A very small quantity of this gum dissolved in water will serve to add to the consistence of savoury jellies, when mixed with them over boiling water. It is also used for the improvement of meat pies.

Haddock, Baked.—Make a nice stuffing of bread, egg crumbs, suet, parsley, lemon or orange peel, and egg. Fill the inside of the fish, which place in a pie-dish. Dredge the fish well with flour, pour in at the sides half a pint of hard cider; add a lump of fresh butter, some pepper and salt, put the whole into a tolerably brisk oven. The haddock may also be roasted like the pike, and basted with equal parts of water and hard cider. The stuffing must be exactly the same as for hare. The remains of a cod's head and shoulders of a previous day may be so prepared as to be presentable at a second feast. Let all the muscular and gelatinous parts be separated from the bones. Then let a good lump of fresh butter be put into a stewpan, and when it boils, dredge in a tablespoonful of flour. Moisten with equal parts of hard cider and water, and let the sauce boil up. Season it to your taste, and put in the fish. When this is warm, but without boiling up, take it off the fire, and stir in a *liaison* made of the yolks of two eggs, beaten up with a dash of grated nutmeg.

Haggis.—Take the lights, heart, and chitterlings of a calf, chop them very fine with a pound of suet. Proceed to season with pepper and salt to your taste; mix in a pound of flour or oatmeal, roll up, and put the whole into a calf's bag; boil it—an hour and a half will do it. Some add a pint of good thick cream, and put in a little beaten mace, clove, or nutmeg, or allspice is good in it. Another way of making this celebrated old Scotch dish is that given by Mrs. Maciver in her cookery-book published at Edinburgh in 1787, "Make the haggis-bag perfectly clean, parboil the draught, boil the liver very well so that it will grate, dry the meal before the fire, mince the draught and a pretty large piece of beef very small, grate about half of the liver, mince plenty of the suet and some of the small onions. Mix all these materials together with a handful or two of the dried meal, spread them on the table, and season them properly with salt and mixed spices. Take any scraps of beef left from the mincing, and some of the water that boiled with the draught, and make about a chopin (a quart) of good stock with it. Then put all the haggis-meat into the bag with the broth and sew it up, first making sure to press out all the wind. It will require at least two hours' boiling."

Haggis with Fruit and Sugar.—Take the meat and suet as above, and flour, with beaten mace, cloves, and nutmegs to your palate, a pound of currants, a pound of raisins, chopped and stoned, half a pint of sherry; mix all well together, and boil in a calf's bladder two hours. It must be carried to table in the bag it is boiled in.

Hard Water.—The tear and wear of clothes by the system necessary for washing in hard water is very important in the economical consideration of the question. The difference in this respect between hard and soft water is very striking. It has been calculated that the extra cost in London in the one article of ladies' collars, by the unnecessary wear and tear, as compared with country districts, is not less than, but probably much exceeds, £20,000 annually. Hard water almost always contains carbonate of lime or chalk, as well as selenite. By boiling the water this is separated, and forms the fur or crust on the inside of tea-kettles; so that hard water is rendered somewhat softer by boiling, but not quite soft. For chemical purposes this property may be wholly obviated by adding to the water a small quantity of barytic solution. It is this selenite or gypsum which gives the water its hardness. Such water curdles soap, and is therefore unfit to wash with. The sulphuric acid of the selenite attaches itself to the alkali of the soap, whilst the oil and lime are separated in flakes, and give the appearance of curdling. It is a common practice to add wood-ashes to hard water when it is required for washing purposes; in this case the alkali of the wood-ashes decomposes the selenite. Peas and other vegetables retain their colour better when boiled in hard then when boiled in soft water, but they are not so soft and tender. Soft water is best adapted to most manufactories, as brewing, dyeing, &c. In dyeing, if hard water is used, the selenite or its earthy part, is deposited in the stuff, and prevents the colouring particles from penetrating. In brewing, or any other process where water is used to extract the virtues from vegetable or from animal matter, soft water is best, because its solvent powers are greatest. In making tea, hard water will not extract so much as soft, unless the tea be powdered, for it has not so much power in softening and opening the tea-leaves.

Hare, Potted.—Skin a hare and save the blood, cut off the head, legs, and shoulders, cut the body into four parts, take out the gall; cut two pounds of streaky bacon, rather fat, and put it into a stewpan with half a pound of butter. Fry it lightly; put the hare in this with the lights and liver, all the blood, a good bit of garlic, a bunch of parsley, and green onions, well season with thyme, bay-leaves, cloves, mace, cayenne, salt and pepper. Moisten it with half a bottle of port wine, add a little spice, and put it on a slow fire to steam. When well done, and you have tasted it (it must be highly seasoned), take all the gravy out, and likewise the bones; put the contents of the stewpan into a mortar, pound them well, and rub them through a hair sieve. Reduce the liquor that comes from the hare, by boiling with the paste; try whether the flavour is good, then put it into a pot, and cover with a paste. When hermetically covered, put it into a moderate oven for one hour, then take it out, let it cool, and cover it with melted lard or butter, and when quite cold cover it hermetically with a bladder.

Hare Soup.—If you have a tough old hare, cut it up, but do not lose the blood, and put the whole into a large stewpan, or into a boiler, with plenty of water. Put also into the stewpan a piece of leg of beef, a couple of sheeps' melts, and a lump of bullock's liver. Let the whole of this stew very gently for six or eight hours, after having first let it boil; when it does so, add a large onion, a clove of garlic, a bunch of herbs (consisting of parsley, a small sprig of lemon-thyme, and one small bay-leaf) and some salt. At the expiration of the time specified, strain the soup; cut the meat off the bones of the stewed hare, pound it to as fine a paste as possible, and return it to the soup. Place this over the fire, add a quart of hard cider, half a pint of mushroom ketchup, and seasoning to your taste. Add a good thickening of flour, and let the soup remain for three quarters of an hour longer. Then drop in a little butter rolled in flour, and serve up. As a variety, egg or forcemeat balls may be used.

Haricot Mutton à la Bourgeoise.—Cut the breast, neck, and scrag of mutton into pieces about three inches long; put them into a stewpan with butter, lard, or dripping, and fry them a nice brown. Add some boiling water, a large onion stuck with cloves, a bunch of parsley, and some young onions. Let all stew together till the meat is nearly done; then add some turnips that have been stewed in gravy, with a little brown sugar to colour them; put the turnips to the mutton, take out the onions, and the bunch of parsley, skim and serve up. Some persons prefer potatoes to turnips; you must be careful they do not break.

Hashed Mutton à la Tomato.—Cut the meat from the joint over night, and cover with flour; break the bones, and put them into a stewpan early next morning with plenty of water and an onion that has boiled in three waters to extract the flavour; let this boil to a pint, and allow it to cool, and skim off the fat a short time before dinner, strain off the gravy, and put into it half a dozen tomatoes, or some tomato sauce; set this on the fire, and about five minutes before the dish is wanted put in the slices of mutton, with a little salt and cayenne; simmer the gravy, but do not let it boil, or the meat will be hard. Cold mutton or lamb done in this way makes an economical and savoury dish.

Health.—An assemblage of all the secretions of the human body in a state of activity, whereby they exist in harmony and equilibrium, constitutes health. To maintain that desirable state of life, a proper proportion of the fluids is requisite, and of the solids duly formed of these fluids; the invigorating influence of the vital powers; and last, though not least, a sound mind in a sound body. The causes of the diversity of temperaments by which conditions of health are much affected are very numerous. Among such may be reckoned hereditary disposition, habit of body, climate, diet; not unfrequently religion, mode of life, and luxury. Besides the variety of constitutions to which men are subject from these incidents, circumstances peculiar to every individual influence the number as well as the energy and vigour of the functions. The health of a new-born infant, for instance, is different from that of an adult; and in regard to sex, it differs in a marriageable virgin and an old woman past child-bearing; it varies also during menstruation and suckling, and in regard to mode of life. The more functions flourish simultaneously in the body, the more considerable is its life, or *vice versâ*. Hence life is greatest when the functions have attained their highest state of perfection in adult age; and least, when the functions, although very perfect, are fewer and more sluggish—namely, in the newly-conceived embryo. Life is also less vigorous as the functions decay. To secure health by the golden mean is so practically described by Milton in his "Paradise Lost," that we cannot resist quoting it here. When he introduces the angel Michael giving directions to our first parents by what means they might preserve health, he says:—

"If you will observe
The rule of not too much, by temp'rance taught,
In what thou eat'st and drink'st, seeking from thence
Due nourishment, not gluttonous delight,
Till many years over thy head return:
So may'st thou live, till, like ripe fruit, thou drop
Into thy mother's lap, or be with ease
Gathered, not harshly plucked, in death mature."

The whole art, in fact, of preserving health may be properly enough said to consist in supplying what is deficient in the system, and carrying off what is redundant, in order that the body may be habitually kept in its natural state; and hence it follows that all the supplies from eating and drinking, and all the discharges of perspiration, and by the other channels and distributions of nature, should be regulated in such a manner that the body shall not be oppressed with repletion, nor exhausted by evacuation. Of these two, one is the cure or antidote of the other—every error in repletion being corrected by a seasonable and congruous evacuation, and every excess of evacuation, should, if it has not proceeded too far, be cured by a gradual and suitable repletion. This is the art of enjoying a life of health, or of recovering lost health, and preserving it when once established. "It is health that makes your bed easy and your sleep refreshing; that renews your strength with the rising sun; that makes you plump and comely, enriching the complexion with Nature's choicest colours; that makes your exercise a sport, increases the natural endowments of your mind, and makes the soul delight in her earthly mansion."

Heat.—The readers who have favoured our preceding articles with attention will have perceived how curiously important a part heat plays in the economy of creation. Heat and light are very intimately connected. We have already pointed out in our articles on *Animal Heat*, *Air*, *Blood*, *Food*, *Respiration*, and *Combustion*, how the processes of existence are always productive of heat. Combustion is so frequently productive of light also, that it has been stated as probable that the heat is convertible into the light. The rays of the moon have been pointed out as antagonistic to this theory, but this is an error. If our most powerful instruments fail to detect the heat in such rays, we must remember that a moonbeam ray only possesses one three-hundredth part of the light which is possessed by a solar ray of equal magnitude. It is generally held that all light and heat proceed from the sun. In our paper on atmospheric air we have shown that the farther it is from the surface of the earth the colder it becomes. This is due to the simple fact that air is not heated by the immediate passage of the sun's rays, but only by contact with some opaque body. The light which impinges upon our earth becomes heating, and hence extends its warmth to the air which is nearest to the earth, upwards. If this were not so, the air on the tops of lofty mountains would be of the same temperature as that in the lowest valleys, and some of its most important offices would cease to be fulfilled (see *Temperature of the Air*). Passing through transparent bodies, such as air and water, light, not being absorbed, communicates no perceptible heat. A variety of old and well-known experiments serve to prove this. If pieces of cloth of different colours (white, scarlet, and black, for instance) are laid at the same time on the surface of the snow where the sun's rays can fall upon them, they will be found after some hours to have sunk into the snow to various depths, according to their reflective powers. The white, which reflects the most light, will have sunk the least; the scarlet, reflecting less, will have sunk more; and the black, which reflects little or none, will have sunk by far the deepest in the snow (see *Conduction of Heat*). In this experiment the rays falling on the black, being absorbed and not reflected, produce heat, which causing the snow to melt, necessarily makes that piece of cloth sink; the others reflecting more of the rays, less heat is emitted, and consequently they sink less into the snow. It is for the same reason that black clothes of all kinds are much warmer in summer than light-coloured ones. And the same fact, we are informed by Sausseur, is known to the Swiss peasants, and taken advantage of by them when the snow lies too long upon the ground. He tells us that when this is the case, and they want particularly to sow their seed, they are in the habit of spreading black cloths upon the surface of the snow to facilitate its melting (see *Conduction of Heat*). You will now understand why a thermometer that has its bulb blackened is more sensible to an increase of heat than a common one, and why, when exposed to the light, the blackened one indicates a higher temperature. In this case the rays of light that are reflected by the common thermometer are absorbed and emit heat in the blackened one, and consequently increase the temperature of the contained mercury. That it is the absorption of light in this case that causes the heat, is proved by interposing a plate of transparent glass between a thermometer and a lighted candle. The glass will evidently intercept the rays of heat and transmit only those of light, and yet the mercury in the thermometer will rise, and particularly if the bulb of it is blackened. The sultry heat experienced on the surface of the water on a sunny day, arises from the reflection of the rays of light. The temperature of the water is but little raised, because the light is reflected and not absorbed; but the reflected rays as well as the direct rays of the sun, striking upon any object that is on the surface of the water, make it so much the hotter to persons in that situation. Some persons reflecting upon these facts, that light when absorbed emits heat, and that black bodies absorb whilst white ones reflect it, have argued for the propriety of forming black walls for fruit trees; but mere reasonings are insufficient without experiments to determine the point, as will appear from the following consideration:—The walls themselves will no doubt be warmer than if they were white, but the heat will be communicated from the walls to the air immediately in contact, and not to the fruit, which very seldom touches the wall, and then only by a small surface; the heated air, being unconfined, will most of it pass away, and thus the heat emitted by the absorption of light be of little advantage towards the ripening of the fruit. But if the walls are white they reflect the light, and these reflected rays meeting with the opaque substance of the fruit, and other parts of the trees, emit heat that is directly applied to the desired purpose. The fruit is in this respect precisely in the same situation with a person on the surface of the water.

It is necessary to determine by experiments to what extent the temperature of the air is increased at the distance from the wall that the fruit usually hangs; and whether it is more than equivalent to the heat emitted by the absorption of rays reflected from the white wall. In a pinery, however, or other hot-house, particularly where there is no fruit growing near the wall, a black wall would be decidedly preferable to a white one, for here the air, heated by the warmth of the wall, not being allowed to escape, would increase the temperature of the whole air in the house; whereas the rays reflected by a white wall would let many of them pass again through the glass of the windows and the roof without adding to the warmth of the room. Besides the above instances of intimate connection between light and heat, the phenomena of combustion will afford others. When the temperature of a piece of iron is raised to the state called incandescence—that is, until it becomes red-hot—it emits light as well as heat; and when more inflammable substances are heated, combustion is the consequence, during which there is rapid extrication of light in the form of flame. The source of the light in these instances is still a matter of dispute. Although light and heat are in so many instances very intimately connected, we have examples of the existence of the one without the other. By friction, heat is extricated unaccompanied by light. In phosphorus and other bodies possessing phosphorescent qualities, as glow-worms, shining fish, and putrid animal or vegetable substances, we have light without heat: or rather the means have not been discovered of rendering the heat sensible. And, as we have said, light reflected from the moon has not yet been satisfactorily proved to emit heat. The range of heat from its lowest to its highest degree may be aptly compared to an immense chain formed of links that have exactly the same length, the extremities of which chain are beyond the limits of our sight. The most distant link that we can distinguish towards one extremity we mark as the first, that next to it the second, and so on, till we come to the most distant that we can distinguish towards the other extremity. Now, in speaking of the links of this chain, which may be compared to degrees of heat on the scale of the thermometer, it would evidently be erroneous to say that an object placed at the hundredth link was twice as far from the extremity as one placed at the fiftieth; nor could we say how far either was from the extremity; but knowing that there are fifty links between the two, we can form an idea of their distance from each other, and their relative situation with respect to other objects placed along the same chain that are within our view. (See also *Conduction of Heat*, *Combustion*, *Expansion of Heat* and *Gases*). Most substances are capable of being melted and vaporised by the application of heat; and most probably all would be so were we able to excite a sufficient degree of heat. By abstracting the heat, we again reduce most vapours to their fluid state, and fluids to that of solids. And it is likewise probable that vapours we at present cannot condense or freeze, would be subject to these changes were we able to excite a more intense degree of cold. It is only when the temperature is raised to a certain degree that solids begin to melt, or fluids to be vaporised, and this degree is different for every different substance, but is always precisely the same for the same substance, provided other circumstances are similar. Thus ice always melts when heated above 32°, as water always freezes when cooled below 32°; and water is always converted into vapour when its temperature is raised to 212°, provided the pressure of the atmosphere is the same. Wax has another degree at which it is melted, lead another, silver another, and gold another. The degree of heat at which spirits boil, or begin to be converted into vapour, which is the same thing, is lower than the boiling point of water, and that at which ether boils is a great deal lower still. (See *Conductors of Heat*). The point at which salt water freezes is lower than the freezing point of fresh water, and in the act of congelation its salt is deposited, and the ice is separated and melted and affords fresh water. Some of our navigators have observed this fact with great joy, and obtained a supply of fresh water where they but little expected to meet with it. The mountains of ice met with at sea in the polar regions are wholly of fresh water, and pools and basins of fresh water are often found on them from the partial melting of the ice. Although all these substances have their fixed points at which they boil under similar circumstances, yet the pressure of the atmosphere has a very considerable influence in determining the point. The greater the pressure the greater the degree of heat requisite for making the liquor boil; and the more we can diminish the pressure of the atmosphere, as is done by the air-pump, the less is the degree of heat that is required to convert it into vapour. In this way ether, spirits, and even water are made to boil at the usual temperature of the air, when the pressure of the atmosphere is removed by means of the air-pump. So much is the boiling facilitated by this means that philosophers have gone so far as to assert that, if all pressure was removed from the earth, every substance, solid as well as liquid, would immediately be volatilised, or converted into vapour. Water, upon an average, is found to boil at 212°, and this is generally considered its boiling point; but in this country there is a considerable difference at different times in the weight of the atmosphere. In the barometer, which is the instrument for measuring this pressure, the height of the mercury varies as much as three inches, and a rise of one inch makes the water require two degrees more of heat to boil it. There is, therefore, in this country a variation of six degrees of heat in the temperature of boiling water at different times. When the barometer is at the lowest, water will boil at 209°; and when it is at the highest, it will not boil till it is heated to 215°. The more elevated the situation, the less is the pressure of the air, and consequently water will boil with less heat on the top of a mountain than in the valley. An amusing experiment, easy to be performed, shows this effect of pressure on the boiling water as well as any experiments with the air-pump. Half fill a Florence flask or other glass vessel with boiling water, and cork it tightly. The water is now at rest; but pour a little cold water on the upper part of the flask, and it will begin to boil; then pour hot water upon it, and it will cease; pour the cold water again, and it will boil, and so on for a considerable time. The explanation of the experiment is this. When you cork the flask the upper part of it is filled with vapour from the boiling water, and the cold water poured upon this part condenses the vapour. Now, as the air cannot get in, there is a partial vacuum—that is, the pressure of air on the surface of the water is considerably diminished. This being the case, the water will boil at a lower temperature, and the heat which it retains is sufficient for the purpose. In the next place, by pouring hot water upon it, that within is partly converted into vapour, which affords the same pressure as the air would do; the water, therefore, ceases to boil because its heat is insufficient under that pressure to make it boil. It has been said that by increasing the pressure on the surface of the water you retard its boiling. It is on this principle that what are called *digesters* are formed. By means of screws, the top of the vessel is kept down with such force as to prevent the escape of the vapour, which, increasing the pressure on the surface of the water in the same degree, enables it to acquire a higher temperature. This may be carried to such a pitch that the water acquires a sufficient degree of heat to melt lead. A vessel on the same construction, but of far less power, has been introduced into the kitchen with economical views. By enabling the water to be heated much above the boiling point, its solvent powers are increased, and thus bones are made to afford their glutinous and nutritious part to the water when common boiling would not extract properly. The immense power that is exerted by water on the point of being converted into steam requires digesters and other instruments intended to confine it, to be made with great care and amazingly strong. By a sufficient increase of heat it may be made to exert almost any force. It has been made to burst cannons and still stronger machines, and by the important invention of the steam-engine it has been applied to a variety of purposes to which we owe so large a degree of modern progress and so vast a number of modern improvements. When a substance undergoes the change that we have been talking of, from solid to fluid, or fluid to vapour, it is not only necessary to raise its temperature to the melting or boiling point, but to supply it with still more heat, for the conversion is attended with an absorption of heat. When ice is melted it absorbs heat from all surrounding bodies, which heat has not the effect of increasing its temperature, but becomes latent. The water is not hotter to the feeling or to the thermometer than the ice was before it was melted, but it has absorbed and contains more heat. The same happens when a fluid is converted into vapour, and the same quantity of heat that is thus absorbed is again extricated when the vapour is condensed into a fluid, or the fluid frozen into a solid. The application of this fact assists us in explaining a variety of phenomena that without the knowledge of it would be inexplicable. Put a vessel of snow or of ice before a fire, and although it is all the time receiving heat from the fire, a thermometer immersed in it shows no increase of temperature; all the heat that is received being necessary to convert the snow into water, but as soon as it is all melted the thermometer begins to rise. Were it not for this circumstance, all the snow and ice would be instantly melted when the temperature of the air is above 32°, the consequence of which would be dreadful inundations after every winter. So much heat is absorbed when a solid becomes a fluid, that if we can suddenly effect the conversion we produce a great degree of cold, and on this depends the effects of freezing mixtures. When snow and salt mixed are melted in a warm room, so much heat is absorbed by them that a vessel of water immersed in the mixture becomes frozen notwithstanding the warmth of the room. In this way confectioners prepare different kinds of ices in the summer. Various mixtures of salts, when dissolved in water, produce the same effect without the addition of ice. Eleven parts of sal ammoniac, ten of saltpetre, and sixteen of Glauber's salt, mixed with thirty-two parts of water, will produce cold sufficient to freeze water. By dissolving chloride of lime in nitrous acid even mercury may be frozen. The heat that is given out when water is frozen tends to moderate the intensity of our winters, and accounts for the increase of warmth that is frequently observable after a fall of snow. When ether, spirits, or water are exposed to the air they are gradually evaporated, and in this process absorb heat as well as when they are made to boil, and are thus vaporised. To prove this, dip the bulb of a thermometer in ether and expose it to the air, and you will find the mercury fall considerably; or dip your hand into the same liquor, or into spirits, or even water, and then expose it to the air, and you will feel a degree of intense cold, in consequence of its absorbing heat from your hand to convert it into vapour. In warm climates the inhabitants cool water and other liquors for drinking by wrapping the vessels in wet flannels and suspending them in the air; or by keeping the water in porous earthen vessels, through which a part, gradually oozing, is evaporated, and cools the rest. It is this evaporation that makes a person feel so cold when his clothes are wet, although he is perhaps sitting near the fire; and it is the cold thus produced that injures the health much more than being exposed to a cold sharp air. It is the absorption of heat by the vapour that prevents water from acquiring a greater degree of heat than 212°. If you boil water ever so violently or apply to it ever so intense a heat, it never increases in temperature; the heat that you communicate all going to the conversion of it into vapour. In cooking, therefore, it is useless to apply additional heat to water that is boiling, to make it, as the servants call it, boil fast. If you keep the water just boiling, that is quite sufficient; and in many cases, indeed, articles will be as well done, and as soon done, by a heat considerably less than that of boiling. Having observed that vapours contain more heat than fluids, and fluids than solids, when their temperature is the same, we must now add, that among fluids, among solids, or among vapours, one kind contains more heat than another. Thus a pound of water contains more heat than a pound of mercury; and a pound of iron more than a pound of tin, and a cubic foot of common air more than the same quantity of inflammable air.

Before quitting the subject of heat, we may mention a very singular application of it in accordance with its power of expanding iron. It was some years ago observed at the Conservatoire des Arts et Métiers at Paris, that the two side-walls of a gallery were receding from each other, being pressed outwards by the weight of the roof and floors. Several holes were made in each of the walls, opposite to one another, and at equal distances, through which strong iron bars were introduced so as to traverse the chamber. Their ends outside of the wall were furnished with thick iron discs, firmly screwed on. These were sufficient to retain the walls in their actual position. But to bring them nearer together would have surpassed every effort of human strength. All the alternate bars of the series were now heated at once by lamps, in consequence of which they were elongated. The exterior discs being thus freed from contact of the walls, permitted them to be advanced farther, on the screwed ends of the bars. On removing the lamps, the bars cooled, contracted, and drew in the opposite walls. The other bars became in consequence loose at their extremities, and permitted their end plates to be further screwed on. The first series of bars being again heated, the above process was repeated in each of its steps. By a succession of these experiments they restored the walls to the perpendicular position; and could easily have reversed their curvature inwards, if they had chosen. The gallery still exists, with its bars, to attest the ingenuity of its preserver, M. Molard.

Herbs used for Seasoning.—Most of the plants used for seasoning belong to an order of plants remarkable for abounding in a variety of volatile oils to which they owe their aromatic perfume and flavour, which, however, resides not in their flowers, but in the stalks and leaves. *Parsley*, an umbelliferous plant, affords an exception to the usually poisonous leaves of that class. It is always eaten young before flowering, being afterwards unwholesome. It is in the proper sense of the term biennial, that is to say, it flowers the second year, ripens its seed, and dies. (See *Cooking*.) *Fennel* belongs to the same class as the above, but is less frequently used. *Horse-radish*: An indigenous plant of the cruciferous order, extremely prolific. The root is highly pungent, and more wholesome than most other strongly stimulating vegetable products.

Hessian Soup.—Take one pound of lean beef, three quarters of a pound of split peas, three potatoes, six carrots, six onions, and boil in four quarts of water until it is reduced one-half. Strain it through a colander and afterwards through a sieve. It should be as thick as ordinary pea-soup. Add Cayenne or Jamaica pepper, salt, a glass of white wine, and a lump of sugar.

Hiccough, Simple Remedy for.—Take about a teacupful of cold water at nine sips, and the involuntary cough will in most cases cease.

Hoeing.—The value of the hoe as a garden tool is great. We extract the following excellent remarks on this subject from the *Gardeners' Magazine*:—"Hoeing is one of the much-neglected operations of which few have considered the value, and to keep down weeds is generally the sole object of using the hoe. Certainly that is a good object, and if these observations quicken the vigilance of gardeners who are a wee bit careless upon the growth of groundsel, couch, and bindweed, and other rampant weeds among their crops, it will serve one good purpose. But it must have frequently come under the notice of practical men that a piece of cabbage or cauliflower frequently hoed between, even to the extent of working the instrument very near their roots, always grows to finer proportions than similar breadths left to take care of themselves, with the ground trodden between to the hardness of a Babylonian brick, 'to keep the moisture in and the heat out.' In such a case it is made evident that there is a virtue in the hoe beyond the killing of weeds that take away the nourishment required by the crop; and if the problem of their well-doing is to be solved by observation, it must be at daybreak, when every leaf is loaded with dew. Then it will be seen that ground recently hoed or pointed over with a small fork is uniformly moist, while hard ground adjoining the same plot is almost as dry as during the heat of a sunny day. The solution is simple enough. The rough open surface absorbs a large amount of dew, not simply because it is broken, but because it presents a greater extent of radiating surfaces, for the deposition of dew depends on the radiation of heat at the immediate surface, and the subsoil need not and will not be colder than the subsoil of hard ground, although it has a greater power of surface radiation. In fact, ground frequently hoed becomes warmer from its more ready absorption and conduction downwards of solar heat, so that the roots of the plants are kept warmer and moister in broken ground than in close hard ground, and therefore the vigorous growth of vegetation is promoted by hoeing. We have ourselves frequently indicated to gardeners that the chief benefit of dew to plants arose through its absorption by the soil for the nourishment of their roots. It comes to this, that if you cannot soak the ground with water, you have only to break the surface, and it will soak itself. The more heat by day the more dew by night, the more cloudless the sky the heavier the deposition of moisture between sunset and sunrise. Recent experiments show that if the dew is allowed to settle on the leaves of plants, and not on the soil in which their roots are, they gain nothing in weight, whereas when the dew is allowed to condense on the soil they gain considerably. But the hoeing is the matter we wish our readers to think about and act upon. The hoe is an irrigator of as much value to the English gardener as the shadoof is to the wretched cultivator of millet on the banks of the Zab or Tigris; and where people are wasting their strength in conveying hogsheads of water, which are often more harm than good, the labour might in most cases be saved, the ground kept clean at the same time, and the plants encouraged to push their roots about in search for nourishment, by the use of the hoe, and the hoe alone. Take notice of a rhubarb leaf; the midrib forms a depressed groove, and the leaf slopes up on each side of it, somewhat in the fashion of the two sides of a wooden water-shoot. The upper surface of the leaf-stalk is channelled too, and all night long the leaf distils dew from the atmosphere, the water trickles to the midrib, and thence finds its way by the channel of the stalk direct to the heart of the plant, for the benefit of its roots and rising leaves. This is the way nature makes almost every plant its own irrigator: we must co-operate with nature, and by the use of the hoe assist the soil also to drink freely of the dew of heaven, that we may enjoy thereby the fatness of the earth."

Homœopathy.—So many learned and experienced medical men in the different countries of Europe have regarded and regard homœopathy with respect as a science, and practise it or have practised it with success, that, putting aside the more extravagant pretensions of its founder, Hahnemann, we can neither deny its importance nor ignore its facts. Homœopathy was originally based upon the principle that "two maladies resembling each other in their manifestations and their effects —that is to say, in their symptoms —mutually destroy each other, the strongest conquering the weakest." Regarding all classification of diseases as absurd, because it is impossible that the essential nature of any particular disease can really be fully discovered, Hahnemann argued that the physician should confine his efforts to attacking and destroying the symptoms; and considering the ignorance which must exist with regard to the complicated action of drugs under the influence of unknown conditions, he argued that they should be used purely with regard to their known effects. (See *Medicine.*) In conformity with these ideas, to cure one disease we must produce a similar disease, both of which are known by the same symptoms. When the artificial disease has destroyed the natural one, we know how to remove the former because we know how it was produced, and can at once remove its cause. The early homœopathists, arguing that all alimentary substances exert a more or less important influence in altering or modifying the chemical effects of their remedies, devote much of their attention to this branch of study, and the minuteness with which the specific action of various chemical agents on certain organs is detailed is very wonderful. Taking as an example phosphorus, they affirm that it produces vertigo, morning headache, falling off of the hair, a difficulty in opening the eyelids, burning sensation and ulceration of the internal canthus of the eye when exposed to the open air, lachrymation and adhesion of the palpebræ, inflammation of the eyes, sparks and spangles floating before the eyes, pulsation in the ears, epistaxis, mucous discharge from the nostrils, foulness of breath, tumefaction of the throat, whiteness of the tongue, ulceration of the mouth, expectoration of glairy mucus, dryness of the mouth by night and day, spasmodic eructation, nausea, sense of hunger after eating, anxiety after meals, and so on, to the extent of twenty-four octavo pages. Symptoms as numerous and singular were attributed in such profusion to the various medicinal substances in use, that it would be utterly impossible for the most retentive and powerful memory to keep them in view in ordinary practice, as a reference to the Organon of Hahnemann will clearly show. An eccentric, rambling, discursive, but sometimes eloquent and forcible, French writer on Homœopathy, Dr. Michel Granier, asserting the great doctrine of his belief that like cures like, in opposition to the doctrine of opposing contraries, asks, "What is the contrary of a thing?" and adds, "Reflect well before you reply, for the answer is not easy. Two things are contrary to each other when they are opposed in their essence and mode of existence; but things contrary in this sense are very seldom found. . . . We hear it every day said that heat is the contrary of cold, shade that of light, silence the contrary of noise, and so on. These are errors. Cold is only a greater or less degree of heat, shade a greater or less degree of light, noise a vibration of the air, and silence, being air in perfect rest, can never be in nature where everything vibrates. . . More is not the contrary of less. Take a thermometer and reflect; the first degree below zero is a degree less, the first above a degree more. Does it therefore follow that these two degrees are opposites?" In the same way he asserts that the contraries of diseases have no existence, and asks, "What is the contrary of small-pox, measles, or scarlatina, of rheumatism and gout, of intermittent and typhoid fever?" Dr. Granier continues: "In vain do you tell me that blood-letting is the contrary of congestion—an inflammation of the lungs, for instance. I reply, that in this case you do not practise medicine, but simply perform a physical and hydraulic act; you unload the vessels, lessen the mass of liquid contained in a reservoir; but this is not the *contrary* of a disease. It is no use saying that a purgative is the *contrary* of constipation, for it will produce precisely the effect you are trying to avoid. Are you ignorant of, or do you affect to despise, the phenomenon of vital reaction? If you give purgatives a certain result will follow, but, by the reaction of vital force, you will as a necessary consequence produce a constipation more obstinate than ever. In this sense diarrhœa is not the contrary of constipation, weakness of strength, or bleeding of congestion. In a word, you may search in the domain of theory for *contraries*, and never find them; you may ask the system-mongers for that of *contraries*, they cannot give it you; and when you wander in the vestibules of your rich Academies searching for *contraries*, you may knock at every door, but not one will be opened." In the administration of their remedies the homœopathists use the most minute particles of medicine, obtained by infinite trituration or dilution in three vehicles which they consider free from any medicinal property which might impair that of the remedy—namely, distilled water, spirits of wine, and sugar of milk. By these means they obtain the decillionth or a quintillionth fraction of a grain. Globules of sugar of milk, about the size of poppy-seeds, saturated with the alcoholic medicinal solutions, are the form in which these medicines are usually prepared for domestic use, as they keep better than the liquids. It is these globules which have brought so much ridicule upon homœopathic doctors, although a very numerous range of experiments will serve to demonstrate how the most minute particles of two substances possessed of chemical affinities may be brought into action although diluted *ad infinitum*. Dissolve, for instance, a five-thousandth part of arsenite of ammonia in five hundred thousand parts of water, and the addition of the smallest proportion of nitrate of silver will detect its presence and throw down a yellow precipitate. Dr. Michel Granier says:—"There is a medicine which for several years past has certainly enjoyed all the favour of fashion, I mean cod-liver oil. Medical men prescribe it in a number of cases useless to enumerate. The brown oil is the best. How does it act? By virtue of the iodine it contains. How much does it contain? *Two milligrammes* to a quart! Sick people have been known to be cured of an attack of fever from having slept in a room where sulphate of quinine had formerly been prepared. Mercury salivates in the smallest doses. A publication called *Les Transactions Philosophiques* speaks of an English vessel which carried a large quantity of this metal. By accident some of it escaped from the casks in which it was packed. In three weeks two hundred men were salivated, ulcers appeared, they were partially paralysed, &c. Even the animals on board were not exempt. A chemist at Tours had a fit of asthma every time a bottle of powdered ipecacuanha was opened. At Marseilles there was a chemist still more susceptible to the action of this medicine; he was seized with violent vomiting each time it was pulverised, and whenever the least particle reached his nose. Dr. Andrieu relates a similar case of a Sister of Charity, who was nurse in an hospital. In *La Gazette Médicale de Toulouse*, Mons. Bonnefoux relates a curious case of anæsthesia. A cork impregnated with chloroform was passed under the nose of a patient attacked with nervous paralysis; it caused his head to fall on the pillow, and apparently produced a sound and refreshing sleep. At different times the same simple means were employed, and with the same result. In the two last administrations of the chloroform it was necessary to pass the cork *twice* under the nose." A bird dies in an atmosphere containing 1,500,000th part of sulphuretted hydrogen gas. It has been affirmed that three centigrammes of the cyanuret of iodine administered to rabbits will cause instant death. In a memoir read before the Academy of Sciences in 1843, Mons. Bouchardat pointed out that a milligramme of mercury dissolved in twenty parts of water suffices to kill fish plunged into it, although the proportion of mercurial salt is so feeble—a 20,000,000th—that it escapes the most delicate chemical tests. Mons. Bondin once said that to deny the existence of those disease-breathing exhalations from marshy land because they were invisible, was like denying the existence of God because he is not visible to the bodily eyes. Speaking of mineral waters, Walchner said, "All these mineral waters, amongst which there are some whose efficacy has long been acknowledged, contain these substances in such very small quantities that their amount is only traceable in millionth degrees." Dr. Granier inquires, "What are our artificial processes compared with those of nature? What are our homœopathic doses compared with those of the miasmata?" Boerhaave says, "Medicines may preserve their virtue although divided into such minute parts that the imagination can no longer follow them. . . . Although these particles are no longer appreciable to our senses, they do not the less produce very marked effects on our organisation." These remarks, emanating from one not an homœopathist, are very suggestive. As Mons. Jourdan, a member of the Academy of Medicine, said :—"The time has gone by when jokes about infinitesimal doses were thought to be sufficiently good arguments against homœopathy. Here are indisputable facts which ought to impose silence on pure reasoners. These minimum doses do act, and even exercise a powerful and surprising influence; doubt is no longer admissible on this head." As in another part of this book we have given a series of general ideas on the nature and action of different medicines in ordinary use, we shall follow the same plan with reference to those used by the homœopathists. The medicines most frequently recommended are :—

Aconitum.	Hepar Sulphuris.
Arnica.	Ignatia.
Arsenicum.	Nux Vomica.
Belladonna.	Mercurius.
Bryonia.	Opium.
Calcaria Carbonica.	Pulsatilla.
Graphites.	Rhus.

ACONITUM acts powerfully upon the circulating system (see *Blood* and *Heart*), and its effects in cases of acute inflammatory affections and fevers are said to be very immediate.

ARNICA acts upon the absorbents (see page 2), promoting the absorption of effused blood and the reparation of tissues which have suffered mechanical injury.

ARSENICUM exercises very prolonged, deep, and searching effects upon nearly every organ and tissue of the body.

BELLADONNA acts upon the brain and its membranes, and upon the glandular system. The mucus of the throat is peculiarly susceptible to its influence.

BRYONIA acts upon the muscles, and especially upon the fibrous tissues of the joints. It is useful in rheumatic cases, and in coughs and catarrh.

CALCARIA CARBONICA resembles arsenicum in its prolonged and powerful action, but has a more definitely marked action upon the glandular system.

GRAPHITES has nearly the same character as the above.

HEPAR SULPHURIS acts upon the exhalants of the skin, and is therefore often used to promote perspiration. (See page 317.)

IGNATIA holds a middle place between nux vomica and pulsatilla.

MERCURIUS acts in a remarkable manner upon the mucous membranes, the glands, and the liver, and is often used in cases of indigestion. It also acts upon the skin, and favours in a degree the suppurative process.

NUX VOMICA exercises a very marked influence upon the nervous system, especially upon the spinal cord, and upon nerves associated with the organs of digestion. It is usually prescribed in cases of indigestion, and acts quickly where, from a want of nervous energy, the bowels are inactive.

OPIUM.—In certain lethargic conditions of the brain this medicine is found specially useful.

PULSATILLA.—This is very useful where the bowels are relaxed, and resembles nux vomica in its action upon the digestive organs and the nervous system.

RHUS resembles bryonia in its action upon the tendinous structures and cartilages of the joints. Used for sprains, strains, and rheumatic complaints.

To permit these remedies to have their full effect, general attention must be given to diet, and every other kind of domestic medicine must be carefully abstained from. In sickness the use of the following alimentary substances should be avoided:—Bread containing potash or soda, or fermenting powders; cakes containing much fat or butter, or spices; new bread and preparations of oatmeal, muffins, crumpets, &c. Veal, calf's-head, sucking-pig, fresh corned beef, salt or hung beef, ham, bacon, pork, salted and dried tongues, sausages, brains, liver, kidney, sweetbread, tripe, heart, and lungs should be avoided. So also should pigeons, ducks, geese, and similar food; curries of every description, hard-boiled eggs, and turtles. Shell-fish, salmon, mullet, mackerel, herrings, and fresh-water eels are to be avoided; and also smoked, salted, or pickled herrings, pilchards, anchovies, sardines, haddock, salted cod-fish and stock fish. All rich and highly-seasoned broths and soups, including pea-soup, will retard recovery, as will also partaking of all raw vegetables, and rich or heavy pastry, whether boiled, baked, or fried. Acid and unripe fruits are dangerous; avoid olives, and amongst nuts—walnuts, filberts, hazel-nuts, cob-nuts, hickory-nuts, cocoa-nuts, raw chestnuts, &c. Ardent spirits are bad, and fermented liquors generally should be avoided. Tea is forbidden, and all natural and artificial mineral waters—bitters, lemonade, rich sauces, garlic, catchup, pickles, garlic onions, pepper, spices, &c. Long as this list seems to be, the number of allowable aliments include a still longer list of almost every kind of food, providing only such are selected as are nutritious, easy of assimilation, and without any appreciable medicinal properties which might counteract or weaken those of the adopted remedies. In a very celebrated and deeply-interesting work called "Curiosities of Medical Experience," written by J. G. Millingen, M.D., M.A., who in 1839 was "surgeon to the Forces" and resident physician of the Hanwell Lunatic Asylum, and a member of the medical societies of Paris and Bordeaux, homœopathy receives very impartial consideration. While ridiculing its more extravagant pretensions, and showing the errors in some of its theoretical calculations and conclusions, the author says:—"It has been advanced by the opponents of homœopathy that the insignificant dose of three or four medicinal globules cannot possess any power, since one might swallow a thousand of them with impunity. To this it is answered, that it is only under certain morbid conditions that these medicines act by their homœopathic affinities. Moreover, it is well known that small doses of medicinal substances will frequently produce more powerful effects than larger quantities. Tartar emetic, sugar of lead, calomel, afford daily instances of this fact; and it is also admitted that many substances act differently upon the healthy and the sick. An individual in health can take any food without apprehension; but when his functions are deranged, the slightest imprudence in regimen may lead to serious consequences. There are primordial and inscrutable peculiarities in our constitution that cannot be accounted for; and the medicine which relieves one patient will aggravate the sufferings of others. The exhalations of the American *rhus* are deadly to some persons, but innocuous to others; and many poisons which cause instantaneous death to some animals may be given with safety to others. Whence has arisen the controversy regarding damp sheets, which many maintain are not dangerous, simply from the fact that a healthy person with a vigorous circulation may sleep in them with impunity, when a feeble and languid subject will be exposed to some dangerous determination of blood?" The same author gives the following interesting account of cures effected by homœopathy:—"The facts I am about to record—facts which induced me, from having been one of the warmest opponents of this system, to investigate carefully and dispassionately its practical points—will effectually contradict all these assertions regarding the inefficacy of the homœopathic doses, the influence of diet, or the agency of the mind; for in the following cases in no one instance could such influences be brought into action. They were (with scarcely any exception) experiments made without the patient's knowledge, and where no time was allowed for any particular regimen. They may, moreover, be conscientiously relied upon, since they were made with a view to prove the fallacy of the homœopathic practice. Their result, as may be perceived by the foregoing observations, by no means rendered me a convert to the absurdities of the doctrine, but fully convinced me by the most incontestable facts that the introduction of fractional doses will soon banish the farrago of nostrums that are now exhibited to the manifest prejudice both of the health and the purse of the sufferer.

"Case 1. A servant-maid received a blow of a stone upon the head. Severe headache, with dizziness and dimness of sight, followed. Various means were resorted to; but general blood-letting could alone relieve the distressing symptoms, local bleeding not having been found of any avail. The relief, however, was not of long duration, and the distressing accidents recurred periodically, when abstraction of blood became indispensable. Reduced by these frequent evacuations, I was resolved to try the boasted "bleeding globules" of the homœopathist, when, to my great surprise, I obtained the same mitigation of symptoms which the loss of from twelve to sixteen ounces of blood had previously accomplished. Since the first experiment no venesection became necessary, and the returns of the violent headache were invariably relieved by the same means.

"Case 2. An elderly woman was subject to excruciating headache, with an evident determination of blood to the brain. Numerous leeches were constantly applied. The usual remedies indicated in similar affections were resorted to, but only afforded temporary relief. A homœopathic dose of aconite was given, and the relief that followed was beyond all possible expectation.

"Case 3. My much-esteemed friend Dr. Grateloup of Bordeaux was subject to frequent sore-throats, which were only relieved by local blood-letting, cataplasms, &c., but generally lasted several days, during which deglutition became most difficult. I persuaded him to try a dose of the belladonna, neither of us having the slightest confidence in its expected effects. He took the globules at twelve o'clock, and at five P.M. the tumefaction of the tonsils, with their redness and sensibility, had subsided to such an extent that he was able to partake of some food at dinner. The following morning all the symptoms, excepting a slight swelling, had subsided. Since this period Dr. G. has repeatedly tried the same preparation in similar cases, and with equal success. In my own practice, I can record seven cases of cynanche tonsillaris which were thus relieved in the course of a few hours.

"Case 4. H——, a young woman on the establishment of the Countess of ——, was suffering under hemiplegia, and it was resolved by Dr. Brulatour and myself to try the effect of nux vomica. At this period the wonders of the homœopathic practice had been extolled to the skies by its advocates, and we were resolved to give one of their supposed powerful preparations a fair trial. The girl was told that the powder she was about to take was simply a dose of calomel; and on calling upon her the following morning we did not expect that the slightest effect could have been obtained by this atomic dose, when, to our utter surprise, the patient told us that she had passed a miserable night, and described to us most minutely all the symptoms that usually follow the exhibition of a large dose of strychnine. It is but fair to mention that the homœopathic treatment did not cure the disease; but the manifest operation of this fractional dose, that could not possibly be denied, is a fact of considerable importance.

"Case 5. Mrs. —— of Bromley, Bow, had laboured under hectic fever for several months, and was so reduced by night perspirations, that she was on the very brink of the grave. Called into consultation, I frankly told her husband that every possible means known in the profession had been most judiciously employed, and that I saw no prospect of obtaining relief. At the same time I mentioned to him that the homœopathic practitioners pretended that they had found the means of relieving these distressing symptoms, which he might submit to an experimental trial if he thought proper. He immediately expressed his wish that it should be adopted. I gave her a homœopathic dose of phosphoric acid and stannum; and, to the surprise of all around her, the night sweats did not break out at their usual hour—three o'clock in the morning. What renders this case still more interesting is the fact of these perspirations recurring so soon as the action of the medicine ceased; a circumstance so evidently ascertained, that the patient knew the very day when another dose became necessary.

"Case 6. A daughter of the same lady was subject to deafness, which I attributed to a fulness of blood. This cause I clearly ascertained by the relief afforded by the application of a few leeches behind the ear. I was therefore induced, on a recurrence of the complaint, to endeavour to diminish vascular action by a dose of aconite. The effects were evident in the course of four hours, when the deafness and the other symptoms of local congestion had entirely disappeared. I could record numerous instances of similar results, but they would of course be foreign to the nature of this work. I trust that the few cases I have related will afford a convincing proof of the injustice, if not the unjustifiable obstinacy, of those practitioners who, refusing to submit the homœopathic practice to a fair trial, condemn it without investigation. That this practice will be adopted by quacks and needy adventurers, there is no doubt; but homœopathy is a science on which numerous voluminous works have been written by enlightened practitioners, whose situation in life placed them far above the necessities of speculation. Their publications are not sealed volumes, and any medical man can also obtain the preparations they recommend. It is possible, nay, more than probable, that physicians cannot find time to commence a new course of studies, for such this investigation must prove. If this is the case, let them frankly avow their utter ignorance of the doctrine, and not denounce a practice of which they do not possess the slightest knowledge. Despite the persecution that *Hahnemannism* (as this doctrine is ironically denominated) is at present enduring, every reflecting and unprejudiced person must feel convinced that, although its wild and untenable theories may not overthrow the established systems (if any one system can be called established), yet its study and application bid fair to operate an important revolution in medicine. The introduction of infinitely small doses, when compared, at least, with the quantities formerly prescribed, is gradually creeping in. The history of medicine affords abundant proofs of the acrimony, nay, the fury, with which every new doctrine has been impugned and insulted. The same annals will also show that this spirit of intolerance has always been in the *ratio* of the truths that these doctrines tended to bring into light. From the preceding observations, no one can accuse me of having become a blind bigot of homœopathy; but I can only hope that its present vituperators will follow my example, and examine the matter calmly and dispassionately, before they proceed to pass a judgment that their vanity may lead them to consider a final sentence."

Honey.—Honey consists of sugar, mucilage, and an acid. It is useful for dissolving viscid juices and promoting expectoration, and it is excellent food, but its medicinal value has been greatly exaggerated.

Honeycomb, to Make a Lemon. — Take the juice of one lemon, sweeten it with fine sugar. Take a pint of cream, and the white of an egg; add sugar, and beat it well, and as the froth rises, take it off, and put it on the juice of the lemon, till you have taken all the cream off upon the lemon. Make it the day before you require it in the dish it is to remain in.

Hop Tea.—The hops are put into an ordinary tea-pot in the proportion of one ounce of hops to the pint of boiling water. It is to be bottled and taken when cold, and is usually recommended for indigestion. Two ounces of hops in a quarter of a pint of boiling water is said to be an excellent tonic.

Horseradish Sauce. — A dessert-spoonful of olive oil or cream, a dessert-spoonful of mustard (powder), a table-spoonful of vinegar, a stick of grated horse-radish; salt, mix well together, and serve in a sauce-boat.

Hortus Siccus, or Dry Garden, To Prepare.—First procure a strong oak box, of the same size and shape as those employed for packing up tin plates; then a sufficient quantity of finely sifted sand to fill the box; several pieces of pliant paper, from one to four inches square; some small flat leaden weights, and a few small bound books. The plant is first to be cleared from the soil and decayed leaves, and then laid on the inside of one of the leaves of a sheet of common cap-paper. The upper leaves and flowers are next to be covered, when expanded, by pieces of the prepared paper, and one or two of the leaden weights placed on them. The remainder of the plant is then to be treated in a similar manner. The weights ought now to be gently removed, and the other half of the sheet of paper folded over the opposite one, so as to contain the loose pieces of paper and plants between them. A book or two is now to be applied to the outside of the paper, till the intended number of plants is thus prepared, when a box is to be filled with sand to the depth of an inch, one of the plants put in, and covered with sand sufficient to prevent the form of the plant from varying. The other plants may be placed in succession, and likewise covered with a layer of sand one inch thick between each of them; after which the whole is to be gently pressed down in a greater or less degree, according to the tenderness or firmness of the plants. The box is to be carefully placed before the fire, one side being occasionally raised, as may be most convenient, the sides being alternately presented to the fire two or three times a day, or the whole may be put into an oven gently heated. In the course of two or three days the plants will be perfectly dry, when the sand ought to be taken out and put into another box; the plants should likewise be removed to sheets of writing-paper.

House-buying. — "House-buyers," says a newspaper correspondent, "should be very careful ere they part with solid sterling gold for new-built airy fabrics, which scarce resist a gale of wind, structures which often fall down before completion, but are saddled with lawyers' long leases, strict repairing covenants, and heavy ground-rents. Since the pulling down of so many City, Westminster, Borough, Somers Town, Clerkenwell, Holborn, Shoreditch, and other ancient buildings for railway and street improvements, these rotten old materials have been freely used in the suburbs; but are so cleverly concealed by the aid of new-facing bricks, new thin floor-boards, plaster, paint, and showy paper-hangings, as oftentimes to dupe the unwary and incautious purchaser, who, alas! very soon discovers that cracked window arches, brittle window glass, sinking foundations, stopped drains, leaky roofs, shrunk wood-work, shaky floors, fallen rotten plaster, rising damps, smoky chimneys, vermin, and other minor evils, sadly try his patience and purse; in short, that in the long run it would be a saving at once to pull down and rebuild properly the vile erection than to be at a continual expense for unsatisfactory costly repairs. I for many years past have been almost daily amidst speculative building estates, N., S., E., W., and well know the operations of needy builders, who run up dwellings, the carcases of which are composed of abominable materials, a sight of which, combined with the slight, rapid, scamping, and unskilful workmanship, would convince any one they were meant only 'to let and not to last,' that they were merely contract-built edifices by 'slop builders,' certainly not sturdy houses such as our ancestors were so justly proud of, for their weather-tight and durable qualities. As dilapidations are incessant, and no landlord can accept low rents for 'sale houses,' I entreat both tenants and owners to ascertain with vigilant care and strict inquiry:—1st. That the house is not built on made soil, where the gravel has been dug out and sold. 2nd. That it has deep concrete foundations. 3rd. That all the materials are new, and the bricks sound, hard-burnt stocks, well bonded in lime (not mud) mortar. 4th. That no iron chimney-bars supporting the arch are absent, and that the chimney-flues are pargeted. 5th. That the drainage is distinct and separate, properly connected with the main sewer. 6th. The strength of joists, quarterings, lintels, rafters, purlins, sills, sill-heads, thickness of doors, floor-boards, shutters, skirtings, shelving, panelling—in short quality and quantity of timber used. It is frightful to view how slight houses are timbered and scantily nailed. 7th. Whether the locks, grates, ironmongery, blinds, closet, cistern, and other fittings are of the cheapest sort, unfit for wear. See that the cistern is not exposed to frost. 8th. That it has a trap-door fire-escape to roof. 9th. Avoid zinc gutters, cisterns, flats, &c., as zinc is a very temporary affair. Insist upon lead or stone cisterns, sinks, &c. 10th. If the parish has not taken the road, have money security for its cost from seller; it may save you £10 to £30, or even more. 11th. Find out if it is an estate where any scamping is allowed, to create heavy ground-rents and lawyers' leases. 12th. Investigate the title thoroughly. Beware of needy bankrupt or litigious vendors, and improved ground-rents. Lastly. Insist upon a warranty (legally drawn up), subject to penalties if false. Have the warranty before paying deposit or purchase-money. Think well over leasehold covenants. In conclusion, let me declare my picture of modern houses might have been presented in much worse colours, as every district surveyor or workman can easily certify, and no doubt many will do so in reply to this brief epistle on a sad fraud of the day, viz., the erection of houses 'built to sell,' 'to let and not to last' dwellings." We derive some further hints on this important subject from a lecture delivered by Mr. A. Norman Tate, at Liverpool, who laid down several principles which he considered ought to be observed by persons building houses, and while speaking of the materials to be used, remarked that a great many of the bricks made in Liverpool and its vicinity were very like half-baked sponge-cakes. Their highly porous nature caused them to suck inwards a vast amount of moisture, and he could not help thinking that such capillary attraction must materially affect the health of the inmates of the houses. With respect to the coverings of walls, he was of opinion that when painted they were decidedly more healthy than when papered. It was a well-known fact that a vast supply of poison was continually being conveyed into dwellings by means of drains, and that the death-rate was materially increased thereby. In the general construction and arrangement of dwellings they might learn a great many lessons from what, in their self-satisfied way, they called "the lower orders." Whatever might be done by public bodies to promote health among the people, such efforts would be of little avail unless there was also individual effort on the part of householders themselves to ensure decency and cleanliness in every way in their homes. In selecting the locality for a house, attention should be given to the nature of the soil and subsoil. A foundation of gravel absorbs the moisture and is warm. In selecting the aspect, remember that a south-west aspect is drier and warmer than one which has a northerly or north-easterly aspect. Great care should be given to the water-supply. Ascertain the source from which it is obtained, its nature, and the character of the supply. It is important to note that the doors and windows of the house are so arranged as to admit of perfect ventilation. Look also to the chimneys (see *Chimneys*) and the grates, bearing in mind the hints we have supplied in our remarks on *Combustion* and *Heat*.

Houses, Buying.—If you wish to purchase a house, the best mode of proceeding is to apply to respectable house-agents for their lists of properties for sale. Always, however, consult a reliable surveyor before concluding a purchase.

Houses, Newly Built.—Disastrous consequences have been the result of families taking up their abode in newly-built houses which have not had time enough to become thoroughly dry and set.

Hung Meats.—Meats should be always hung long enough to grow tender, or they will be tough and hard. If hung too long, they become dry and lose their juicy flavour. Meat should be hung where the air is clear and cool, but not in a strong current of air, for this would soon render it too dry.

Hyacinth and Narcissus Roots.—These grow better in dark glasses, as the spongioles or finest fibres of all roots perish at certain seasons, when the main root becomes dormant, until the stimulus of moisture and warmth combined again cause them to throw out new fibres. In the dark they have the power of decomposing the moisture into its elements of hydrogen and oxygen, but when exposed to light this abstracts from them the oxygen, which in the first stage of the germination of seeds, as well as in the re-growth of bulbous roots, is necessary for their well-being. When leaves are put forth these organs assist by their action what at first the roots alone had to furnish.

Hydrogen Gas, as its name imports, is a constituent part of water, of which oxygen is the other ingredient. It is from the decomposition of water that we obtain hydrogen gas, and this is done in a variety of ways. We shall describe only two, the first of which is the most easily accomplished, and the latter is most economical, which is of consequence when a large supply of this gas is required. The first mode only requires you to pour sulphuric acid, or oil of vitriol, previously diluted with five or six times its weight of water, upon iron filings or small iron nails, in a phial or glass retort with a recurved tube. An effervescence will ensue, and the escaping gas may be collected in a jar under water. To obtain this gas in a large way, procure a gun-barrel, the breech of which has been removed so as to form a tube open at each end. Fill this with iron wire curled up in a spiral form. To one end of the barrel adapt a small glass retort, partly filled with water, and to the other a bent glass tube, the open end of which terminates in the receiving vessel. Let the barrel be placed horizontally (or rather with that end to which the retort is fixed a little elevated) in a furnace having two openings in its body opposite each other. Light a fire in the furnace, and when the gun-barrel has become red-hot apply a lamp under the retort. The steam of the water will pass over the red-hot iron, and will be decomposed. Its oxygen will unite with the iron, and its hydrogen will be obtained in the form of a gas. This gas burns with a silent lambent flame when in contact with common air, hence its name of inflammable air. When previously mixed with common air an explosion takes place on the approach of a lighted match or candle. This gas of itself, however, extinguishes a burning body; thus, if a jar containing inflammable air is brought in an inverted state over the flame of a candle and depressed, it immediately extinguishes it. Its other properties are, that animals confined in it soon die, though plants live and thrive in it, and that it is considerably lighter than common air. Knowing it to possess these properties, we shall be able to explain many very curious facts. The amusing experiment proving the lightness of this gas may be performed by forming soap-bubbles with it instead of common air. For this purpose fill a bladder with gas. If the bladder is furnished with a stopcock it will be more convenient, and then adapt it to a common tobacco pipe. Dip the bowl of the pipe into a lather of soap, and by pressing the bladder blow it up into bubbles. These bubbles, from their extreme levity, rise very rapidly. We have explained how hydrogen and oxygen form water, and in the experiments detailed above for procuring hydrogen gas we have proved it analytically above, for whilst this gas comes *over*, the other constituent, oxygen, is united to the metal that is employed. We have also synthetical proofs of this composition of water, one or two of which we shall recite; and these, we trust, will suffice. When a mixture of pure hydrogen and oxygen gases is made to explode, there is always a formation of water; but in a single experiment it is too minute to be completely satisfactory, although a dew may generally be observed to be deposited on the sides of a vessel on which the experiment is performed. By the slow but continued inflammation of hydrogen gas in common air a sufficient quantity of water may be formed to satisfy any one with respect to its composition. This may be done in the following manner:—Fill a bladder furnished with a stopcock and pipe with hydrogen gas. Procure a glass globe having two openings opposite to each other; then set fire to the stream of hydrogen gas passing from the tube, and introduce it into the centre of the globe. The combustion may be continued, if required, till all the inflammable air is burnt, and drops of water will be observed running down the inside of the globe.

Hygrometer, Cheap.—A very ingenious apparatus of this kind may be made to consist of a short piece of cord or catgut, from four to ten inches, suspended by a hook over a horizontal board. To the lower end of the cord is fixed a horizontal index, having a circular graduated scale on the board. As the cord attracts moisture, or the contrary, it untwists or uptwists, and thereby turns the index. On this principle the Dutch toys called weather-houses are made; one end of the index supports a man, and the other a woman. The former appears or is brought out in wet weather, and the latter in fair weather.

Ice for a Large Cake.—Take the whites of twenty-four eggs and a pound of double refined sugar; mix together in a delf pan, and with a whisk beat it for two or three hours together till it looks white and thick; then with a thin broad board or a bunch of feathers spread it all over the top and sides of the cake. Set it at a proper distance from a good clear fire, and keep turning it continually for fear of its changing colour, but a cool oven is best, and an hour will harden it. You may flavour the iceing if you think it desirable.

Ice, Preservation and Cutting of.—Small quantities of ice may be preserved in a flannel jelly-bag hung up in a cool place so that the water may drain off. It may be cut into small pieces by tapping it with the sharp metal point of a hammer.

Ices.—These should not be taken in hot weather after violent exercise, such as dancing, for then they are very dangerous. At all times they should be eaten sparingly; and the feeble and delicate will do well to avoid them altogether.

Incombustible Fabrics.—To render fabrics incombustible, dissolve borax in hot water, soak the clothing in the liquid, and afterwards let it dry. It will now be impossible to inflame it, although it will burn away with a slow combustion. Alum has been recommended for the same purpose, but it is more injurious to the clothing. The carbonate of potash may also be used, but this is apt to contract moisture from the air, and thus render the clothes damp. (See also *Clothing*, page 120.)

Indian Flappers.—Pour boiling water over one quart of Indian meal, using enough water to moisten the meal well; when cool, add the yolks of four eggs, salt to taste, add a small quantity of flour, thin to the proper consistency with milk, and add the beaten whites.

Indian Ink, Substitute for.—Boil in water some parchment or pieces of fine gloves until they are reduced to a paste. Apply to its surface while still warm a porcelain dish which has been held over a smoking lamp; the lamp-black which adheres to it will become detached, and mingle with the paste or glue. Repeat the operation until the composition has acquired the requisite colour. It is not necessary to grind it. It flows as freely from the pencil as Indian ink, and has the same transparency.

India Pickle.—Take a gallon of vinegar, one pound of garlic, and three quarters of a pound of whole pepper, a pint of mustard-seed, one pound of ginger, and two ounces of turmeric. The garlic must be laid in soak three days, then wiped clean and dried in the sun; the pepper broken up, and the mustard well bruised. Mix all together in the vinegar; then take two hard cabbages and two cauliflowers, cut them in quarters, and salt them well; let them lie three days, and dry in the sun. The ginger must lie twenty-four hours in salt and water before being used.

India-rubber Floor Covering.—"Having some india-rubber varnish left, which was prepared for another purpose, the thought occurred to the writer of trying it as a covering for a 'carpet' made in the following way:—A piece of canvas was stretched and covered with a thin coat of glue (corn-meal size will probably answer best); over this was laid a sheet or two of common brown paper or newspaper, and another coat of glue added, over which was laid some wall-papering of a suitable pattern. After the body of the carpet was thus prepared, a very thin touch of glue was carried over the face of the paper to prevent the india-rubber varnish from tarnishing the beautiful colours of the paper. After this was dried, one or two coats (as may be desired) of india-rubber varnish were applied, which, when dried, formed a surface as smooth as polished glass, through which the variegated colours of the paper appeared with undiminished, if not with increased, lustre. This floor-covering is durable, and impenetrable to water or grease of any description. When soiled it may be washed like a smooth piece of marble or wood. If gold or silver leaf forms the last coat instead of papering, and the varnish is then applied, nothing can exceed the splendid richness of the effect," although it must be confessed that it is somewhat suggestive of the theatre.

Indigestion.—Indigestion is a theme on which we have no lack of literature. Volumes have been and probably will be written on it, but none the less is indigestion the least understood of all the complaints to which flesh is heir. The importance and the wide-spread, curiously varied nature of the disease have secured for it the studious attention of medical men at all times; but to this day opinions of the most contradictory kind continue to be held regarding both its nature and the treatment which it should receive. The earliest symptoms of indigestion are the unpleasant sensations arising from the presence of undigested food, such as flatulence, distension of the stomach and bowels, or acid, oily, and putrescent eructations. The stomach and bowels growing debilitated and their nerves irritable, other and more numerous symptoms arise. The secretion of healthy gastric fluid is prevented, the bowels no longer act regularly, the mouth is clammy, and the tongue more or less white, especially in the morning, and thirst begins to be more frequently felt. These symptoms continue, and feelings of languor and weakness arise. The mind begins to feel a loss of energy, and there is a difficulty in concentrating the attention upon one subject for any length of time. Feelings of despondency now succeed, the patient grows anxious and depressed; in short, every function of his symptom is more or less affected. The next change marks a very important step in the progress of the malady. The intestinal excretion begins to deviate from its healthy condition, and becomes mixed with uncombined bile, or consists chiefly of bile. In colour it is either too light or too dark (long delay in the bowels will alone render it dark). Occasionally it is almost black; sometimes it inclines to green and sometimes to blue, and undigested food sometimes appears in it. It often separates from the canal with unusual difficulty, and leaves an uncomfortable feeling of the bowels not having been completely emptied. The urine, which in health is perfectly transparent, has a red or white deposit, or is covered with a very thin oily film. Up to this stage indigestion has only taken the form of what is called a stomach complaint, from which it passes into stages of disease called bilious and nervous, from which arise a variety of complicated symptoms, into which we do not think it desirable to enter. For the simplest and best remedies to be adopted see *Diet*, *Meals*, and *Digestion*, which we recommend to be carefully studied.

CAUSES OF INDIGESTION.—Intemperance is a fruitful cause of indigestion. The unnatural stimulus causes the liver to secrete an excess of bile (see *Digestion*), which by a revulsive action enters the stomach, and by its acrimony irritates the lining membrane, causing sickness and nausea, and otherwise impairing the digestive functions. Impure air will create indigestion. Smoking to excess is another cause, the peculiar medicinal properties of the tobacco being injurious, and the loss of saliva consequent upon spitting depriving the food of an element by which it is prepared for digestion. Climate, temperature, and the state of the weather also have their influences upon the process of digestion. Indeed, the stomachs of some persons may be regarded as a kind of combined barometer and thermometer. During hot weather they find it difficult to digest their food, and as the cold increases they find this difficulty disappear. A dull, gloomy atmosphere often has its effect in oppressing the stomach, and impairing digestion. Imprudence and irregularity in diet is, however, the most common and fruitful cause of this disease. (See *Meals* and *Diet.*) The injudicious and too frequent use of medicine of a drastic, purgative kind, such as the anti-bilious pill or severely purgative medicines, is another cause which is by no means uncommon, and the use of narcotics, opium, or laudanum rapidly disturbs the natural energy of the stomach. Other causes are the want of pure air and proper exercise, the neglecting of bathing and washing, the excessive use of strong peppers or iced fluids, violent and repeated vomiting and eating too fast. When we eat slowly a proper time is given for those combinations to take place which we have fully described under the head *Digestion*, and consequently the appetite abates before the stomach is overcharged. Every one has observed that occasionally after he has eaten perhaps not more than a third of his usual quantity of food, and has been interrupted for perhaps ten minutes, on his return to the table his desire for more food has completely gone, and the stomach appears to be wholly satisfied, the gastric fluid having by that time combined with and neutralised the food previously taken. For the same reason we hear people decline to take a few mouthfuls before dinner, because, as they say, it would spoil their appetite. This is especially the case in delicate people, with whom the gastric fluid is secreted in small quantity, or is of a less vigorous character. Food too highly seasoned or too slightly seasoned (see *Diet*), or in too great a variety, is often the direct or indirect cause of indigestion, either in consequence of our being tempted to take food in excess, or by the stimulus of the seasoning calling forth a greater supply of gastric fluid than the food taken demands. Wine taken before dinner is for this reason to be avoided by those who suffer from indigestion. Other causes arise from the following:—From the selection of food which swells in the stomach too greatly, from the mind being so strongly affected by grief, violent passions, or anxiety, that the gastric fluid secreted is not of a healthy character, and therefore both fails to apply a due stimulus, and tends to vitiate the fluid already secreted. Indigestion also sometimes arises from constipation, from variable weather, from mechanical pressure either of the stomach itself or other parts of the alimentary canal, from tumours, from worms in the intestines, or from extraneous bodies in any part of the canal. For the relative characteristics of food in relation to digestion, see *Diet* and *Digestion*.

Inflammable Air, or Carburetted Hydrogen Gas, is frequently extricated in mines, probably from the decomposition of bituminous or coaly substances. This is called fire-damp by the miners, and is to them a source of great danger as well as inconvenience; for, by becoming mixed with common air, it is subject to sudden and violent explosions whenever a lighted candle or other ignited body is accidentally brought into contact with it. In stagnant muddy pools, where the putrefactive process is constantly going on, both of animal and vegetable matter, there is a considerable disengagement of inflammable air, which is seen rising to the top in bubbles. It is easily collected by inverting a wide-mouthed bottle or jar filled with water in one of these stagnant pools where the bubbles are observed, and then stirring up the mud from the bottom with a stick. This agitation causes a more rapid disengagement of the gas. The gas thus obtained is found to contain a considerable portion of another gas—viz., the carbonic acid gas, or fixed air. The evolution of these gases from such marshy situations is in consequence of the decomposition of water by the putrefying animal and vegetable matter. The oxygen of the water, uniting with the carbon of the putrefying mass, forms the fixed air, whilst the hydrogen of the water escapes in the form of hydrogen gas. It must be remembered that the bubbles of air seen to arise from streams and clear water in which the green conferva and other vegetables grow, as the duck-weed (*lemna*), or chickweed (*alsine*, or *stellaria media*), is pure air, or oxygen gas, and not this inflammable air, or *fire-damp*. (See also *Choke-damp*.)

Ink, a Good.—A very good ink may be made by the following proportion of ingredients:—Nut-galls, one pound; gum arabic, six ounces; green copperas, ditto; water, four pints. The galls are to be bruised and allowed to stand in the water (being now and then shaken) for four hours. The gum is next to be added, and when this is disolved, the copperas. The liquor immediately becomes black in consequence of the precipitation of the iron, and the use of the gum is to suspend the black powder, which would otherwise fall to the bottom. Two grains of the bichloride of mercury (corrosive sublimate) should now be added to prevent the ink becoming mouldy when kept. The use of this substance is, however, found to be injurious to steel pens by corroding them. To avoid this, creasote (in the proportion of about two drops to each pint of ink) may be employed instead. The creasote also tends to render the ink more fluid, and better suited for fast writing, but it gives the ink an unpleasant tar-like smell.

Ink, to Imitate Indian or China.—Take six parts of isinglass, which are to be dissolved in double their weight of boiling water; in like manner dissolve in two parts of water one part of Spanish liquorice. Mix the two liquors warm, and gradually incorporate with them, by means of a wooden spatula; one part of the best ivory black. When this mixture is properly made, it is heated in a water-bath, that the whole of the water may be evaporated. The requisite form is then given to the paste which remains. The colour and goodness of this ink are equal to those of the true China ink. (See also page 237.)

Insects.—Remedies for Bites or Stings of Insects.—If stung on your hand or foot plunge it immediately into cold water, or, better still, cold salt and water, and hold it there until some other remedy is prepared. A sting in any place will be much relieved by plastering on it immediately some clay or earth mixed with a little water to the consistence of thick mud. Powdered chalk moistened with water is good. A paste of salt moistened with vinegar is excellent. A slice of raw onion is said to allay the pain from the sting of a wasp or bee; or you may apply the blue-bag used in washing to the part affected. It is also very good to bathe the wound with laudanum or with hartshorn, or with spirits of camphor, or with sweet oil. The pipe or hollow of a key or pipe pressed hard upon the wound will allay the pain of a sting. Another plan is to hold the part that is stung in moderately strong soda and water. The application of a little lemon or lime juice to the parts affected will generally allay the terrible itching and irritation of such bites. Sometimes a wasp or a bee is swallowed, and you may immediately kill the insect by swallowing a tea-spoonful of common salt dissolved in water. This will also prevent the sting from inflaming your throat. The pain caused by the sting of a bee may be much allayed by rubbing the part with balm, rosemary, mint, or sage leaves. All the above applications should be repeated till the intensity of the pain subsides. If the sting shows a disposition to inflame, keep the place constantly wet with rag soaked in a solution of Prussian blue and soft water. A poultice of cold lead lotion and bread-crumbs is also a very soothing remedy. If there is any danger of the sting becoming a sore (which is sometimes the case if the blood is in a bad state, or if the stings are numerous), take a dose of salts and refrain from animal food.

Insects, Best means for Destroying.—White Blight.—The insects known by this name, or that of the American Blight, are often very mischievous in the apple-trees. A strong decoction of foxglove, mixed with fresh cow-dung to give it consistency, is said to be the best remedy. It is applied with a brush to the bark, and it has been remarked that a tree thus treated never again suffers from the ravages of the White Blight.

Ants. — Quicklime and boiling water will destroy ants. When these remedies might endanger the safety of plants, camphor or tobacco-water will serve to poison them with. A ring of tar round the trunk of a tree will prevent them from climbing up it. A saucer of sweet oil sunk in the earth is an excellent trap for these insects.

Expelling Insects generally.—All insects dislike penny-royal. The odour of it destroys some, and drives away others. At seasons when fresh, green bunches of penny-royal are not to be obtained, get oil of penny-royal; pour some into a saucer, and steep in it small pieces of wadding. Lay them about in corners, closet shelves, bureau drawers, and all places where you have seen beetles, cockroaches, ants, &c. If the insects do not speedily disappear, renew the wadding and penny-royal. Bunches of penny-royal, or wadding, steeped as above directed, are good remedies for fleas and bugs if pieces or sprigs are strewn between the beds and mattresses. The shavings and saw-dust from cedar-wood will also answer the same purpose. They may be purchased at a cheap rate from the makers of cedar lead pencils. The cuttings of Russia leather are also said to act in a similar manner. A few drops of creasote applied to the inside of the drawer will likewise soon cause them to disappear. Camphor answers the same purpose.

Insects, to Free Gooseberry and Currant Bushes from.—In the beginning of November clear all the weeds from them, and give the ground a good coat of dung close to the stems of the bushes; then dig a trench one spade deep right down the middle of the rows, throwing the earth on each side over the dung, so that it may be covered one or two inches thick. In the end of March or beginning of April fork up the whole with a dung-fork, filling up the trench and making the whole level, but do not rake it at this time. Be particular in laying on the dung as above, and in forking up the whole in spring. The time for forking up is just when the buds have fairly opened. The fruit is wonderfully improved by this treatment, and the caterpillar effectually prevented. The spade should never be applied about the roots of gooseberry or currant bushes, there being nothing more injurious to them. Further hints on the subject of killing insects will be found under the head of *Garden, Hints for*.

Insects, How to Collect and Study.—One can scarcely walk a mile in the country without obtaining some object to grace his cabinet, or observing some fact in natural history to add to his storehouse of mental treasures. It should be borne in mind by the student collector that, notwithstanding he may propose to confine his studies to one order of insects, he should also contract a constant habit of observing and collecting those of other orders, as well as such small and portable vertebrates and invertebrates as his opportunities may enable him to capture and preserve. Alcoholic specimens of mammals, birds, fishes, reptiles, mollusks, crustacea, and facts concerning them are marketable commodities in the exchanges of science. Especially should this plan be carried out by the collector who may be established for a term of months or years in a region remote from libraries and museums. Such study and investigation in this field as his time permits will of itself materially enlighten his mind upon the secrets of Nature; and although destitute of books—those records of repeated failures and few successful attempts to unmask Nature's protean face—he may learn the structure, habits, and comparative intelligence of the creatures around him. A subsequent opportunity may occur for him to ascertain, if so disposed, the different technical names imposed upon "Mouse, No. 7," "Bird and Nest, XII.," or "Bug, No. 427," and accepted by the scientific world. Should he care only to acquaint himself with the nomenclature of some limited group or order, and wish to increase his cabinet in that speciality, he will find that he has the powers of a capitalist to invest his miscellaneous collection of specimens and facts in such manner as he may prefer. Thanks to the diversity of tastes implanted in us, there is always some eager specialist—individual or backed by an association—standing ready to give value for, and "work up," this or that portion of such material. The practice of noting (with *ink* if possible) in a small blank book, or on cards, such facts and observations as he may make or discover, adds immensely to the value of any collection, and cannot be too strongly recommended to the collector. The date of capture of a specimen, of the transformation from the egg, larva, or pupa, of the appearance or disappearance from its usual haunts, and such other items of interest that arise in connection with the specimen, are of importance to the student, and should be therein set down. A small tag or ticket of paper attached to the dry specimen, or of parchment, leather, or soft metal to the alcoholic, and bearing a number corresponding to that in the note-book, renders the information thus obtained available, and sufficiently identifies the specimen. As the collector pursues his investigations month after month, he will find his senses becoming educated to a delicacy of touch and fineness of perception that cannot fail to be a source of pride and gratification to him. He whose attention would not at first be diverted to the ragged leaves of a caterpillar-ridden tree will, in a few months, notice instantly the slight convexity of outline on twig or leaf caused by the presence of a small insect, or the extremity of a branch cleanly cut by a pruner-beetle. In the course of his observations he will be amused by the imitative shapes and colours of many forms of insect life, and will frequently be deceived by the curculios, who successfully simulate buds and bits of bark. The caterpillars of some of the moths resemble so closely cylindrical twigs, as many of the loopers (*Geometridæ*); scales of rough or smooth bark, as the hag-moth (*Limacodes pithecium*) and the lappet-moths (*Gastropacha veleda* and *Americana*). Some of the beetles, as the *Crytocephali* and *Histers*, closely resemble seeds, as do certain bugs, among them *Coleoptera*, and the two latter suggest such kinship as to cause them almost invariably to fraternise in the cabinet of the amateur. These singular resemblances are called mimetic forms; and, existing everywhere in nature, even if they have no higher significance and serve no better purpose, educate our perceptive powers to a degree undreamed of by the careless horde of money-worshippers. During the active season of the insect year the collector should make it a rule never to stir abroad without a cork-stopped phial half filled with alcohol, for the temporary deposit of beetles, ants, or the larvæ or pupæ of any insecst that it may be desirable to preserve in this way. The only insects that are irrecoverably injured by a few days' immersion in pure alcohol are the butterflies and moths. For these a small cork or pith-lined pocket-box, of convenient form, and fully an inch and a half in depth, containing a few insect-pins of various sizes, is indispensable, and should be a constant companion. Upon a premeditated excursion of a day or more in duration, the collector will naturally provide more extensive means of transportation, such as jars of alcohol, a phial of chloroform, a number of old envelopes, a large box slung over the shoulder with straps, and a stock of pins. Some collectors always carry in a pocket made for the purpose a wide-mouthed phial like a chemist's test-tube, "of the same size all the way up," containing at the bottom a few grains of cyanide of potassium, which is kept in place by a wad of cotton, felt, or thick cloth, neatly pressed down upon it. This prevents the cyanide, which is a deadly poison, from touching or soiling any delicate insect, and allows the powerful vapour to destroy, as it does almost instantly, the life of any insect that may be enclosed in the prepared phial. The permanence of this poison (its virtue enduring for a twelvemonth or more), its cleanliness, and cheapness render it perhaps the most convenient and desirable "life-annihilator." It is, perhaps, unnecessary to mention that the phial should be kept tightly corked, and that the insect should remain therein not much more or less than ten minutes. A phial one inch in diameter and four inches in length, made of strong glass, is the most desirable size. Some collectors carry a small phial of chloroform, through the cork of which passes a very small tube of metal; what is called by jewellers "hollow wire," of minute aperture, is used for this purpose. This instrument is employed for conveying a limited quantity of chloroform to the spiracles of the insect, without deluging and damaging much of its plumage, if furnished therewith. Ether, as well as chloroform, is sometimes used in lieu of the cyanide, but it has to be continually supplied from another reservoir. In some countries bruised laurel-leaves are placed in the bottom of the phial, or a small packet of them pinned in a corner of the collecting-box, enclosed in a little bag or wisp of loosely-woven cloth, such as lace, book-muslin, &c. All of these poisons act at first only as anæsthetics, or stupifiers, and should be continued in use sufficiently long to destroy vitality, or to prevent the struggles of the insect; for by these struggles it injures itself as well as its companions after being pinned in the collecting-box.

INSECTS, KILLING THEM WITH TOBACCO.—In destroying insects upon plants with the fumes of tobacco little good will, as a rule, be done unless the fumigation is followed by a good washing. The tobacco stupifies the insect, and it can then be washed away, but if allowed to recover its hold it is as pertinacious as ever. (See also *Tobacco Paper*.)

WIREWORMS AND GREEN APHIDES, HOW TO DESTROY.—Two pounds of tobacco paper, one gallon of boiling water. Pour the water on the paper, and let it stand until cold in some close-covered vessel, then strain the liquid through a coarse cloth. Make it two or three days before you want to use it, and to one gallon of the mixture add three of ordinary soapsuds. A correspondent of *Land and Water* informs us that he tried a little on one of the trees first, so as to make sure it would kill the aphides without injury to the trees; and next afternoon, finding it all right, he began to wage war. "It is very requisite to select a fine afternoon—rain would wash away the mixture from the leaves and stems of the trees that are syringed. Now, although my experience with this application was in respect to the extermination of the pest after they had begun to ravage, others tell me that they have used it as a preventive effectually. The aphides generally put in an appearance so close upon the development of the flowers, that one runs great risks of injuring the latter; then, again, the little embryo fruit are so tender, just as they are bursting their vegetable shell, that a strong syringing of this kind would be likely to hurt them; so the best time to apply it is between the casting of the decaying blossoms and the bursting of the calyx for the unfolding of the fruit-germ; and when done it should be well done—no half syringing will do. A gentleman I know in Surrey, who has a magnificent peach wall, always uses this wash to his peach-trees; but one of his men who had had considerable experience in the south of England, said he had invariably applied clear liquid ammonia, and that it was quite as effectual. The wireworm at one time made a point of inhabiting the carrot-beds in a neighbour's garden; no matter where the beds were made, how light and well dug over the soil, the worm came into the carrots, until one year Mr. J. read that by sowing white mustard-seed he could prevent them. He did so, and ne'er a worm was there that season. He removed the mustard before it had time to injure the carrots."

WOOD-LICE. — These pests generally come out to feed at night; they harbour in crevices, and when their haunts can be found a plentiful supply of boiling water is certain destruction. Toads consume great numbers of these and other vermin, and are useful to clear frames of them. We recommend our readers to adopt the following plan, and persevere in it until the winter arrives, when they may discover them more readily in a dormant state by searching crevices, the shreds used to nail up fruit-trees, &c. :—Put a cold boiled or roasted potato into a small flower-pot; cover the potato with moss, leaving a little out of the pot by way of enticing the insects to enter; then lay the pot on its side in the place which they are supposed to haunt. By this means hundreds may be taken, and destroyed by throwing them into boiling water. A dozen pots so prepared and cleared out every morning will soon effect a clearance.

MOTHS.—A mixture of spirits of wine with corrosive sublimate (perchloride of mercury), made very strong, is often recommended for destroying moths. This liquid is colourless, and will not soil the most delicate fur; it is a spirit, and diffuses itself rapidly through the furs. It is antiseptic, and preserves from decay; and of all poisons known it is the most deadly one to insects. A piece of sponge covered with turpentine placed in a drawer in which furs are kept, will kill the insects in half an hour.

Intestacy.—In the case of a man dying intestate (without making a will), or leaving a will made when he was of unsound mind, or one made under improper influence, the Court of Probate will, on receiving evidence of the existence and amount of the intestate's property, grant power to the widow or next of kin to administer the estate in accordance with certain forms of law. Landed property will be awarded to the heir-at-law, and personal property will be divided as follows, in accordance with the act now in existence :—One-third to the widow and two-thirds to the children; or if there be no children, half to the widow and half to the next of kin. Or should the deceased have left neither widow nor child, the whole goes to the heirs, and is divided equally amongst both males and females. In the event of there being no legal claimant the property goes to the Crown.

I O U.—This is a simple form of acknowledgment of a debt which does not require a stamp, and is usually given in the following form :—

29th September, 1872.

To A. B. Cooke.

I O U *Seven Pounds.*

£7. *C. D. Goose.*

If an I O U names any special time for payment it becomes a promissory note, and is liable to the stamp duty.

Ipecacuanha Powder.—This is said to be very effective in allaying the pain caused by the sting of the scorpion, hornet, and wasp. It has also been successfully tried in cases of prolonged annoyance from mosquito-bites, and doubtless it would give relief if applied to midge-bites. For scorpion-stings, &c., make a paste of the powder with a little water, and apply it to the wound in a patch about the size and thickness of a shilling.

Iron is chiefly found in the form of an oxide that is combined with oxygen. It is diffused more through different natural productions than any other of the metals. It exists in small proportions in most animal and vegetable, as well as in most mineral productions. According to the degree of oxidation it assumes different colours. It is the colouring substance of most of the gems and precious stones, of the different clays, and other earths, and of a variety of pigments and paints. From the variety of conditions which it is capable of assuming, according as it is mixed with more or less carbon and oxygen, it is the most useful of the metals. It is the proportion and state of combination of these substances with iron that constitutes the difference between iron and steel, between cast iron and forged iron, and between all these and plumbago or black-lead. When combined with a certain proportion of carbon or charcoal it constitutes steel, and with a much larger proportion it forms plumbago, for which last, therefore, black-*lead*, as it is generally called, is a very improper name. The uses of iron in these various states it is needless to mention. Plumbago has been found most abundantly in Cumberland. It is sawed into small slips to form the black-lead pencil, but an inferior sort is made by mixing up the lead dust into a paste. Iron combined with sulphuric acid forms green vitriol, from which, when dissolved in water, the iron is precipitated in form of a black powder, by adding to it any vegetable astringent, as oak-galls, bark, or the like. On this depends the art of making inks and black dyes.

Italian Pudding.—Take a pint of cream, and slice in some French rolls, as much as you think will be sufficiently thick; beat ten eggs fine, grate a nutmeg, butter the bottom of a dish, slice twelve apples into it, throw some orange-peel and sugar over it, and half a pint of red wine; then pour the cream, bread, and eggs over it; first put a puff paste at the bottom of the dish and round the edges, and bake it half an hour.

Italian Sauce.—Fry two spoonfuls of chopped mushrooms and one spoonful of shallots in a little butter. Remove, drain them, and add them to one-third fresh stock broth and two-thirds of Spanish sauce. (See page 356.) Italian sauce is much esteemed by epicures. A little champagne or light wine of another kind is sometimes added to it.

Ivory Staining.—The simplest way of staining ivory is that of using Judson's dyes.

Jaune Mange.—Beat well together four yolks of eggs, half a pound of loaf sugar, a pint of water, a pint of white wine, and the juice and peel of two lemons. Put these into a stewpan with a quart of rich cream and one ounce of isinglass, boil up, run it through a sieve into moulds, and when cold turn it out.

Jelly-bags are usually made of white flannel. When new wash them well before using, in order to get all the grease out of the wool. They are made of a square of flannel doubled like a half handkerchief so as to be wide at the top and pointed at the bottom, the side being sewed up in a strong seam, and the top or mouth hemmed with three tape-loops sewed to it, by which when in use it may be suspended.

Jelly, Calves' Foot.—Boil two calves' feet in a gallon of water, strain the jelly, and when it is cold skim off all the fat, and take it up carefully and clean. If there is any settling in the bottom, leave it. Put the jelly into a saucepan, with half a pint of sherry or mountain port, half a pound of loaf sugar and the juice of four lemons, beat up six or eight whites of eggs; put these into the saucepan with the rest of the ingredients, and stir well till it boils. Let it boil a few minutes. Have ready a jelly-bag, and pour the jelly through it; pour it backwards and forwards until it runs clear, then have ready a china basin, with the lemon-peels cut as fine as possible. Let the jelly run into a mould, and the peel will give it a fine amber colour, and also a flavour.

Jelly Cream.—To three pints of water put four ounces of hartshorn, boil till it is a stiff jelly, which you will know by taking a little in a spoon to cool, then strain it, and add to it half a pint of cream, two spoonfuls of rose-water, two spoonfuls of sherry, and sweeten to taste. Next give it a gentle boil, but keep stirring all the time, or it will curdle; then take it off the fire, and stir till it is cold, pour it into a mould, and when you turn it into a glass dish, pour over it half a pint of cream flavoured with sauce or any essence.

Jelly, Hartshorn.—Boil half a pound of hartshorn in three quarts of water over a gentle fire till it becomes a jelly; if you take out a little on a spoon and it hangs, it is done enough. Strain it while it is hot, put it in an iron saucepan, or a well-tinned one, put to it a pint of Rhenish wine, a quarter of a pound of loaf sugar, beat the whites of four or five eggs to a froth, stir all together, that the whites may mix well with the jelly, and pour it in as if you were cooling it; let it boil two or three minutes, then put in the juice of three or four lemons; let it boil a minute or two longer. When it is finely curdled, and of a pure white colour, have ready a flannel jelly-bag over a glass dish or china basin, pour in the jelly backwards and forwards until it is as clear as rock-water, then fill the jelly-glasses. Have ready some thinly-pared lemon, and when you have half filled the glasses, throw the peel into the basin; and when the jelly is all run through the bag, with a clean spoon fill up the glasses, and the jelly will have the appearance of a fine amber colour.

Jelly Isinglass.—To a quart of milk add one ounce of isinglass and a little essence of lemon, or ratafia, or cloves. Boil altogether to a pint, strain off, after sweetening to taste, into a mould, and when cold, turn out into a glass dish.

Jew Bread.—The process is to set a sponge in the usual manner with wheat flour, yeast, water, and salt, and when it is ready to make up into loaves, to cut out five pieces of equal size, which are rolled out a considerable length in the shape of a rolling-pin to a tapering point; the pieces are then flatted together (beginning in the middle), and when complete laid aside; five other pieces are then rolled out about four times the size of the former, and flatted in the same way. The first flatted cake is then placed upon the large one, and over this another piece of dough about the third of an inch in diameter and the length of the longest cake. This is run over the top from point to point, and fastened to the middle by a coil of dough, with two thin bars laid over it in the form of a cross, the points secured by pinching them together, and the whole makes a handsome appearance. An egg whipped up is spread over the cake with a brush, which produces that shiny appearance for which Jew bread is distinguished; a few white poppy seeds are sprinkled over it, and it is then baked in the usual manner.

John Dory, Sauce for the.—This is rather an expensive sauce except when mullets are plentiful. Boil some red mullets, take out the livers and roes, pound and rub them through a sieve, and mix with the melted butter.

Jumballs, How to Make.—Take a pound of fine flour and a pound of fine powdered sugar, make them into a light paste, with whites of eggs well beaten, add half a pint of cream, half a pound of fresh butter melted, and a pound of blanched almonds well beaten; knead them all together thoroughly, with a little rose-water, and cut out your cakes in what figures you fancy; and bake them in a gentle oven, or fry them in fresh butter, and they make a good side or corner dish.

Kaleidoscope.—The principal parts of the kaleidoscope are two reflecting planes made of glass or metal, or any other reflecting substance, ground perfectly flat and highly polished. These reflectors may have any magnitude, but in general they should be from four or five to ten or twelve inches long, their greatest breadth being about an inch when the length is six inches, and increasing in proportion as the length increases. When these two plates are put together at an angle of 60 degrees, or the sixth part of a circle, and the eye placed at the narrow end, it will observe the opening multiplied six times, and arranged round the centre. Although the kaleidoscope is capable of creating beautiful forms from the most ugly and shapeless objects, yet the combinations which it presents, when obtained from certain forms and colours, are so superior to those which it produces from others, that no idea can be formed of the power and effects of the instrument unless the objects are judiciously selected. The objects which give the finest outlines by inversion are those that have a curvilineal form, such as circles, ellipses, looped curves like the figure 8, curves like the figure 3 and the letter S; spirals and other forms, such as squares, rectangles, and triangles, may be applied with advantage. Glass, both spun and twisted, and of all colours and shades of colours, should be formed into the preceding shapes; and when these are mixed with pieces of flat, coloured glass, blue vitriol, native sulphur, yellow orpiment, differently-coloured fluids enclosed and moving in small vessels of glass, &c., they will make the finest transparent objects for the kaleidoscope. When the objects are to be laid on a mirror plate, fragments of opaquely-coloured glass should be added to the transparent fragments, along with pieces of brass wire, of coloured foils, and grains of spelter. In selecting transparent objects, the greatest care must be taken to reject fragments of opaque glass, and dark colours that do not transmit much light, and all pieces of spun glass or coloured plates should be as thin as possible. The best form of kaleidoscope by far is *The Jewel*, sold by the London Stereoscopic Company, which fully carries out the best of the above hints.

KALEIDOSCOPE, CHANGES OF THE.—Supposing the instrument to contain twenty small pieces of glass, &c., and that you make ten changes in each minute, it will take the inconceivable space of 462,880,899,576 years and 360 days to go through the immense variety of changes it is capable of producing. Or, if you take only twelve small pieces, and make ten changes in each minute, it will then require 33,264 days to exhaust its variations.

Lacquering Brass.—Take of turmeric-ground, as it is sold, one ounce, and of saffron and Spanish arnatto each two drachms. Mix in a bottle with a pint of highly-rectified spirits of wine, and place them in a moderate heat, with occasional shaking, for several days; strain, and again bottle with three ounces of good seedlac roughly powdered, keep in a moderate heat, and shake occasionally until the lac is dissolved. Strain as before, and it is fit for use. If a deep orange lacquer is required, increase the quantity of arnatto; if a bright yellow, decrease it. First clean the brass-work—if new from the founders, by means of aquafortis—then warm it and apply the lacquer with a brush as you would any other varnish, and put it in a warm place until it is thoroughly dry; repeat this until the work is of the required colour and brightness. Avoid using too much seedlac, as this has a tendency to prevent the lacquer from laying evenly on the metal.

Lamb.—Lamb is generally recognised by butchers until it reaches the age of about twelve months, when it is termed yearling, although at this period the yearlings are often dressed "lamb fashion." The size, fatness, condition, age, and sex are considered best in the order as follows:—1. Spring (or house) lamb (ewe), from six weeks to three months old. 2. Spring lamb (buck). 3. Wether lamb, three months to eight months old. 4. Ewe lamb. 5. Wether lamb or yearling, eight months to twelve months old. 6. Ewe lamb. The spring lamb, commonly called house lamb, it is presumed from the circumstance of its being born during the winter months, when its tender life, if not carefully housed, fed, and kept warm, would perish, remain dwarfish, or become sickly. Its flesh is prized for its unseasonable character, and, although delicate and tender, is quite insipid, and is not nourishing. Lamb is sometimes sold as early as March, after which it slowly increases in size and quantity; and in the months of June, July, and August it is in full season and of fine quality. When first brought into market lamb is not sold in less quantity than a quarter its weight, being seldom above five or six pounds. As it increases in size by age, being amply fed by the grass-fed ewe, aided by the warm sun, the lamb speedily increases in weight—the quarters from eight to twelve pounds each. Later in the season, with age and forced feed, the quarters of the lamb will weigh as much as twenty-five pounds. To choose lamb, first examine the fat on the back, and then that of the kidneys, both of which should be white, hard, and of the same colour. Lambs are tender creatures. Rough handling, cold, stormy weather, insufficient food, and being long driven, produce a feverish state, which causes the fat and flesh to be veiny, and of a dark red colour, and also renders it dry, tough, and tasteless. The kidney fat of a fine (or inferior) lamb should not be raised, stuffed, or blowed, but merely its own caul or fat laid on its legs and flanks, to prevent them from drying or burning whilst roasting. Beware of two or three colours of fat found about the dressing of the hind quarters, which, in all probability, is here appropriated from some other animal, and will give it a different flavour when cooked. This caution applies to all kinds of meat of blown or spongy appearance, this being frequently produced by human breath. It is needless to add that the breath of the human lungs (even those of the most healthy and sweet condition), in this manner blown into meats, is neither calculated to add to its sweetness, nor to render it palatable to people of delicate taste. The carcase of the lamb is first split down the centre of the back and neck into two sides, which are quartered by leaving two or three ribs on the hind quarter of lamb. When large enough, and it is desired by the purchaser to be cut or divided, the leg is first cut off and prepared for roasting, boiling, or cut into chops, &c. The loin of lamb is usually cut into chops, or cracked for roasting, &c. The fore quarter of lamb is smaller than the same joint of mutton. The bones are of a more reddish colour. The fore-leg is broken off immediately above the joint of the foot, at the point where the fore-foot or hoof-lock joint is cut from the mutton, which connects with the white joint bone. Some call it lamb as long as the foot breaks off with the hand at this place; this, however, often occurs in old sheep. By many the fore quarter of lamb is preferred for the delicacy of the ribs and breast when roasted. Removing the blade-bone from the quarter greatly assists the carver. Separated from the shoulder the neck and breast make a choice dish. Lambs' frys and sweetbreads are generally found in our markets in the spring and summer months on dishes, nicely cleaned, and prepared ready for use. Some sprinkle a little parsley to decorate them. They are considered, and certainly are, delicate eating, and are therefore much sought after.

LAMBS' AND SHEEP'S TONGUES.—These can be had fresh or salted. The small pickled tongues are excellent for lunch when nicely prepared.

LAMBS' KIDNEYS are taken from the loin suet, and are sold and used separately. Used for stews, broils, &c.

LAMBS' HEADS make excellent broth.

LAMBS' BRAINS AND EYES make excellent sauce and other delicate dishes.

LAMBS' TROTTERS, prepared like calves' feet. They are soaked in water until quite white, when they are ready for use. They are best stewed.

Lampreys, to Choose and Cook.—The best of this sort of fish are taken in the river Severn; and when they are in season the fishmongers and others in London have them from Gloucester. But the fresher they are the better. Bleed them, and save the blood, then wash them in hot water to take off the slime, and cut them in pieces. Fry them in fresh butter, but before they are quite done pour on the fat, put in a little white wine, give the pan a shake round, season it with whole pepper, nutmeg, salt, sweet herbs, and a bay-leaf; put in a caper, a good-sized piece of butter rolled in flour, and the blood, give the pan a shake round often, and cover them close. When you think they are well done strain the sauce, give them a quick boil, squeeze in a little lemon, and then pour over the fish. Garnish with lemon, and serve.

Lamps.—In trimming lamps the end of the wick should be preserved level, and this is better done with the finger and thumb than with the scissors. If any piece of the wick projects above the rest the flame will be uneven, and smoke.

Lamp Shades.—Soap or pearl-ash may be used in cleansing these, as they will not discolour them.

Lamps Smoking, to Prevent.—This is often caused by the wick being too high; and it may be prevented by care in this respect, and by steeping the wick in strong vinegar, and drying it thoroughly before using it.

Latent Heat.—It is important for the reader who would understand completely the facts and hints of a large variety of domestic matters to know that all bodies contain heat, even snow and ice. In the fire heat, which, as we have shown in our article under that head, is the result of a chemical action (see also *Combustion*); it is of course very perceptible, but in the case of snow or ice it is latent, that is to say, least perceptible. To illustrate this in a practical way, put half a pint of salt into a pint of snow, and have by you another vessel containing snow without salt. If you first put your hand into the mixture you will find the cold to be so intense that on removing the hand to the snow alone a sensation of warmth will be perceived.

Lawns.—To make a lawn, first drive in pegs at the corners of the space you intend it to cover, and from these stretch cords. Commencing at one extremity, dig the soil out about eight inches deep, and at the bottom of the trench thus made place a foundation to the depth of two or three inches of old gravel, or some similar material. When this is quite level and flat over the entire space, it should be well rolled. The nature of the foundation must be alike in every respect, or the lawn will show patches of different shades of green. Garden mould is next laid over this foundation to the depth of two or three inches, and this also must be levelled and rolled. Turf good in quality can be obtained from about eight to ten shillings per hundred pieces, each of which will be about a yard long and one foot in breadth. Before laying this the mould prepared for its reception should be watered with lime-water to destroy the worms, which otherwise would become troublesome. When the turfs are laid down and neatly joined, the whole is beaten down with a block of wood to which a handle is attached, and repeatedly rolled. If done in the summer the grass must after this be kept well watered until it has fairly taken root. Cut the edges neatly and let it be mowed, occasionally repeating this process. Care should be taken that the turf selected is free from weeds. If the soil under the turf is poor and unable to sustain it, the grasses die off at the roots, and moss usurps its place. The remedy for this is a top-dressing of manure in winter when the rains wash it in; and soot, or anything containing a good share of alkali. Guano mixed with a large proportion of ashes is sometimes used. Lawns sometimes crack and assume an unsightly appearance. When this is the case, fill with some slight sandy soil, water well and roll it in. Repeat the process as often as the cracks re-appear, and if the spaces are large, throw a few grass seeds on the face of the fresh soil.

Lead has a very injurious effect upon the constitution when taken in any way along with our food, or when introduced into the body by other means, as by exposure to the dust or fumes of lead, or by suffering white lead in the form of paint to remain on any part or surface of the body. It is a frequent cause of disease amongst plumbers and painters, and several instances have occurred which have brought on alarming symptoms, and sometimes even death. Water kept in leaden vessels for any length of time becomes impregnated with it, and sometimes even pump-water, in consequence of this metal being used in the construction of the pump and pipes, has been so much impregnated with it, as to affect the health of those who drank it. To avoid the probability of this, the water that is lodged in the pipe should be first pumped off before the water is taken for use.

Lead is often found mineralised by

sulphur in pieces of a cubical form, denominated "galena." It is often mixed with small quantities of arsenic, or of silver, the latter being in the largest quantity in those cubes or dice that are smallest in size. Lead oxidated or calcined in different degrees assumes different colours. First, grey, as the dull crust that always covers lead that is exposed to the atmosphere; secondly, yellow, as the oxide of lead, called massicot; thirdly, red, as minium of red lead; fourthly, a reddish yellow or orange, as the scaly oxide, called litharge; and lastly, white, as the white-lead used by painters, which is obtained by evaporating sheets of lead to vinegar in an uniform heat, as that of a hot-bed, or by exposing it to the vapour or steam of vinegar. To make shot, a small quantity of arsenic is melted with the lead to render it more brittle; and when it is so far cooled that a card may be plunged into it without being burnt, it is poured into a kind of cullender, pierced at the bottom with many holes, and containing lighted charcoal. This cullender is held over water, and the lead assumes a round form as it passes into it.

Leaden Water Cisterns. — Nothing is more common than water cisterns lined with lead, although they form an element of very serious danger, especially when they are new. Water charged with carbonic acid gas, which it derives from contact with the atmosphere, will, in the absence of certain mineral ingredients, which all waters do not contain, eat away lead, and thereby become impregnated with a most pernicious element, which renders it quite unfit for drinking. These mineral ingredients are the sulphates, phosphates, and carbonates of the alkalies and alkaline earths which act by combining with the lead in the water, and thus form compounds which, being insoluble, cease to be dangerous. But such minerals act only in the absence of nitrous or nitric acid and nitrates. In old leaden cisterns it will be found that these insoluble precipitates protect the water from contact with the lead, hence it is while new that these cisterns are most dangerous. Water containing carbonate of lime or chalk may be known by its depositing inside the kettle in which it is boiled what is called *fur*. If it contains sulphate of lime in its natural state, or gypsum, this is deposited by evaporation in the kettles or pans containing such water in a form which is usually called *slate*.

Lead Pipes, to Solder.—To solder lead pipe, a task which is often demanded, the lower portion of the pipe should be slightly opened with a piece of wood, such as the handle of a bradawl, until it takes somewhat the shape of the mouth of a trumpet; and the upper piece should be dressed, carefully beaten with a hammer. The edges of each part should then be cleaned very carefully, and, when quite bright, placed firmly together. A little powdered resin should next be laid on the ledge round the joint, and the soldering may then proceed as described on page 355. If it be required to solder a brass tap to lead pipe, the tap should be well cleaned with a file, the resin sprinkled on, as before directed, and a little solder applied with a hot soldering-iron. The solder will adhere to the brass and leave a smooth white surface, which is called the "tinning." The pipe may then be opened, as described for the joint, and the tap placed as required, when the soldering of the two may be effected precisely as in the ordinary joint of a pipe.

Leather, Oiling Old.—A practice is common of wetting harness, &c., before it is to be oiled, under the idea that it soaks in the oil the better for wetting. No two things are less capable of union than oil and water. The leather appears soft after the above practice, but a dry day will soon show how hard the leather becomes when the water imbibed has evaporated, and how rotten the heart of the leather is, although the outside appears yet oily.

If leather be dry and then oiled, the quantity of oil consumed will tell whether the leather has absorbed the oil or not. If it has, it will last for years if it be oiled thoroughly every spring. The most durable stuff to nail up garden trees is leather soaked in oil and then drained before use. Old shoes and harness will thus be of use when no longer of service to the body.

Leaves and Foliage, to Obtain Casts of.—The leaf, as soon as convenient after being gathered, is to be laid on a fine-grained, moist sand in a perfectly natural position, having that surface uppermost which is to form the cast, and being banked up by the sand, in order that it may be perfectly supported. It is then, by means of a broad camel's-hair brush, to be covered over thinly with Burgundy pitch rendered fluid by heat. The leaf being now removed from the sand, and dipped in cold water, the wax becomes hard, and at the same time sufficiently tough to allow the leaf to be ripped off without in any way altering its form. This being done, the wax mould is placed on moist sand, and banked up as the leaf itself was; it is then covered with plaster of Paris made thin, care being taken that the plaster is closely pressed into all the interstices of the mould by means of a camel's-hair brush. As soon as the plaster has set, the warmth thus produced softens the wax, which in consequence of the moisture of the plaster is prevented from adhering thereto, and with a little dexterity it may be rolled up, parting completely from the cast without injuring it in the smallest degree. Casts thus obtained are very perfect, have a high degree of relief, and are excellent models either for the draughtsman or for the moulder of architectural ornament.

Leaves, Impressions from.—Prepare two balls of chamois leather stuffed with wool; moisten them with linseed oil, then take as much *dry* finely-powdered colour which will rub, as will lie on the point of a penknife, and spread it over the balls; rub it in with a little more oil, till they are smooth and free from knots. Take any fresh-gathered leaf (those whose veins are most prominent are best adapted for the purpose), and place it between the balls, till every part of it is coloured; lay it between two pieces of paper, and press it lightly. The under side of the leaf will give the impression. Very elegant borders, taken off on satin, for ladies' dresses, may thus be procured, also embellishments for hand-screens and various ornamental works.

Lemon and Orange Seeds steeped in spirits make a good tonic.

Lemon Cheesecakes.—Boil the peel of two large lemons very tender, then pound them well in a mortar, with a quarter of a pound of loaf sugar, the yolks of six eggs, and half a pound of fresh butter; pound and mix all well together. Lay a puff paste on your patty-pans, fill them half full, and bake them. Orange cheesecakes are done in the same way, only boil the peel; put in two or three waters to take out the bitterness.

Lemon Cream.—Take five large lemons, pare them as thin as possible, steep them all night in half a pint of water, with the juice of the lemon. Then strain it through a jelly-bag into a saucepan, the whites of six eggs beat well, ten ounces of refined sugar; set it over a very slow charcoal fire, stir it all the time one way, skim it, and when it is as hot as you can bear your fingers in it, pour it in the glasses.

Lemon or Orange Tarts.—Take six lemons, rub them well with salt, and put them in water with a handful of salt for two days, then change them into fresh water every day (without salt) for a fortnight. Boil them for two or three hours until they are tender, then cut them in quarters, and the three-quarter sections as thin as you can. Take six pippins, pared or quartered, and a pint of fresh water. Let them boil until they all break, put the liquor to the orange or lemon, and half the pulp of the pippins well broken, and a pound of sugar. Boil these together a quarter of an hour, then put it in a gallipot; squeeze an orange in it. If it be a lemon tart, squeeze a lemon. Two spoonfuls are enough for a tart. Your patty-pans must be small and shallow. Use fine puff paste, and very thin. A short time will bake them. As the tarts go into the oven brush them over with a little melted butter, and a little sifted sugar.

Lemon Pickle.—Slice six lemons, rub them with salt, lay them in a stone jar, with two ounces each of allspice and white pepper, and a quarter of an ounce each of mace, cloves, and cayenne, and two ounces of horseradish, and mustard-seed. Pour over these two quarts of hot white wine vinegar, and after standing a few hours, strain. Some add garlic or shallots. The best time for making this pickle is from November to April.

Lemon Pudding.—Half a pound of suet chopped fine, half a pound of finely-grated bread-crumbs, half a pound of sugar, four eggs, one large or two small lemons, the rinds grated and the juice squeezed out. Mix and boil three hours.

Lemon Sauce, to eat with Fowls.—Pare off the rind of a lemon, then cut it in thin slices small, take the pips out, bruise the liver with two or three spoonfuls of good gravy, then melt some butter; mix all together, give them a boil, and cut in a little lemon-peel very small.

Lentils.—According to the analysis of Dr. Playfair, the lentil contains more nitrogeneous matter than any of the leguminosæ, and consequently is more nutritious where digested than any of the other forms of leguminous seeds. The lentil is consumed in the East in considerable quantities, and a curious proof of its value as a nutritious diet is afforded by the use which is made of it amongst the Hindoos, who always have recourse to lentils in addition to their rice when engaged in laborious work, such as rowing on the Ganges, &c.

Lettuce, Cultivation of the.—Any kind of lettuce will grow freely in the open garden after the 22nd of March. In any rich garden soil four seeds in a square foot are sufficient. Three crops in summer off the same land may easily be got, and if persons will go to the expense and trouble of transplanting lettuce many crops may be had; and as four will grow upon a square foot, and weigh, when young, half a pound each, every square yard of soil will produce in the season half a cwt., which is fifteen cwts. to the pole of ground, or 120 tons to the acre. (See *Opium.*)

Leverets.—Young hares are preferable to old ones, because they are easier of digestion.

Liaison.—This term is used to discribe a finish given to ragoûts and sauces with yolks of eggs and cream.

Life-preservers.—The most common contrivances—called *life-preservers*—for preventing drowning are strings of corks put round the chest or neck, or air-tight bags applied round the upper part of the body, and filled, when required, by those who wear them blowing into them through valved pipes. On the great rivers of China, where thousands of people find it more convenient to live in covered boats than in houses upon the shore, the younger children have a hollow ball of some light material attached constantly to their necks, so that in their frequent falls overboard they are not in danger. Lifeboats have a great quantity of cork mixed in their structure, or, if air-tight vessels, of thin copper or tin plates, so that even when the boats are filled with water a considerable part still floats above the general surface.

Light.—The consideration of the laws of light as to its refrangibility, its reflection, &c., belong to the natural philosopher. We have only to consider it as a chemical agent, viz., to notice its influence on other bodies, so far as its presence or absence regulates their chemical changes. We have already considered it as bearing certain relations to heat; we have also noticed its extrication either from the air or from an inflammable body during combustion. Nitric acid, when exposed to the sun's light, undergoes gradual change, that would not take place if the light were wholly excluded from it. It first becomes of a straw colour, and then passes to a deep orange, and its other properties are at the same time altered. The light is supposed to mix with the oxygen of the acid; for the coloured liquor certainly contains a less proportion of that acidifying principle, and oxygen gas is extricated from it during the action of the sun's light. This points out the necessity of keeping nitric acid, or aquafortis, in painted bottles, or otherwise excluding it from light. Kept in this manner it undergoes no change, but without this precaution it acquires other properties, by which both the chemist and manufacturer, particularly the dyer, may in some cases be disappointed. Very many coloured bodies are faded or otherwise changed in colour, by long exposure to the light. This can only be in consequence of it effecting some chemical change in the colouring matter, whether it be an artificial dye or the natural colour of the substance. The druggist aware of this, should keep his digitalis, or foxglove, and other green vegetable powders, in bottles painted black, as the best means for preserving their colour, and probably their medicinal virtues; for there is great reason to believe that the same chemical change that affects their colour diminishes their virtues as medicines.

Light Food.—For the meaning of this term in its application to food, see *Diet*.

Light, its Effect upon Plants.—In attending to the phenomena of vegetation it is found that the presence of light is absolutely necessary to the health of plants. If it is wholly excluded from them they soon become pale and sickly, grow weak, wither and die. Vegetables are blanched by the partial exclusion of light—celery, by earthing it up round the roots, and cabbages or lettuces by tying their leaves together. The parts thus kept from the influence of the light become pale and almost colourless, and are then said to be blanched. Plants that grow naturally in dark situations are usually of a pale colour; as the orobanche ramosa, which always grows under the shade of hemp; the lathræa, and others that are found in the shady parts of woods, and a variety of lichens growing upon trees. If light is admitted only to one part of the room in which plants grow, they always incline towards that part; nature's laws being in this instance, as in others, so widely established, and so connected with each other, that where benefit is to be derived from it, the effects of one lead to the completion of another. This inclination of the plant towards light bears so much the appearance of voluntary motion, regulated by a knowledge of the beneficial influence of light, that some philosophers have adduced it as a proof that vegetables are endowed with reasoning faculties. But how slight, how futile are their arguments, to assume a new power, a reasoning faculty in plants merely because the confined and imperfect knowledge of man is unable to explain an ascertained fact! How many thousands of phenomena are our weak intellects unable to comprehend? and how many of nature's laws remain yet to be explained? The presence of light we find to be necessary to healthy vegetation. The chemical effects are such as to preserve and keep up those changes in the various parts of the plant that constitute health. But this is not all: the Creator of the world, the establisher of all nature's laws, anticipating, as it were, the accidental wants of individual plants, has so ordained it that the effects of light shall also be such as to incline the plant that is but partially exposed to it towards the light, in consequence of which it receives more and more of its genial influence. This is a beautiful instance of the omniscience and beneficence of the Creator, and the philosopher viewing it in that light must notice it with admiration, and acknowledge that infinite wisdom is apparent in the minutest of his works. The presence of light has considerable effects both in the process of bleaching and in that of tanning. Cloth, exposed in the bleach-field is whitened more rapidly in the day-time than during the night, and more so on a sunny day than in cloudy weather. In tanning, the process of handling the hides has more effect if performed in an exposed situation, and whilst the sun shines than otherwise.

Lightning.—Lightning, the result of electricity accumulated in the clouds, is due to evaporation from the surface of the earth, to chemical variations in the air and on the earth, and probably to friction between currents of passing air differing in temperature. Zigzag lightning is caused by the condensation of air immediately before the flash, to avoid the resistance of which it darts from side to side. If the space through which the flash passes is small, this does not occur. Sheet lightning is the effect seen when the flash itself is invisible, and we only perceive the glare of its light upon the clouds. Lightning also assumes other forms which are less common, including that of a globe, and what is called the brush form. Air being a non-conductor of electricity, the electricity consequently becomes visible in the flash; if it were not a non-conductor it would neither be seen nor heard. It is well known that when the electric current passes through the body of a man or a beast, the animal fluids being excellent conductors, its action upon the nerves is so violent that life is either endangered or at once destroyed. For this reason any person out in a storm of lightning ought to shun the path of the electric fluid, and be cautious to avoid certain objects by which it might be attracted or discharged. It is well known that trees should be avoided on such occasions, but it is not so well known why, and consequently many people ignore all precautions in connection with that fact. Attracted by the tree, the electric fluid will run down it through the sap under the outer bark, the sap being a conductor of electricity; but if a better conductor be near enough, such as the human fluids would be, the lightning will leave the tree and pass into the body of the unfortunate who chanced to have sought that shelter. For the same reason it is dangerous to be near water during a thunderstorm, water being so good a conductor that the lightning might take his body on its way to reach it. To lean against a wall at such a time is also dangerous, because the fluid will run down a wall to reach the man because he is the better conductor of electricity. Bell-wire being an excellent conductor, it has sometimes been found a source of danger from lightning to those who pull it. For the same reason all substances which act as conductors of electricity should be avoided during a thunderstorm; putting up an iron shutter-bar, the exposure on the person of metal chains, keys, brooches, &c. When wet a person is in less danger from the lightning than when dry. The lightning-rods or conductors set up serve, by their height, to discharge the lightning, and at the same time the metal conducts it harmlessly away. Copper, being a better conductor than iron, is the metal usually selected for these rods; their points should be made triangular. The relative value of different metals as conductors of electricity may be expressed in the following figures:—Lead, 1; iron, $2\frac{3}{5}$; zinc, 4; copper, 12. One lightning conductor to a building of average extent is found to afford sufficient protection. Conductors defective in the principles of their construction have often been found rather to increase the danger than diminish it. If the rod is not sufficiently thick to conduct the whole of the electric current to the earth, its metal becomes fused, and the building injured. Lightning turns milk sour by disturbing its electrical condition, and effecting its decomposition. New beer, in which the process of fermentation is not completed, is so affected by lightning that the process of fermentation being forced, the sugar is converted into acetic acid before it has attained the preliminary or alcoholic stage. Some time since, while commenting upon a recent case of death from lightning, Mr. Lane remarked that "there is no doubt that the safest place for shelter during a thunderstorm is in the interior of a dwelling-house or other enclosed building, at a distance from windows and street-doors; and in a cellar, perhaps, for choice, not only is the chance of being struck infinitely less, but the risk of serious injury is also much diminished." The popular objection to take shelter under a tree in a storm we have shown to be well founded, especially if the tree be isolated. "A low tree, or a hedge with several high trees in its proximity, is less objectionable, as the lightning will generally be attracted by preference to the most prominent objects. Trees standing together in a wood are seldom struck. The electric cloud coming within the attraction of a mass of trees, probably discharges itself insensibly through the innumerable points of foliage. A wood, therefore, is not an unsafe place, though even there it may be well to keep away from a tree which is higher than its neighbours. Many persons have been killed while standing under a hay or corn rick; these, therefore, should be avoided. From their dryness they are worse conductors than the human body, so that the current passes from them to the latter, as the readiest channel by which it can reach the ground. But is it safer to remain in the middle of a large open space? This is a doubtful question, for a man in the erect position, though less prominent than a tree, still offers a dangerous point of attraction when no other object is near, and, if struck, the whole force of the stroke will pass through his body, entering probably by his head; whereas under the tree the current is likely to be divided and split up, so that though the chance of being struck may perhaps be greater, the risk of fatal injury is considerably less. It appears to be pretty generally agreed that the safest plan, supposing shelter within a house to be unattainable, is to remain near some prominent object, such as a tree, but on the side opposite to that from which the storm is proceeding, and at a distance sufficient (say twenty or thirty yards) to avoid the risk of the electricity being attracted from the tree to the person. Under any circumstances the recumbent is undoubtedly safer than the erect position, elevated and prominent situations being of course carefully avoided. Additional security may also be obtained by depositing watch and chain, money, or other metallic substances which attract electricity, at a safe distance. Wet clothes are not without a compensating advantage; they are all the better conductors of electricity, and, if they do not convey safely the whole of the current, they will transmit a much larger proportion of it, so that there will be all the less risk of personal injury. A gun is a very unsafe companion; nothing could well be worse than to walk about in a thunderstorm with a gun over the shoulder. Neither is it wise to walk along an exposed road under an umbrella, especially one with metallic stem and framework."

Lime-dust in the Eye.—After carefully removing with a feather or camel-hair brush any pieces of lime visible, bathe the eye with a piece of soft linen soaked in weak vinegar-and-water.

Lime-water.—Take of quicklime four ounces, pure water six pints; mix and set aside in a covered vessel for one hour. Then pour off the clear water, and keep it in bottles well corked for use. When weakness of the stomach is accompanied with acidity and flatulency, this water affords an excellent auxiliary vehicle in the quantity of a wine-glassful for taking the compound tincture of ginger and camomile or the aromatic tincture of rhatany root. Lime-water being capable of dissolving slime or mucus in the stomach and intestines, a redundance of which affords a nidus or lodgment for worms, will considerably promote the efficacy of vermifuge medicines, in the dose of a teacupful two or three times a day. Lime-water has been much celebrated as an alterative in scrofula and scurvy. In the latter case it has not supported its character, while in the former it has its abettors. The good effects produced by it in such cases probably arise from its destroying acidity in the stomach and promoting digestion. In cases of violent vomiting, when the object is more to restrain than stop it, lime-water will answer better than the chalk or cretaceous mixture. It may be given in the following form:—Take of lime-water six ounces, compound tincture of cardamoms half an ounce; mix. Two or three table-spoonfuls three or four times a day. The addition of a little lime-milk makes it sit easy on weak stomachs. With this admixture, in the proportion of a table-spoonful to half a pint, invalids have been able to take milk after it has disagreed in every other form.

Linen.—(See also *Clothing*.)

Mildewed Linen, to Restore.—Clothes sometimes become mildewed by remaining damp too long before they are ironed, and from other causes. If they are clothes that have no dye or colouring about them, dip them in some sour buttermilk, then spread on the grass in the sun. When they are dry, wash out the buttermilk with cold water, and repeat the process till the mildew disappears. Another way of removing mildew is to soap the spots, and then, while wet, to cover them with fine chalk scraped to powder. Rub it well in, and then expose the article to the sun. By repeating the application, the mildew will disappear. Another way is to mix some soft soap with powdered starch, adding half as much salt as you have of the starch, and also the juice of a lemon. With this mixture cover the mildew on both sides, and lay the article on the grass, keeping it out night and day till the stains disappear.

Linen, to give it a Gloss.—Mix with the starch a little white wax, use it strong, and as much of it as the surface will take, dry, and after making it slightly moist by sprinkling, iron it first in the ordinary way with an ordinary iron, and afterwards with greater vigour and force, using a peculiar heavy flat iron with a rounded, highly-polished, bright surface.

Linen, to Restore, that has Long been Stained.—Rub the stains with brown soap; mix some starch to a thick paste, and lay it on the soaped parts. Then expose the linen to the sun and air, and if the stains have not disappeared in three or four days repeat the process with fresh soap and starch. Afterwards dry it, wet it with cold water, and put it in the wash.

Lint.—This is a very useful article in a medicine-chest for dressing and clearing sores or ulcers. When applied dry, it will destroy fungus-flesh, and with a little pressure, stop the bleeding of superficial wounds, and the punctures made by leeches.

List Tippets.—List is usually thrown away, though the list, both of flannel and broadcloth, forms warm and lasting tippets, which the poor find very serviceable in the cold, wintry weather. The shape is cut out in calico or other material, and the list put on in rows slightly overlapping each other, the row at the outer edge being the first put on. The collar is a straight piece covered with rows of list. A lining should be added to the tippet, for which glazed jaconet is the best and cheapest material. The list of broadcloth is sold at 2d., 4d., or 6d. the pound by tailors and drapers, and is, perhaps, still better than flannel list, though less pleasant to work on. A little leisure employed by the charitable in making these tippets for the poor cottagers' children would be time well occupied.

Liver.—The livers, especially those of full-grown animals, are very undesirable as food, although they afford nourishment. Serious obstructions and gross humours have been traced to indulgence in such things as food, and we counsel our readers to avoid them.

Lobster Soup.—Put two codlings into a stewpan with some onions, celery, carrots, parsnips, a bunch of sweet herbs, three anchovies or a red herring, and two quarts of water. Stew gently for two hours, strain, then add to the soup the meat of three lobsters cut small, and thicken with butter rolled in flour. Add the crust of a French roll, simmer for a quarter of an hour, and serve.

Long Pepper. — This is only a variety of the common pepper imported whole.

Longevity.—Dr. Southwood Smith, in his valuable work on "The Philosophy of Health," gives some excellent Hints for the prolongation of life. He says—"In the space of two years from its birth every infant has ceased to be an infant, and has become a child; in the space of six years from this period every male child will have become a boy; add eight years to this time and the boy will have become a young man; in eight years more every young man will have become an adult man, and in the subsequent ten years every adult man will have acquired his highest state of physical perfection. But at what period will this state of physical perfection decline? What is the maximum time during which it can retain its full vigour? Is that maximum fixed? Is there a certain number of years appointed for this transition to every human being? Can no care add to that number? Does the physiological condition or the constitutional age of any two individuals ever advance to precisely the same point in precisely the same number of years? Physically and mentally are not some persons older at fifty than others are at seventy? And do not instances occasionally occur in which an old man who reaches even his hundredth year retains as great a degree of juvenility as the majority of those who attain to eighty? If this be so what follows? One of the most interesting consequences that can be presented to the human mind. The duration of the periods of infancy, childhood, boyhood, and adolescence is fixed by a determinate number of years. Nothing can retard the succession of each. Alike incapable of any material protraction is the period of old age. It follows that every year by which the term of existence is extended is really added to the period of mature age; the period when the organs of the body have attained their full growth, and put forth their full strength; when the physical organisation has acquired its utmost perfection; when the senses, the feelings, the emotions, the passions, the affections, are in the highest degree acute, intense, and varied; when the intellectual faculties completely unfolded and developed carry on their operations with the greatest vigour, soundness, and continuity; in a word, when the individual is capable of receiving and of communicating the largest amount of the highest kind of enjoyment. A consideration more full of encouragement there cannot be. The extension of human life, in whatever mode and degree it may be possible to extend it, is the protraction of that portion of it in which the human being is capable of receiving and of communicating the largest measure of the noblest kind of enjoyment." Well authenticated instances of extreme longevity are by no means so rare as they are popularly supposed to be. We could ourselves fill a good-sized volume with them by the mere aid of certain occasional notes made from time to time in the course of our miscellaneous reading and preserved in our commonplace book.

Looking-glasses, to Clean.—First wash the glass all over with warm soapsuds and a sponge. When dry, rub it bright with a leather and a little prepared chalk, finely powdered. Finish with a silk handkerchief. This is also an excellent way to clean the inside of windows; it makes the glass beautifully clear. Another very good way is to wash the glass first with a sponge and cold water, and afterwards with a soft flannel dipped in spirits of wine, which will effectually remove fly-stains and all smears. Then having wiped it dry with a soft linen cloth, rub over it with a fine piece of flannel a little powder blue, or else fine whiting. Let it rest awhile, then rub it off with a soft cloth. In cleaning looking-glasses, take care that no moisture touches the frame or gilding. To clean a burnished gilt frame, nothing is better than to go over it lightly with pieces of soft cotton wool, or a piece of the inside of new wadding, having first dusted it with a feather brush. A mahogany frame should be first dusted, and then cleaned with a flannel dipped in sweet oil, using a small brush for the carvings, if there are any, and finishing with a silk handkerchief. The frame should be cleaned previously to the glass.

Looking Glasses, to Silver.—In the usual way, a sheet of tin-foil of the size of the glass is spread out upon a table; mercury is then poured upon it and rubbed about with a brush, and more mercury poured upon it until it makes a full line in thickness. The glass is now to be glided upon it, pressing its edge close down and along the tin. The glass must then be equally pressed with weights, and allowed to remain so for two or three days. For convex and concave mirrors, which cannot be so pressed, an amalgam is used that is formed of two parts of mercury, one of tin, one of lead, and one of bismuth.

Lucifer Matches.—We strongly recommend the new safety matches, which strike only on the box, and wish they were more generally used. We believe that many of the fires announced in the journals as supposed to be the work of incendiaries, have their real origin in the careless use of the ordinary matches; and we propose to point out some of the ways in which property is thus endangered. We feel quite confident that in many instances risk is incurred from want of knowledge. There are several kinds of matches in popular use. Of these probably the safest are those in which sulphur forms a large portion of the compound used for tipping. Such matches require considerable friction to ignite them, and unless some deflagrating substance like chlorate of potash, and kindred salts, is used, they do not detonate when ignited. Some matches in quite popular use are so explosive that they detonate almost like a percussion cap; and when they chance to be tipped too profusely, the burning material will be scattered to some distance by the sheer force of the explosion. We have seen the fused burning compound from such a match fly from one to two feet. The material thus scattered would in many cases do no harm; but in some instances it might kindle a disastrous conflagration. Falling into loose cotton, inflammable liquids, fine shavings, &c., it would be almost sure to ignite them, but as in such cases the fire is generally at once discovered, and is smothered out by the hand or the foot, the cases in which fires thus caused become disastrous, are still fewer than those in which they become so through the persons using matches being heedless, or worse, intoxicated. Unfortunately, heedless and tipsy people are not uncommon, and so far as we are aware, they are not prohibited the use of matches; hence it may be fairly inferred that occasional fires do occur by the use of matches which violently detonate, when with a safer kind of match no harm would accrue. In the hands of such people, the fusees used for cigar-lighting, as they hold fire for a considerable time, are exceedingly dangerous. Thrown down often before the fire in them is extinguished, glowing hot, they are, of course, likely to ignite almost any readily combustible substance with which they come into contact. The writer once extinguished a fire in a wooden box of sawdust, used as a spittoon, caused by a fusee cast away by an intoxicated person, and this would, doubtless, but for its timely discovery, have done immense damage. The dropping of a book once ignited a bunch of detonating matches lying on our table. Such an accident occurring at night, through the agency of some inquisitive cat, might well pass into the papers as the work of an incendiary. These matches are often dropped upon floors by persons too careless to pick them up, and are subsequently ignited by stepping upon them. Others who would stoop to pick up a whole match, would not think it worth their while to attend to a broken piece, although it might be, perhaps, the tipped end, and, of course, just as dangerous as the whole match would be should it chance to be stepped upon.

Lungs.—In our article on *Blood* (see page 56) we fully explained its nature and uses. Our article on *Respiration* describes how atmospheric air acts upon the blood through the lungs (see page 317); and in our remarks on *Exercise* (page 181), we have pointed out the importance of muscular action in connection with respiration, and its effect on the blood; while our remarks upon *Digestion*, *Indigestion*, and *Consumption* will serve to indicate the important bearing of all these matters upon the preservation of health. It must not therefore be thought inconsistent with the promise of our title when we give our readers these short papers descriptive of certain parts of the human organisation, since, without such FACTS, how to preserve health, comfort, and happiness can neither be clearly explained nor properly understood. The human lungs—vulgarly called lights—are soft spongy substances, of a conical shape, so light when in a state of health that they will float in water. The weight of the lungs, however, will vary with the proportion of blood, mucus, or serous fluid contained in them, but they are commonly found to be from 36 to 42 ounces. They are placed one on each of the side cavities of the chest, and their purpose is to permit the atmosphere to exercise its action upon the blood, which, in passing through them, is changed from a deep purple or blackish colour to red; in other words, from *venous* to *arterial* blood. When you hold your breath a sensation of suffocation is experienced. This is merely a nervous impression, due to the blood passing in its impure state through the lungs to the left side of the heart, and serves to illustrate very practically the vital importance of inhaling fresh air. The lungs, with the exception of the air tubes—branches of the windpipe that perforate in every direction—are a network of blood-vessels. Those near the surface of the lungs are divided into a multitude of small branches, the coats of which are so extremely thin that the air we breathe readily acts through them, to effect that change which is essential to life. Each lung has two lobes, one below and one above. When we consider that upon the good or bad state of the lungs both our enjoyment of life and its duration depend, we ought to regard very carefully all those causes by which perfect ease of inspiration and respiration are secured or interfered with. Colds and coughs, from which arise inflammation, tubercles, ulceration, and consumption, will then be less frequently neglected. Colds act upon the pores, producing their sudden collapse when the perspirative matter, being repelled, is thrown upon the circulation, introducing into the blood those elements of disease to which we have referred, which, left uncared for, develop into an evil, which defies medicine, and ensures death more or less speedily. (See *Respiration*, *Blood*, and *Consumption*.)

The following queries will enable any one to judge whether the lungs are diseased, and in what manner, and to what extent. They will also enable consumptive patients to consult a practitioner by letter:—

In what manner did the disease commence? What has been the duration of the cough? Is the chest narrow? or is there any malformation of the chest?

Is the neck long? Were there any tumours in the neck? or is there any disease besides that of the lungs? Is there any reason to suspect that the disease is inherited from a parent? or does consumption prevail in the family? Is there much expectoration? Does the cough commence by expectoration? or is it dry? Is expectoration easy or difficult? Is the matter expectorated clear, opaque, ill-tasted, or streaked with blood? and does it sink in water? Has there ever been a vomiting of blood? Are there any pains in the chest, and where? Can rest be obtained equally lying on either side? and is there any palpitation of the heart? Is the pulse frequent? and how often does it beat in a minute? Is the patient affected by heat and shivering? Is there costiveness? Is the sleep disturbed, and not refreshing? Is the skin hot and dry? or is there copious perspiration? Is there any purging? Is the urine high coloured? Does it deposit a sediment on standing? and is it offensive to the smell? Can a deep breath be taken in? Is there flushing in the face? Do the legs swell? Is there much emaciation? Have the whites of the eyes a pearly appearance? and is the hair of the head easily eradicated? Is the appetite good? or is there nausea or vomiting? Has high living been customary? or the too free use of spirituous liquors?

Lymphatic Constitutions.—Persons of lymphatic constitutions are generally possessors of soft flabby flesh, large lips, puffed faces, greatly-developed glandular systems, and require a generous and rich animal diet. (See *Diet*.)

Macaroni Grain-balls for Soup.—Roll out some macaroni paste very thin, cut into small squares dry and stiff enough to be rubbed through a grater.

Macaroni, To Cook.—One of the daily papers recently gave the following directions for cooking macaroni, derived from experience in Italy:—"Take a little fresh macaroni and put it into a saucepan with boiling water, and, after adding a little salt, keep it boiling about fifteen or twenty minutes, when it is removed from the fire and served up on a dish, flavouring it with tomato sauce, adding a little butter, salt, and pepper. This mode of cooking the Anglo-Italian macaroni my cook has tried with great success, and it makes a very serviceable dish. In the case of a family who are desirous to make a little meat go a great way, the housekeeper will take about half or three-quarters of a pound of beefsteak, and after stewing it for half an hour, will add a little tomato paste, and stew the same for another hour. The macaroni, having been boiled separately for fifteen or twenty minutes, may then be served up on the same dish with the steak, and flavoured further with tomato, adding salt and pepper to suit the palate; or the macaroni may be put into the same saucepan with the meat after the meat has been stewed; the whole should then be boiled for another twenty minutes, when it should be served up together and flavoured as desired."

Macaroni Pudding may be made in twenty different ways, and when judiciously flavoured, sugared, and iced in hot weather it is simply delicious. With reference to this kind of food two things should be observed: 1st. The macaroni should be sweet and fresh, which makes us prefer the Anglo-Italian in Naples form. 2nd. It should be put into boiling water, and kept at that temperature from twelve to twenty minutes. It is not very digestible. All unfermented pastry tries the stomach more or less.

Macaroons, how to Make.—Blanch a pound of almonds, and throw them into cold water, dry them in a cloth, and pound them in a mortar; moisten them with orange-flower water or the white of an egg to prevent them oiling. Afterwards take an equal quantity of finely-powdered sugar with three or four whites of eggs, a little flavouring; beat all well together, and shape them on a wafering paper with a spoon round. Bake them in a gentle oven on tin plates.

Mace and Nutmeg.—The nutmeg is the seed of the *Myristica moschata*, and mace is the soft fleshy coat enveloping the seed. The plant is a native of the East Indian Archipelago, and yields by pressure an oil used in medicine.

Mackerel with Vinegar.—Cut some fillets of mackerel about one inch in thickness; sprinkle each with pepper and salt, add a little butter, and pour over them a little essence of anchovy; place them in layers in a jar, which fill up with vinegar, and bake in an American oven or in a side one, as may be convenient.

Magnesia is an earth that is much less frequently met with than lime, and is never found alone. The stones in which it constitutes a considerable part are known by a peculiar greasy feel, as the *French chalk* (a steatite), which is used to take grease-spots out of silk; *lapis ollaris*, a bluish stone so soft as to be easily cut and fashioned by a turning machine into a variety of utensils; and lastly, *asbestos*, a fibrous stone that may be spun or woven into cloth. In such cloth, which is perfectly incombustible, did the Romans sometimes burn their dead bodies to preserve their ashes.

Mahogany, Artificial.—The following method of giving any species of wood of a close grain the appearance of mahogany in texture, density, and polish is much practised in France with such success, that the best judges are incapable of distinguishing between the imitation and real mahogany. The surface is first planed smooth, and the wood is then rubbed with a solution of nitrous acid. One ounce and a half of dragon's-blood, dissolved in a pint of spirits of wine and one-third of an ounce of carbonate of soda, are then to be mixed together and filtered, and the liquid in this thin state is to be laid on with a brush. This process is repeated, and in a short interval afterwards the wood possesses the external appearance we have described. When the polish diminishes in brilliancy it may be restored by the use of a little cold-drawn castor oil.

Maizena Puddings.—To four ounces of maizena add one quart of milk. Mix the maizena in one-fourth of the milk. Boil the remainder of the milk; add to it four ounces of sugar, to which you have given the flavour required; when on the point of boiling remove it from the fire, and mix by degrees with the maizena; when well mixed return it to the saucepan, and boil for four minutes. When cold pour it into moulds; put plain currant jelly round it. This may be flavoured with Rimmel's essence of cardinal.—*Gastronomic Art Journal.*

Mandram is a sauce used in the West Indies with beef and mutton. It is made thus:—Slice a cucumber, minced shallot, and a green capsicum and mix in a couple of tablespoonfuls of Madeira wine and vinegar.

Manures.—(See *Soils.*)

Marble Jelly.—If after a party there are any creams or jellies left put them in a cool place, and the next day put them all together in a mould; shake the mould gently to well mix them together; when this is done pour a little orange or wine jelly into the mould, taking care that it is quite cold, otherwise the mixture will become livid.

Marking Ink for Linen.—M. Kuhr recommends the following preparation:—One part of hypophosphite of soda and two parts of gum arabic are dissolved in six parts of distilled water. The tissue, linen, or cotton to be marked is thoroughly moistened with this liquid and then left to dry. After having become well dried, the following liquid, composed of one part of nitrate of silver and six parts of gum dissolved in six parts of distilled water, is used as marking ink with a quill pen. The mixtures here described are stated to yield an indelible and very deep black-coloured ink.

Marmalade of Cherries.—Take five pounds of stoned cherries, two pounds of loaf sugar; shred the cherries, wet the sugar with the juice; then boil the cherries and sugar until they reach a marmalade; when it is cold put it into glasses for use.

Marmalade, Orange or Lemon, how to Make.—Take the best Seville oranges, cut them in quarters, grate them to take out the bitterness, and put them in water, which you must change two or three times a day for three days. Then boil them, changing the water until they are tender; shred them very fine, take out the fruit and pips, and put the peel to a pound of pulp. Add a pound of double refined sugar; wet the sugar with water, and let it boil to candy heat (with a very quick fire), which you may know by its dropping, when it hangs like a hair. Then take it off the fire, put in the pulp, stir it well together, and set it on the embers. Stir it till it is thick, but do not let it boil.

Marrow, Animal.—Eaten in moderation the marrow of animals is nutritious and strengthening, resembling in its properties fat. In France it is dipped in a kind of batter, and then fried. If used too freely, like fat, it impairs the stomach, weakens the appetite, and deranges the digestion.

Marrow Pudding.—Pour on the crumbs of a penny loaf a pint of cream boiling hot; cut a pound of beef marrow very thin, beat four eggs well, sugar and nutmeg to taste, and mix them all well up together. You can either boil or bake it three-quarters of an hour; well cook; cut two ounces of lemon-peel very thin, and stick over when you dish it up.

Mashed Parsnips.—Boil the parsnips in plenty of water with a little salt; when they are soft, remove, scrape, and wash them; put them into a saucepan, with a little milk or cream, stir them over the fire until thickened; add one ounce of butter with a little salt, and when the butter has melted put them into a hot basin ready to be turned out into the vegetable dish.

Mastication.—During mastication food becomes properly mixed with the saliva and mucus of the mouth, which render it easy to be swallowed, and at the same time is of great consequence to health in fitting it for digestion. and assimilation. (See *Food* and *Digestion.*) The wise know well enough that the great art of digesting food is, first, to well masticate it. As the French express it in a proverb which is literally true—"Meat well masticated is half digested." When any derangement in the teeth of horses prevents them from chewing their food, the hide becomes hard and dry, more like the covering of a hair trunk than of a living animal. Mr. Walker, in his "Original,' relates the case of a young lady who was subject to dreadful fits, for which no remedy could be discovered, till a physician found out that her teeth were in such a state as effectually to prevent mastication. He adopted the strong measure of causing all her teeth to be drawn, and a fresh set put in, after which she completely recovered.

Mead or Metheglin.—A wholesome, agreeable liquor, prepared with honey boiled in water, which was very popular in the olden time. The expression "honeymoon" owes it origin to the ancient custom—derived from the Teutons—of drinking mead during the thirty days' feast of weddings.

Meals.—What to eat, drink, and avoid, the periods best adapted for meals, and the intervals which should elapse between them, are matters which ought to receive far more attention than is usually given to them. First, and most important, is the necessity for regularity in the periods selected for the meals. This may be received as a general rule of primary importance, but with regard to other rules for general dietetics, the words of Dr. Granville may be advantageously quoted. He says in his amusing and useful work, "Travels to St. Petersburg," "To lay down general rules for dietetics, to predict or threaten the same terrific catastrophe to every sinning gourmand, to explain by the same unvaried cause, 'indigestion,' every complaint which flesh is heir to, is absurd, even when such generalisations are confined to a large class of society in this country, without wandering abroad. One can no more find two stomachs alike than two noses alike. The whole secret lies in learning how the stomach of the patient has been *educated*, and according to that education to deal with it. This involves an individuality in the attention to be given to cases of stomach complaints, which physicians would find too troublesome; yet without it justice cannot be done to the patients. It is sheer nonsense to talk of classing *human* stomachs and *civilised* stomachs, stomachs of drunkards and stomachs of abstemious people, stomachs of aldermen and stomachs of Pythagoreans, stomachs of literary men, lawyers, physicians, and parsons, and so on, under one and the same denomination and rule. Each has had its physical education, as peculiarly different from that of the rest as that which the possessor has received in the nursery or at college, and each must be dealt with accordingly." The following rules, given by J. A. Paris, M.D., F.R.S., for those who are smarting under stomach complaints, although in some cases they may be found inefficient, will in most cases prove serviceable. (See *Indigestion*) :—

I. "The principal solid meal should be taken in the middle of the day.

II. "Four hours after which a liquid meal should be indulged in.

III. "The digestion of one meal should be always completed before fresh labour is imposed pon the stomach.

IV. "The intervals at which food is to be taken must be regulated by the digestive powers of the individual, and the rapidity with which they are performed.

V. "The patient should never take his meal in a state of fatigue.

VI. "Exercise should always be taken three or four hours after dinner."

Children's meals should be given at intervals of about four hours. Breakfast at about half-past seven; dinner at twelve o'clock; the afternoon meal at about four; and supper at seven o'clock. (See *Diet.*)

Breakfast.—The most proper time for this meal to be taken is about an hour after you have risen from bed, and it is advisable to have a short gentle walk in the open air before partaking of it—weather, of course, permitting—fatigue or violent exertion being always avoided. The nature of the meal should be decided by appetite, state of health, age, &c. (See *Diet.*) The delicate and dyspeptic should avoid new bread and hot buttered rolls, as the oily part of the butter, being separated by the heat of the liquid taken with it, would be apt, by remaining in the stomach, to produce heartburn and other distressing symptoms. Buttered toast had also better be avoided by such persons, for the butter, being fried or empyreumatic in the process of preparation, is apt to be converted into an acrid fluid, which disorders the stomach, impairs digestion, and excites rancid eructations. (See *Cooking.*) When the usual liquids—milk, tea, or coffee—occasion acidity in the stomach, a useful substitute may be found in thin water-gruel or barley-water. Persons of weak or sensitive organs may often observe that the strong coffee usually taken at this meal has a tendency to check digestion. Neither tea nor coffee can be said to be nutritious in an equal degree with cocoa and chocolate, which are often substituted for them.

Meat.—(See *Animal Food*, *Diet*, *Lamb*, *Mutton*, *Beef*, *Pork*, *Veal*, &c.)

Preserving Meat Fresh.—The flesh of all animals, poultry and game (drawn), is much better, in the warm weather, when it can be placed in a cool cellar, a deep well (tied in a linen bag, and hung by a rope near the water), a refrigerator, or an ice-house for a day or two; this will render the flesh cool and firm enough for eating. When it is necessary to send or carry any kind of fresh provisions great distances, such as butcher-meat, poultry, game, or fish, either article should first be kept in a refrigerator, or other cold place, until thoroughly cold, then wrapped in a coarse linen cloth, around which should be placed cabbage-leaves or other green leaves, and the whole again wrapped and tied up in a coarse cloth, and placed in a basket, when the articles may be carried from six to ten hours without danger of becoming sour or tainted. Poultry, game, or fish should be drawn, and a piece of charcoal wrapped in a linen cloth be inserted into the drawn parts; as the intestines, when left in, are apt to give the flesh a disagreeable flavour.

Joints of Meat.—(See also *Beef, Mutton, Pork, Veal,* &c.) The animal, after having been killed and dressed, is called a *carcase;* the one half (a hind and fore quarter) a *side;* and the separate quarters, a *hind quarter* and a *fore quarter.* The same terms apply to mutton, lamb, veal, pork, &c.—in fact, to almost all animals. The whole carcase, before being "split down," or divided through the back, has been occasionally roasted whole. Five times out of six, part of the carcase would be invariably spoiled or tainted by this process, as it is almost impossible so to apply the heat that the inside of the thick parts becomes sufficiently done. Consequently, while some parts are about half roasted, other portions are burnt and the greater part heated just enough to make it turn sour, and, of course, unfit to be eaten. No doubt large iron spits or skewers could be forced or introduced through the thick parts, which, when properly heated, would produce the desired effect.

Meat, Essence of.—This is useful for the sick or in cases of extreme debility, when it is desirable to give as much nourishment as possible without troubling the patient with a large quantity of food. Put two pounds of beef and the same of veal in a covered jar placed in a sacepan full of water; stew for twenty-four hours, carefully watching that the water does not reach the meat; strain, and let it stand till it is a jelly. Half a teacupful of this warmed will be found very nourishing.

Meat, Extract of.—Respecting Liebig's extract of meat, Mr. Bramwell, C.E., in the mechanical section of the British Association, pointed out that it was claimed for this that a one-pound jar represented thirty-two pounds of ordinary meat. Its composition was water and, in large quantity, the salt of meat and the phosphates. It contained only the soluble parts of meat, and such as could be preserved from putrefaction. The fibrine, or solid substance, of the meat was excluded, for that was insoluble in water. The fat was excluded most carefully, as it would become rancid. Gelatine and albumen were excluded, because they would decompose. When, therefore, fibrine, gelatine, and albumen were excluded, it was certainly not "meat" which was left, as the word was understood, for nearly every part of the meat which could be transformed in the body and act as food was excluded; therefore Liebig's extract of meat was not meat, and to give the meat-power the thirty-two pounds of meat from which it was said to be taken must be added to it, for as it was it was the play of "Hamlet" without the character of Hamlet. The product was of less value to the consumer than to the producer, and the preparation was of a delusive rather than a real advantage; but, although he said this, he held that it had a value as a stimulant in the same way as theine or caffeine; but its economic value was very small as representing thirty-two pounds of meat in a one-pound jar. There had been much misconception respecting the product, for Liebig never affirmed that it was meat or the equivalent of meat. Nevertheless, it is good useful food.

Meat Preserving.—The following hints may be acceptable to our readers:—Meat taints soon, and very few persons know how to render it, when tainted, fit for use. Some rub the joint over with pyroligneous acid, which effectually prevents it turning bad, but gives it a very disagreeable flavour. To preserve meat you should thoroughly examine it when it comes from the butcher's, carefully remove any flyblows, if there are any, wipe with a perfectly dry cloth all the flaps and crevices so as to leave no damp, which soon imparts a disagreeable taint to meat, cut out all the kernels and perceptible veins, wrap a piece of muslin lightly round the joint, sew it up, and hang it, if possible, in a current of air in a cool place.

Meat, Washing.—The microscope shows that on the outside of uncooked meat there is a deposit which a mere rinsing in water will not remove, and as it is not desirable that this should be boiled off in the water the meat should be well and thoroughly washed before cooking, and afterwards carefully wiped dry.

Medals, to take Casts from.—Having oiled the surface of the medal with a bit of cotton wool dipped in oil of olives, put a hoop of paper round it, standing above the surface of the thickness you wish the mould to be; then take some plaster of Paris mixed with water to the consistence of cream, and with a brush rub it all over the surface; to prevent air-holes appearing add more plaster immediately to make it sufficiently thick. In about half an hour it will be so hard you may take it off; then pare it smooth on the back and round the edges neatly; dry it before a brisk fire if the weather be cold or damp. To prepare the mould for casting sulphur or plaster of Paris in, take half a pint of boiled linseed oil and one ounce of oil of turpentine, mix them together in a bottle; when wanted pour some of it into a flat vessel, and dip the surface of the mould in it; take the mould out, and when it has sucked in the oil dip it again. Repeat the operation till the oil begins to stagnate upon it, then with a little cotton wool rolled hard wipe it carefully off; lay it in a dry place for a few days, and it will acquire a very hard surface. To cast plaster of Paris in this mould proceed as above directed for obtaining the mould itself, first oiling the mould with olive oil. If sulphur casts are required, melt the sulphur in an iron ladle. Sulphur must not be poured on silver medals, as it will tarnish them.

Medical Prescriptions.—It will help our readers to understand these if we append a few of the abbreviations and characters used by physicians. *R*, recipe, take; *à*, *àà*, or ana, of each the same quantity; *s s* means the half; *cong*, *congius*, a gallon; *coch*, *cochleare*, a spoonful; *coch ampl*, tablespoonful; *coch parvo*, teaspoonfuls; *M.*, *manipulus*, a handful; *P.*, *pugil*, a pinch taken between the thumb and fore-finger; *q s*, quantity sufficient.

Medicine.—If in the education of every girl a course of tuition in domestic medicine were included, we should hear less of human disease and suffering, and of a very much smaller proportion of deaths in childhood. Not one wife or mother in a hundred knows anything about the originating causes of diseases, or of the symptoms by which they are first recognised. Gross mistakes, involving life-long misery, errors by which the most serious dangers are created, may be commonly traced to a want of the simpler portion of such knowledge as a good work on domestic medicine popularly treated would supply. Medical men would be called in more frequently in some cases if some knowledge of disease, its causes and consequences, were more common, but their presence would be far more frequently altogether dispensed with. In how many cases have valuable lives been lost to their families or their country for want of some simple morsel of practical medical or physiological information, which would have at once taught the sufferers how to obtain relief, and those who were in danger the way in which safety could be sought! Medical men cannot always be obtained when they are wanted, and every wife and mother ought to know enough of these matters to do all that is most necessary for the requirements of the minute. Herodotus tells us that the Babylonians and Chaldeans had no physicians. The art of healing was not a profession until the days of Hippocrates, who was justly named the father of medicine. Pythagoras was amongst the earliest teachers of medicine, and his followers were Anaxagoras, Democritus, and Heraclitus. Plato was a physician, so was Aristotle, Herophilus, and many other great thinkers. Rome existed for ages without a physician. There have been polished courts in which the office and almost the name of a physician were unknown. Whitelock, who was the English ambassador to the Court of Sweden in the time of Cromwell, reported that Queen Christina had no physician. In olden times when there were no physicians by profession, women and ministers of religion played their parts, and, all things considered, played them remarkably well. Indeed, if the practice of medicine for the benefit of the suffering poor were still in the hands of clergymen, it would more than double their influence for good, and enable them to confer the greatest possible of earthly blessings on the poorer portions of their flocks. They might then do more than console and sympathise in trying scenes of distress and sickness, by affording relief to the poor sick body, as well as consolation to the anxious mind.

The medicinal preparations of the ancients were taken almost entirely from the vegetable kingdom, though the Arabian school of medicine, which arrived at great eminence while the Saracens were masters of Spain, was well acquainted with several metallic remedies. The researches, however, of the chemists, or rather alchemists, of the Dark Ages first brought fully to light the great value of the metals in the hands of the physician, and this credit these ingenious individuals are at least entitled to, though we may smile at their absurb attempts to transmute baser minerals to gold, or to find out the elixir of life. They made thus a most important addition to the number of medicines, and effected a change in the healing art which is felt to the present time. The liability of herbs to spoil by keeping, whether in the state of roots, leaves, or seeds, gave a great superiority to the mineral preparations, which retain their power for a long period. At the time when they were first introduced, the sensation excited was so great that the numerous believers in their virtues were called, in contradistinction to the admirers of vegetables, "the chemical school." This sect went so far as to refer all the functions of the body to chemical processes, and to treat all diseases upon chemical principles. The discovery of the circulation of the blood founded a new set of philosophers, who maintained that the body was entirely framed upon and regulated by mathematical laws. Though this was supported by some eminent men, and for a short time superseded the chemical theory, yet its total failure to account upon mechanical principles for all or any of the vital actions, soon caused it to fall to the ground. It is scarcely necessary to mention any other changes in the progress of the science of medicine, and indeed those taken notice of are of consequence only from their effects on the nature of the remedies for disease. During the eighteenth century, anatomy was prosecuted with deep attention, the nature of medicinal preparations closely investigated, and their number increased; the result of which was the reduction of the practice of physic to principles more agreeable to reason and to truth. Men, too, partaking of the wide spread of knowledge during the period mentioned, began to object to nostrums when labouring under illness, and became reluctant to swallow a dose without being informed of the nature of the action, and the effects expected. Hence medicines, instead of being applied indiscriminately to every species of disease, were arranged into some sort of order, and classified according to their known operation. This is the most simple method of viewing the range of medicinal substances, and it is the one we shall adopt in the present article, though it will be impossible to enumerate any other medicines than those principally in use. Some substances employed in the cure of diseases act mechanically, and others chemically, on the system, but by far the greater portion of them act vitally. A medicine is said to act mechanically when its effect on the body is the same as that which it exerts over inanimate matter. Demulcents, for instance, or remedies taken to remove the acrid effects of some other substance, operate simply by coating the stomach with a gummy fluid, an action which is entirely mechanical. The chemical operation of medicines may be thus explained:—When an acid and an alkali are mixed in a glass of water, they unite, and form a third substance, which is a salt, having altogether new properties. The same mechanical process takes place when sourness, or an acid, is neutralised in the stomach by soda, or any alkali. The vital action of medicines differs totally from the two former. In this case the substances are absorbed into the blood, and are conveyed by the vessels of the heart to the quarter whither their nature determines them. Diuretics, or medicines which stimulate the urinary organs, may form an example of vital action. From the stomach the diuretic is absorbed into the blood-vessels, and carried to the kidneys, stimulating them to the secretion of the urine, though by what process of separation from the rest of the blood we know not. In these three divisions—mechanical, chemical, and vital agents—all the articles used in medical practice may be comprehended and after this general explanation we may examine the particular classes of each division, commencing with the most important—the vital agents. The class of purgatives (the strongest are called cathartics, the weakest laxatives) is the best known and most commonly used of any description of medicines. They must be arranged under three heads: those of an oily, saccharine nature; those which are derived from vegetables, such as resins and extracts; and those formed by a combination of acids with earths, alkalies, and metals, termed neutral and metallic salts. The operation of all these three is upon the mucous or inner membrane of the bowels, though in their effects they differ considerably from each other. The first-mentioned seem simply to discharge the contents of the bowels; the second appear to increase the quantity of matter evacuated, by stimulating the mucous membrane, and increasing the natural flow of mucus; the third produce evacuations of a watery consistence. These particulars might perhaps appear unseemly, did not the usefulness of the information present what may be regarded as a sufficient excuse; because, in cases of illness, where medical advice is either not at hand or deemed unnecessary, the patient may employ such of these remedies as he may think best suited, from the description given of their action, to his particular case. The principal purgatives of the oily or saccharine kind are castor oil, olive oil (seldom used), manna, tamarinds, honey, and so forth. Croton oil, an essential oil (that is to say, procured by distillation, not by expression as the castor oil is), is scarcely to be included in the class of oils, as its great strength prevents its being used except in desperate cases. The medicine dose of the castor oil is one ounce, of the croton oil a fraction of one drop. The former is imported in immense quantities into this country annually. It is one of the most useful and safe medicines of the purgative class. The rest mentioned are exceedingly mild in their operation, and are generally employed merely to palliate the bad flavour of some stronger drug. The second kind of purgatives includes aloes, scammony, jalap, colocynth, senna, and rhubarb. The general character of all these has been given above, although the rhubarb possesses one remarkable distinction from the others. It is supposed to act on the muscular membrane of the bowels, producing a natural discharge simply, without altering the character of the fæces. The principal neutral and metallic salts which form the third order of purgatives, are sulphate of soda, Epsom salts (sulphate of magnesia), cream of tartar (supertartrate of potash), phosphate of soda, and calomel (submuriate of mercury). The latter is the most universal in its application of all medicinal preparations. By proper regulation of the dose, and in conjunction with other drugs, it can be employed with benefit in almost every disease to which man is subject. But in proportion to its usefulness, so is its danger when misapplied. The dose should be very small at first, and cold ought always to be guarded against during its use. With respect to the others, little can be added to the general description already given, though it may be mentioned that the pleasantest, though not the cheapest, of all medicines, is the phosphate of soda, or tasteless salts. Sudorifics, or medicines which increase the cutaneous perspiration, form another important class of vital remedies. Certain substances, received through the stomach into the blood, excite through it the vessels of the skin to action, and increase the natural discharge. The mode in which this result is effected is not well known. All we know is that during the operation the heart, and the blood-vessels which terminate on the surface of the skin, are roused to unusual action. Among the most active sudorifics may be enumerated, warm drinks, the warm bath, the preparations of antimony, including James's powder, Dover's powders (composed of ipecacuanha powder), the preparations of ammonia, and all medicines generally which nauseate the stomach. Probably of all these Dover's powders are the best. Sudorifics, in almost all cases, when early used, prevent the effects of colds, which when neglected often prove fatal in their consequences. Emetics are another class of remedies acting through the blood, and of very general use. It might have been supposed, that as they act directly and speedily upon the stomach, that they were not absorbed into the blood. But such is not the case. Tobacco, for instance, taken into the stomach, excites vomiting, but it is from its reception into the circulation; because if the tobacco be laid on the arm the same effect will be produced. Some emetics, indeed, appear to act principally on the muscular covering of the stomach, exciting it to contraction, and thereby causing the expulsion of the contents. The most active emetics employed in medicine are tartar-emetic, ipecacuanha-root, chamomile-flowers, mustard, and white and blue vitriol. The two first of these are most commonly used; the latter being the gentler, and perhaps on that account the safer in ordinary cases. Diuretics are those medicines which operate in promoting the flow of the urine, by stimulating the action of the kidneys, the organs which secrete it. This class is very numerous, though the manner of their operation, like that of all other vital agents, is not thoroughly understood. Those chiefly employed in practice are squills, foxglove, juniper-berries, potash, cream of tartar, acetate of ammonia, nitric ether, and Spanish flies. All these act powerfully on the urinary organs; those in highest repute being squills, foxglove, juniper, and cream of tartar. The first and the last of these are the most efficient, being more certain in their action than the others. Warm fomentations are useful accompaniments in all cases. Expectorants are used to promote the expulsion from the lungs of those fluids which are secreted during colds, and lodge there, causing difficult breathing, and sometimes ending in injury of their structure. Thus those remedies which promote expectoration are of great consequence to health, though often neglected. The principal medicines of this class are antimony, squills, ipecacuanha, and gum ammoniac. Syrup of squills is the preparation in greatest use. Carminatives are those medicines which produce the discharge of flatulence from the alimentary canal. This malady is more annoying than dangerous, though it rises occasionally to a most painful height. The warm essential oils, such as carraway, anise, or peppermint, and some aromatic stimulants, as cinnamon and ginger, are the best carminatives. All those classes of medicines which we have hitherto mentioned are called evacuants from the nature of their operation ; and we may now describe another order of medicinal preparations, acting like the former through the medium of the circulation, but repressing instead of stimulating the powers of the system. There are only two distinct classes of medicines of this kind, narcotics and antispasmodics, though the first of these has sometimes been divided into two, narcotics and sedatives. Narcotics are those substances which diminish the natural degree of action in the body, and tend to remove irritation or pain, inducing in general a state of repose. Before this quieting effect is produced, however, there is a primary excitement of short duration, which is well exemplified in the case of opium. Sedatives, viewed as a separate class, are believed to allay pain and promote sleep, without possessing any stimulating qualities ; but it is far from being clear that we have any simple sedative medicines at all. Opium, which is almost exclusively employed as a sedative, is universally admitted to have a primary exciting quality. Unless where excessive pain is present, narcotics may be regarded as a class of medicines only to be used with great caution, and never free from danger. Opium and its preparations, lettuce extract, henbane, foxglove, hemlock, and tobacco are some of the strongest narcotics. It is difficult to say which of these is the safest when a sedative is required, though probably the preparation from lettuce has the slightest stimulating powers. Morphia, a drug procured from opium, is said to possess the sedative without the exciting effect. Antispasmodics are used to remove spasms or convulsive contractions of the muscular fibre in the body, and are so similar in their action to the last-mentioned class as scarcely to require a separate notice. Opium, camphor, ammonia, valerian, and assafœtida, with most of the narcotics, are the antispasmodics generally in use. There is another class of medicines acting by absorption into the blood, or as vital agents, which cannot be ranked either amongst those which excite action or those which repress it. These are stomachics and tonics, the former increasing the digestive powers of the stomach, the latter renovating the tone or contractile energies (see also *Drugs*) of the muscular fibre. They are slow in their operation, and augment the strength of the body without materially exciting its actions. As these two kinds of medicines are not very distinctly separable, it may be better to enumerate them together. Good nutriment is the most natural and best supporter of the bodily powers, but to effect this purpose it is necessary that the function of digestion should be in a proper condition. Gentian root, quassia, chamomile, columba, and canella assist powerfully this object. Amongst the tonics, Peruvian and cascarilla barks, the preparations of iron, the sulphuric and nitric acids, are in greatest repute.

Many of these highly-important facts have been collected from an article which was published in *Chambers' Edinburgh Journal*. The following table of the doses of medicine which may be given at different ages, based on the supposition that the dose for the adult is represented by 40, will be found useful :—

Years	25	20	15	14	13	12	11	10
Doses	40	35	30	29	28	27	26	25

Years	9	7	6	5	4	3	2	1
Doses	24	23	22	21	20	18	16	13·10

Months	11-10	9-8	7-6	5-4	3	2	1	½
Doses	9	8	7	6	5	4	2	1

Thus, if eighteen grains of a powder

were given to a boy three years old, two grains would be the dose of the same for an infant aged one month. Medicines act differently on the same individual in summer and in winter, and in different climates. Narcotics act more powerfully in hot than in cold climates; hence small doses are required in the former, but the reverse in the latter. In conclusion we must warn our readers against being too ready to seek the aid of medicines. So much skill and knowledge are essential to their proper use, that even the celebrated Dr. Baillie wished he could be sure that he had not killed more than he had cured, and Dr. Paris said, "The file of every apothecary would furnish a volume of instances where the ingredients of a prescription were fighting together in the dark." Sir Astley Cooper's famous declaration, "That the science of medicine was founded on conjecture and improved by murder," will not be forgotten. Sir William Hamilton, in a work which the *Athenæum* called "the most profound book that the age has produced," said, "In Hoffman's dissertation 'On the Seven Laws of Good Health,' the last and most important of these is, 'Fly doctors and doctors' drugs, as you wish to be well;" and this precept of the great physician is inculcated by the most successful practitioners—or non-practitioners—of ancient and of modern times. If men of this stamp regard medicines as so uncertain even in their hands, what are they likely to be in non-professional hands? It is well to know something of the nature of drugs, but avoid them as long as you can.

Mercury, or Quicksilver, which differs from all other metals in being fluid in the temperature of this climate, has, however, been frozen both by the natural cold of high Northern latitudes, as at Kamschatka, and by artificial cold, produced by mixtures of snow and aquafortis. It is found to congeal at forty degrees below zero of Fahrenheit's scale. Mercury unites with other metals, forming a soft mass termed an amalgam. On this property depends the art of gilding, as above described, and also the art of coating looking-glasses. Mercury when combined with sulphur is called cinnabar, whether it is a natural or artificial combination; and the best when finely levigated forms the beautiful paint called vermilion. It is usually in the form of cinnabar that mercury is found in the mines; but sometimes it is found pure in beds of calcareous earth or of clay. There are but few mines of quicksilver; the greatest quantity is procured from Spain. To separate the mercury from sulphur, quicklime or iron-filings are added to the cinnabar to detain the sulphur, whilst the heat drives off the mercury.

Meteoric Stones.—The earliest record of falling meteoric stones, or aërolites (air-stones) is that of which Livy wrote, when, in 654 B.C., a shower fell on the Alban Hill, near Rome. In the year 1492, on the 7th of November, a fall of these stones took place in Alsace just at the time when the Emperor Maximilian, then King of the Romans, was on the point of engaging the French army. In April, 1803, a shower fell at L'Aigle, in Normandy. The stones were hot and smoked visibly, and there were collected within an elliptical area of about six miles long by three broad, from 2,000 to 3,000, ranging in weight from two drachms to 17½ lbs. On January 10th, 1623, a stone fell with a noise like that of thunder in some part of the manor of Stretchleigh, in Devonshire, near where some men were working in an orchard. It was buried 3 ft. in the ground, and its dimensions were 3½ ft. long by 2½ ft. wide, and its thickness was 1½ ft. In August, 1628, several meteoric stones fell, weighing from one to twenty-four pounds, at Hatford, in Berkshire. In May, 1860, several of these stones are said to have fallen near London. The total number of aërolites which are recorded to have fallen in Great Britain, from 1623 to the present date, is twenty, of which number four fell in Ireland, and the same number in Scotland. The Greeks thought these stones fell from the sun. In the Middle Ages it was supposed that they fell from the moon, but it was not until 1794 that the subject received scientific investigation; when Albers showed that in order to reach our earth a stone would have to start from the moon at an initial velocity of 8,292 ft. per second, when proceeding downward with increasing speed, it would have attained a much greater velocity than it had been shown it actually had—namely, that of 35,000 ft. per second. Meteoric stones resemble the rocks and minerals of our earth in their composition, the predominating element being iron in a native or metallic state, and are always fused over their exterior surface. Their specific gravity is from two to seven or eight times that of water.

Microscope, Cheap Substitutes for a.—If a concave mirror be arranged in a darkened room, and any object be placed before it, a reflection of that object will be thrown on the opposite wall. The only things required for the success of the experiment being that the mirror should be placed at a proper distance from the wall, which will depend on the curvature of the mirror, and that the object shall be lighted up, either by the beam of light falling directly on it, or by the light from a powerful lamp. There is this peculiarity about the reflection cast on the wall, that the object appears highly magnified. Those boys who do not possess a microscope may thus learn much of the structure of minute objects. If a thin slip of glass, on which a little sour paste is smeared, be held in the bright beam of light proceeding from the mirror, an enlarged representation of the eel-like creatures living in it will be seen on the opposite wall. They may thus be seen moving and twisting about as though they were the living creatures themselves, and not their enlarged images, that were being looked at. The wings of butterflies and other insects may thus be represented, showing their wondrous structure. Or if a few drops of stagnant water from a pond be enclosed in a box or cell, made of thin, clear glass, the magnified images of the insects within it will show us how they pursue and devour each other. By this means also a magnified representation of the sun may be obtained. For when the position of the sun in the heavens happens to be exactly opposite the hole, an image of it will fall on the concave mirror, and will be from thence reflected on the wall. In this way, with a suitable mirror placed at a proper distance from the wall, it is often possible to obtain a representation of the spots upon the sun's surface.

Milk, to Preserve.—Place the milk in a bottle over a slow fire in a pot of water. Let the bottle remain in the water half an hour after it has boiled, and then cork it tightly.

Milk for Mending Broken China.—One of the very best methods of uniting pieces of broken china is by the use of boiling milk. The broken surfaces must be very clean, and brought into the closest contact by means of twine, which, after being loosely tied, should be twisted up so as to create considerable pressure. The article to be mended having been thus prepared, is placed in a pot and covered with milk that has been carefully skimmed. The pot is placed on the fire, and the milk allowed to boil gently for an hour or so. After being taken out and allowed to cool the pieces will be found very firmly united; but it is advisable to leave them tied together for at least a week or ten days, after which they may be freely handled, and exposed to moderate degrees of heat and moisture.

Minced Eggs.—Boil five eggs hard, and cool them in water; remove the shells and mince them; boil half a pint of new milk, add three-quarters of an ounce of flour and one ounce of butter mixed together; chop up and add half an ounce of parsley, season with salt and pepper; boil for five minutes, then add the eggs and shake well together until the whole is thoroughly heated. Do not stir it, and garnish with toasted sippets and lemon. This dish is a great favourite on the tables of vegetarians.

Mince Pies.—Take three pounds of plums, with the same quantity of currants, add the juice of six lemons and six oranges, with four grated nutmegs and the orange and lemon peel after it has been boiled well to extract the bitterness. When these materials are well mixed and minced, put them aside in a jar, adding two glasses of brandy. Melt one pound of butter before a fire, without suffering it to become oily, and add this with one more glass of brandy, and tie securely down. It should not be kept less than six weeks before it is used for the pies.

Minced Fowl and Cucumber.—Cut the meat of a roast fowl into small pieces, putting aside the skin. Peel a couple of cucumbers, divide them into quarters longways, and stew them in some veal steak for about twenty minutes, taking care that it does not boil. In this sauce let the meat be thoroughly warmed, and it is fit for table.

Mineral Waters. — The term mineral water has, by common consent, been given to all natural waters which have been found useful in the treatment of disease; and it has generally been restricted to such waters, although there are many others that contain larger quantities of different mineral productions. Some, as the Malvern waters, in Worcestershire, are chiefly useful in consequence of their containing less heterogeneous matter than even common spring water, and yet these are denominated mineral waters; whilst various others, containing the sulphate of copper, large quantities of common salt, and other mineral productions, are seldom enumerated among the mineral waters, because not applied to medicinal purposes. It is very difficult to free any kind of water from all foreign admixture. Even rain, or snow-water, contains a portion of calcareous earth, besides a quantity of common atmospheric air, nor is it wholly deprived of the former by repeated distillations. What we denominate hard waters contain selenite (a sulphate of lime), and generally chalk. (See p. 218.) Many springs afford good wholesome water, suitable for all domestic purposes, but impregnated with small quantities of different kinds of salts, with iron or with fixed air. It is only those waters, that by their containing greater abundance of these impregnations, or from some other cause, have obtained considerable celebrity in the treatment of diseases that we shall now notice; and these we shall class, and describe in order, according to their predominant qualities.

Cold Spring Waters.—Several springs have acquired celebrity, which are remarkable for their purity, containing much less of earth or saline impregnations than the spring waters in common use.

Thermal, or Warm.—The most celebrated of this division are Bristol, Matlock, and Buxton waters, which are tolerably pure waters, containing no metal or metallic salt, and no great quantity of other foreign matter. Their virtues chiefly depend upon their warmth; and the advantages received by invalids visiting these resorts are in a great measure derived from other adventitious circumstances, as variety of scenery and change of air, the general warmth of Bristol, or the enchanting scenery of Matlock, never failing to excite to exercise. These waters being amongst the most noted in the kingdom, deserve more particular notice, and shall be, therefore, treated of separately.

Bristol Hot Well.—This pure, warm, and slightly acidulated spring was found to contain less solid matter than most common springs, but considerably impregnated with fixed air. Its temperature upon an average was reckoned at 74°. The site of Bristol hot well is peculiarly favourable to invalids, being sheltered from the north-east and west winds, and only open to the south. It is chiefly on this account that it obtained so much celebrity for consumptive patients.

MATLOCK, IN DERBYSHIRE.—There are several springs here uniformly warm, being at 66°. The water is a pure spring water, without any impregnation of fixed air. It may be drunk in all cases where a pure diluent is advisable, but its notoriety chiefly depends upon its use as a bath. Though warm, it is considerably below the temperature of the body, which is commonly 97° or 98°. Immersion in the Matlock bath is therefore attended with some shock, though appreciably less than common cold or sea-bathing. It is chiefly recommended in chronic rheumatism, and all such cases as require ultimately the cold bath; but where from the delicacy of the patient's habit it is necessary to bring him gradually to its use, it forms a proper intermediate bath between Bath or Buxton and the sea.

BUXTON, IN THE PEAK OF DERBYSHIRE.—This water is, like the last, as pure as common spring water, except that it contains a small quantity of azotic gas, and a larger quantity continually escapes in bubbles to the surface of the water in the springs. This gives to it no particular flavour or appearance, and, as far as yet known, no particular medical virtues. Its temperature is at 82°, being considerably warmer than that of Matlock, though not so warm as that of the human body. Its chief use as a bath is in cases of partial loss of motion or of sensation, particularly after rheumatism. As an internal remedy it is serviceable in cases of indigestion from free living, and in the diseases of the urinary organs. Its utility in gouty affections is more doubtful.

CHALYBEATE.—Bath water, though slightly chalybeate, contains so small a proportion of foreign ingredients that it may properly be considered after the simple thermal waters. The climate of Bath is mild and genial; its waters have three principal sources, which supply the King's bath, the Cross bath, and the Hot bath, which differ somewhat in their temperature as well as contents. The first is at 116° when fresh drawn, and about 106° in the bath, whilst that of the Cross bath, which is coldest, is only 112° at the pump, and from 92° to 94° in the bath. The former is likewise more chalybeate; although even that is so slightly so, as only to be evident to the taste when warm, and not at all when cold. Besides this small quantity of iron, Bath water contains some fixed air, though not so much as to render it sparkling, or at all acid to the taste. Its other ingredients are calcareous salts, enough to render the water hard, a minute portion of neutral salts, and of silicious earth, and a small quantity of azotic gas. Used internally, Bath water sometimes produces headache, dryness of the tongue, and a feverish pulse; when this is the case, its further use should not be advised. When likely to prove beneficial it produces an agreeable glow in the stomach, and an increase in the appetite and spirits; it also quickly determines to the kidneys. Bath water, both internally and externally applied, is very beneficial in chlorosis, in irregular gout, and the secondary stage of rheumatism. In paralytic affections, where there is no particular determination to the head; in jaundice, and other liver complaints, brought on by residence in hot climates; and in most hypochondriacal and dyspeptic cases the use of the Bath waters is highly extolled. In cases of old sprains, or the partial effects of rheumatism, the topical applition of the water by pumping it upon the part is frequently serviceable. We have no other hot chalybeate waters in this country, but on the Continent several have gained great celebrity, as Vichy waters, in the Bourbonnais, a mountainous district in the centre of France; which waters, besides being chalybeate, are alkaline, containing a very perceptible quantity of mild soda. Their temperature is about 120°.

COLD, CARBONATED.—This division of mineral waters is the most abundant, not only in this but in other countries. Besides fixed air and iron, many of them contain no foreign ingredients but such as are found in the most common springs. The quantity of these two ingredients, to which they all owe their virtues, varies considerably in different waters. Such as contain but a small quantity of the gas, not sufficient to give it a sparkling appearance, are termed simple carbonated chalybeate waters; and of this kind are all the simple chalybeate springs in this country, as Tunbridge, &c. Those chalybeate waters that sparkle, and are sensibly acid from the abundance of the gas, are called highly carbonated chalybeate waters. Of this class are the Spa waters, in the principality of Liege; and the Pyrmont waters, in Westphalia, which are often imported into this country, and are the mineral waters that we most frequently imitate by artificial means. Amongst the simple chalybeate waters of this kingdom, that of Tunbridge Wells is very popular, but those of Hampstead and many other places are of the same class, and many of them as strongly impregnated. There is a cold chalybeate at Buxton, and likewise at Harrogate, that add to the celebrity of these places. Waters are known to be chalybeate by their striking a purple or black colour, with an infusion of galls, or other vegetable astringent; by their peculiar inky flavour, and by their depositing a yellowish ochre when exposed to the air. Their medical virtues are chiefly as a tonic, producing a genial glow, improving the digestion, and giving strength and tone to the whole system. They are said to be serviceable in chlorosis, and other diseases of females, in flatulency, and in digestion, and in all cases of debility from free living, &c. The highly carbonated class, as Spa and Pyrmont, have a kind of intoxicating effect from the excess of fixed air, and frequently require to be diluted, and are never to be drunk where there is much inflammatory action or determination of blood to the head. It is by means of the fixed air that these waters retain the iron in solution; if, therefore, they lose this gas, which they gradually do, by mere exposure, and more quickly by boiling, the iron is precipitated in the form of ochre, and the water loses all its virtues and peculiar properties. If well corked, they may be kept good for some time. The proper quantity to be taken is from a pint and a half to three pints daily; and the use of the water should not be continued more than from six to eight weeks, without a considerable intermission. Besides the simple and highly carbonated chalybeate waters, there are others that are chalybeate, with the addition of saline substances, as the Cheltenham and Scarborough waters. These are purgative, particularly the former, and are chiefly beneficial in obstructions of the liver, in all glandular swellings, and in cases of scorbutic eruptions. These waters grow turbid, and lose their virtues by keeping, even in bottles well corked.

Saline. — These are waters that differ from common water in holding in solution more or less of the different purging salts, but they contain no iron, and no fixed air, or sulphureous gas. The salts are chiefly either Epsom salts, or Glauber's salts, or both, with muriate of magnesia, and more or less of common salt.

Seidlitz and Epsom Water abound in sulphate of magnesia or Epsom salts.

Vitriolated. — This species of chalybeate water owes its property to the presence of green vitriol, which is iron combined with sulphuric or vitriolic acid. It also contains a portion of alum, and hardly any other foreign matter. These waters are not numerous; their strength varies, and of course the dose; it ought, however, seldom to exceed a pint in a day. In a large dose they produce vomiting. They are useful in hemorrhages and other discharges from debility, and in patients of a general lax habit.

Highly Carbonated Alkaline. —The most celebrated natural water of this class is that of Seltzer. It is a saline, slightly alkaline from the soda it contains, and highly acidulated with carbonic acid or fixed air, which is much more than sufficient to saturate the alkali. This water is palatable to most persons, being brisk and sparkling, and but slightly alkaline; it raises the spirits and promotes digestion. Seltzer is a small town of the lower Rhine, in Germany; its water is transported in stone bottles, well corked, to almost every part of Europe. In Holland as well as Germany it is a common beverage at the table, and in this country either the natural water or an imitation of it is largely used. The water is highly recommended in the hectic forms of consumptive patients, attended with flushings and night sweats, and for allaying feverish irritation from other causes. In eruptions called scorbutic, in cases of indigestion, and particularly in calculous complaints, its virtues have been highly extolled.

Sulphureous Waters.—The sulphureous waters of this country are all cold, while those of Aix la Chapelle in Flanders and several others on the Continent are very hot. The sulphur is retained in those waters by its union with inflammable air, and which hepatic gas gives the peculiar smell and taste to them. It resembles that of rotten eggs or the scouring of a gun-barrel, which with the property of tarnishing silver and rendering black characters written on paper with sugar of lead dissolved in water, are sufficient tests to ascertain its presence in any water. Some of these waters contain a sensible portion of the purging salts, of which Harrogate stands the first in renown. Warm baths of these waters are recommended in almost all cases where their internal use is advised; the principal of which are herpatic eruptions, and such as are termed scorbutic. Dyspeptic patients, and such as labour under worms, experience advantage from these waters. Two or three pint glasses of the water are taken in the course of the morning. The hot sulphureous waters on the Continent are resorted to by gouty, rheumatic, and paralytic patients, and are used externally as tepid baths, or as vapour baths, with great advantage.

Although beneficial when properly used, mineral waters, it must be remembered, are mischievous when improperly adopted, and have been productive of much suffering, and in some cases of death. We extract the following from Dr. Edwin Lee's "Watering Places of England:"—"The evidence of antiquity with regard to the efficacy of mineral waters; the experience of centuries, which confirms this efficacy; the universal favour in which they are held among all civilised people, notwithstanding the difference of medical theories, sufficiently demonstrates that they are of all remedies those of which the regulation is the most justly established. Nature bestows these remedies liberally upon us in order to invite us to have recourse to them more frequently in our diseases. She has consulted as much as possible our delicacy, our taste; she has tempered the virtues of the waters, their energy, and has adapted them to different temperaments. We obtain from plants and minerals many medicaments, but they almost all require certain pharmaceutical preparations, whereas mineral waters are remedies which are always at our disposal. They contain sulphur, carbonic acid, and neutral salts, which are frequently employed in the practice of medicine. Why, when found in Nature's laboratory, should these substances not have an equal power as when taken from that of the apothecary? Most mineral waters are not harmless; one cannot use them with impunity in cases where they are counter-indicated, and every year persons become the victims of their imprudence. So far from being inert, mineral waters are at times so active that we are obliged to moderate their energy by mixing them with milk or some other emollient fluid."

Mint Sauce.—A combination of mint, vinegar, and sugar. This sauce renders lamb, with which it is commonly eaten, more easy of digestion.

Money, English.—English money consists of pounds, shillings, pence, and farthings, called to distinguish it from other representatives of money value, *sterling*. The standard English gold coin represents twenty-two carats of pure gold and two carats of pure copper as alloy to harden. The standard silver coin consists of thirty-seven parts of pure silver and three parts of copper. The following are the names and relative values of ancient English coins:—

A Half-guinea	£0	10	6
A Guinea	1	1	0
A Tester	0	0	6
A Seven-shilling Piece	0	7	0
A Noble	0	6	8
An Angel	0	10	0
A Mark	0	13	4
A Carolus	1	3	0
A Jacobus	1	5	0
A Moidore	1	7	0

MONEY, FOREIGN.—The average value of foreign money in English currency is as follows:—

rance and Belgium	Sous	£0	0	0½
	Franc	0	0	9½
	Louis, or Napoleon	0	16	0
Spain	Hard Dollar	0	4	3
	Doubloon	3	6	0
Portugal	Crusado Nova	0	2	3
	Half Ioe	1	15	6
Holland	Stuyver	0	0	1
	Guilder, or Florin	0	1	8
	Ten Guilder	0	16	8
Austria	Florin	0	2	0
	Ducat	0	10	0
	Sovereign	1	7	6
Prussia	Thaler	0	2	10½
	Frederick d'or	0	16	6
Hamburg	Zweidrittel	0	2	3
	Ducat	0	9	6
	Frederick d'or	0	16	6
America	Dollar	0	4	2
	Half Eagle	1	0	6
	Eagle	2	1	0
	Doubloon	3	5	0
East Indies	Company's Rupee	0	1	10
	Ditto Mohur	1	9	0
Russia	Silver Rouble, about	0	3	2
	Half Imperial	0	16	0

There are slight variations, resulting from three causes—the value of metal, the country in which the exchange is made, and the per-centage claimed by the money-changer. (See also page 212.)

Mordant.—This is the name given to a French method of fixing engravings or lithographs upon wood. It consists of a varnish containing 250 parts of sandarach; mastic in bars, 64; rosin, 125; Venice turpentine, 250; alcohol, 1,000 parts by measure.

Morel. — This differs from the mushroom in being a hollow, light spherical mass supported by a stem. It grows in damp woods and pastures chiefly in May and June.

Moss on Gravel-Walks.—Some years ago Professor Henslow said, "A shaded gravel-walk in my garden was always covered with a mat of moss, and became perfectly green in the autumnal months. I watered it in parallel and transverse strips with solutions of different salts, to see whether any of them would destroy the moss and prevent its growing again. Several appeared to kill the moss, which, however, was replaced in most cases in a very short time. I shall notice three of the solutions as having produced more permanent effects; these were, corrosive sublimate, sulphate of iron (green vitriol), and sulphate of copper (blue vitriol). The first two seemed to kill the moss immediately, but they also turned it black, and at the expiration of a year it was still adhering to the surface of the gravel, black instead of green. But the effect produced by the sulphate of copper was remarkable. The moss entirely disappeared, and at the end of the year, when the rest of the walk was again completely carpeted, the strip which had been watered with this solution was perfectly bare. My quitting Cambridge put an end to further observations. I should think it very probable that either the sulphate of copper or some other salt would be found very useful in keeping the walks of gardens in squares and other confined situations free from moss."

Mother-of-Pearl, to Clean.—Wash mother-of-pearl in whitening and water. Soap destroys its brilliancy.

Moths.—These deposit their eggs in May and June. At such times, therefore, special care should be exercised in guarding against their ravages. (See *Insects* and *Furs.*)

Mucilaginous Food.—Endive, spinach, lettuce, asparagus, &c., are known under this name. (See *Diet.*)

Mum.—A kind of malt liquor obtained by the use of malt made from wheat instead of barley. It is still a favourite drink in Germany. It is expensive, and is never drank while new.

Mushrooms.—When a fungus is pleasant in flavour and odour, consider it wholesome; if, on the contrary, it have an offensive smell, a bitter, astringent, or styptic taste, or even if it leave an unpleasant flavour in the mouth, it should not be considered fit for food. The colour, figure, and texture of these fungi do not afford any characters on which we can safely rely; yet it may be remarked, that in colour, the pure yellow, gold colour, bluish pale, dark or lustre brown, wine red, or the violet, belong to many that are esculent; whilst the pale or sulphur yellow, bright or blood red, and the greenish, belong to the few but poisonous. The safe kinds have most frequently a compact, brittle texture; the flesh is white; they grow more readily in open places, such as dry pastures and waste lands, than in places humid or shaded by wood. In general, those should be suspected which grow in caverns and subterraneous passages, or on animal matter undergoing putrefaction, as well as those whose flesh is soft or watery. (See *Vegetable Poisons.*)

Mushrooms, to Stew.—Peel and put them in milk and water, and let them soak for half an hour; then put them in a saucepan covered very close, shake them every now and then. Let them stew on a trivet for half an hour; then add a small crust of well-toasted bread, a small blade of mace, and a quarter of a pint of cream. Next take out the mace, and put the crust into the middle of the dish. If the cream does not thicken it sufficiently, add the yolk of an egg and half a tea-spoonful of vinegar before it is used.

Mushroom Pudding. — Rub into half a pound of bread-crumbs two ounces of butter, adding pepper and salt, with sufficient water to render the bread moist; cut up and add to these one pint of small mushrooms; line the basin with your paste, put in the above, cover with a paste, tie it up in a cloth, and boil for an hour and a half.

Mussel au Gratin.—Remove the beards, and well wash the fish in several waters; set them in a sauce-pan, shaking and turning them till they open; take them from the shells, and lay them in a pie-dish either of silver or porcelain; dredge the bottom with smooth flour, then a layer of mussels, over which a layer of chopped parsley, with a little salt, pepper, and nutmeg. Over all this a layer of fried bread-crumbs, then alternately until the dish is full, taking care the bread-crumbs come at the top. Then pour in at the side a wine-glassful of sherry mixed with a table-spoonful of mushroom catchup and two table-spoonfuls of soy. Place the dish in a Dutch oven for a quarter of an hour, or longer if needful.

Must.—This word is applied to the juice of the grapes after they have been pressed, and until vinous fermentation commences, and the liquor is casked. Afterwards it is called wine.

Mustard.—This is composed of the seeds of the *Sinapis nigra* and *Sinapis alba* ground to powder. On the Continent it is usual to mix tarragon and several other herbs with mustard to flavour it, but in this country it is usually prepared with water, to which a little salt is added and sometimes vinegar. It is an extremely wholesome condiment, and is also a most valuable medicine. (See *Medicine.*)

Mutton.—The flesh of sheep, when slaughtered and dressed, is called mutton. The age of the animal producing the best mutton is between three and five years. They are then better interlarded or mixed with fat through the flesh; when full fed, and if not driven too far, they will have a large kidney fat. The cosset wether is selected as producing the best mutton, because we find its temper and habits are more docile and gentle. It is usually better fed than other sheep, and it is rarely worried in and out of the fields, but rather treated as a pet around the house or barn-yard; therefore we find its flesh generally in the best condition. Young wether mutton, although usually tender, has not so much rich flavour and sweetness as the same kind when older and more fully developed by proper feeding and age. It is asserted by some that mutton is best immediately after being killed, or before the animal heat has departed from it. The different breeds and feeding have a great deal to do in producing the best qualities. A large-framed, coarse-woolled, fat sheep produces a coarse-grained, dry, and but indifferently-flavoured mutton; while the middle-woolled, round, plump, thick sheep, generally found in the Southdown, Leicester, Cotswold, &c., breeds, produces the close-grained, tender, juicy, and high-flavoured mutton, especially when they are allowed to feed upon the short, sweet grass of the hills and mountains, with the addition of proper stall-feeding afterwards. General opinion confirms the fact that good mutton is one of the most wholesome as well as the most easily digested of all the meat kind, and therefore best calculated for invalids. In choosing the best mutton, perhaps a few remarks may assist the unpractised buyer. The fat should be white, clear, and hard; the second skin on the fore-quarters nearly red; the lean firm, succulent, and juicy, rather of a darkish red colour; and the leg-bones clear, and nearly or quite white. Indifferent or poor mutton is seldom fat, but if so the fat will have a yellowish appearance; and if the animal has been driven a long way, or diseased, the flesh will be flabby, the kidney fat small, with a stringy appearance, and the lean seen through the skin on the back of a dark bluish shade. The flesh of ram mutton is usually found to be dark, close, and coarse-grained; and the fat is of a darker (and sometimes of a yellowish) shade than that found in good mutton, while the flesh is softer and spongy, and rank in flavour. In dividing or cutting up a "carcase of mutton," it is usual first to split it through the backbone into two sides, and if the weather should be unfavourable for hanging them any length of time, it will be best to hang them separately, without quartering them. "In some parts of England," says the *Westmoreland Gazette*, "it is usual at Christmas for the farmers to kill each a sheep for their own use, on which occasion, when the butcher inquires if they want any meat for Christmas, the usual reply is, 'Nay, I think not; I think o' killing myself.' One Christmas, a butcher called on a butcher of his acquaintance in the usual manner, saying, 'Will yo want a bit of meat, or ye'll kill yerself this Christmas?' 'I nae not,' was the answer, 'whether I'll kill myself or take a side o' me father.'" The carcase is often cut with the two hind-quarters together, and so hung up in the shops for weeks, if in weather fit for keeping it, or long enough to ripen it. This hanging of meat is a great loss to the butcher, from the effect of drying out the juices, thereby lessening the weight. An animal of eighty pounds weight, hung up for two weeks, will lose from eight to twelve pounds, according to the state of the weather, which loss, with the risk of sudden changes of either close, damp, or muggy weather, should demand an increased price, or a proper allowance made for the loss on the original weight. When two connected hind-quarters, which are designated hind-saddle, are ready to be used or cut for a saddle, they are hung by the right leg; then cut a part through the aitch-bone; and again, cut off the legs either ham or haunch fashion, which leaves the two loins together, and are known as a "saddle of mutton." This being the finest and choicest part of the mutton for roasting, it should always, if the weather will admit, be well hung, and then, before use, have the outside fleshy skin taken off. An excellent large chop can be cut off the rib-end of a saddle of mutton. When in a frozen state, it should be sawed off like venison, which adds much to its tenderness. The two fore-quarters, when left together, are sometimes called fore-quarters, or fore-saddle, and this name is usually given them when separated; but fore-quarter will properly apply to one, as it is usually known. When the fore-saddle is wanted for a large roast joint, or to corn, the two breasts and shanks are taken off, with a piece of the scrag-end of the neck, which leaves a good thick piece called chines of mutton; but when this is divided, each piece is called a chine. By taking out the shoulder-blade, you leave less work for the carver. For a small family the latter piece makes a good profitable joint, or it may be cut into lean chops. If, however, the carcase is split and quartered, either one of the fore-quarters can be used for roasting, &c., or the hind-quarter of mutton can be divided by taking off ham-fashion or haunch-fashion. The part left of the hind-quarter is called the loin of mutton, which is generally used for chops, or for roasting, haricot, &c. The loin of mutton, being one-half of the saddle, should also have the light tough skin taken off the back fat before use. The following anecdote was created by a gentleman when he was carving this joint:—He said, "Shall I cut this loin of mutton saddle-wise?" "No," said his friend; "cut it bridle-wise, for then we may have a chance to get a *bit* in our mouths." The fore-quarter of mutton, if small, not too fat, and divided like lamb, or with the shoulder-blade taken out, makes an excellent piece to roast, or corn whole; but when wanted in pieces, the shoulder should be first taken off, which makes a good joint for roasting, soup, stewing, &c. The neck chopped from the breast makes nice lean chops, haricots, stews, &c. The scrag-end of the neck is much used for broth, Irish stews, &c. The breast, the lowest-priced joint of the carcase, is used for stews, pies, &c.

Mutton Pies.—Cut a loin of mutton in small pieces, well season, and allow them to stew gently in their own fat with the addition of some beef suet (but without any water) until they are quite tender. When cold remove every particle of grease and fat, as the smallest piece will spoil the whole process. Make some gravy of the bones, adding a little claret or port wine. Bake them in some small patty-pans covered with a light puff paste.

Mutton-tea, how Prepared—Take a pound of lean mutton, and chop it up as finely as possible; pour upon it a pint of cold water; let it stand for two or three hours, and then slowly heat to boiling, and after briskly boiling for two minutes strain the liquid through a fine sieve or cloth, and add a sufficiency of salt.

Nectarines, How to Pickle,—Take the fruit when well grown, just before they are quite ripe (be sure they are not bruised), and then cover them with spring water, made salt enough to float an egg; add bay and common salt, an equal quantity of each; then put in the fruit, and lay a thin board over them to keep them under water. Let them stand three days, and take them out and wipe them very dry; lay them in a glass jar. Then take as much white wine vinegar as will fill the jar; to every gallon of which put one pint of good made mustard, two or three heads of garlic, some sliced ginger, half an ounce of cloves, mace, and nutmeg. Mix the pickle well together, and pour it over the fruit. Tie them close with a bladder or leather; they will be good to use in two months. You may with a fine penknife cut them across, take out the stones, fill them with garlic and mustard, and horseradish, and ginger; tie them together. Peaches may be done the same way.

Nervous Constitutions.—The characteristics of persons having a nervous constitution are great excitability of the nervous system and extreme sensibility to external impressions. Such should adopt a nutritious and not too stimulating diet, selecting food which is easy of digestion. (See *Diet* and *Indigestion.*)

New Wood, to Remove the Taste of.—A new keg, churn, or other wooden vessel, will generally communicate a disagreeable taste to anything that is put into it, particularly if of cedar. To prevent this inconvenience, first scald the vessel well with boiling water, letting the water remain in it till cold; then dissolve some pearlash or potash in lukewarm water, adding a little bit of lime to it, and wash the inside of the vessel well with this solution. Repeat it if necessary; afterwards scald it well with plain hot water, and rinse it with cold before you use it. Wooden vessels should never be allowed to remain out of doors unless they are full. If empty, the sun and air will shrink the staves, open the seams, and loosen the hoops and bottoms so that they will leak when used.

Nightmare.—This complaint always happens during disturbed sleep. It comes on with a sense of weight on the chest, with great horror and agitation of the mind. Sometimes the patient imagines he sees spectres of various shapes, which oppress and threaten him with suffocation; he attempts to cry out, but often without effect; sometimes the uneasiness continues after he is awake, so as to prevent his turning in bed. The studious, and what are termed nervous people, are most subject to this disease.

NIGHTMARE, CAUSE OF.—It arises from distension of the stomach; from indigestible matter in the stomach of heavy supper-eaters, which, pressing up the diaphragm, impedes respiration, and renders it short or convulsed; hence people are most subject to it after a heavy supper, and when they lie on the back. When it arises from indigestion, a little ground Jamaica ginger in a little hot water will sometimes prevent its recurrence.

Nitrous Oxide may be obtained by a variety of other means, but the purest is got by the following process:—To diluted nitric acid add carbonate of ammonia (the common smelling salt) till the acid is saturated; then evaporate the solution; and to supply the waste of alkali, add occasionally a little more of the carbonate. Let the solution be evaporated by a very gentle heat to dryness. The salt thus obtained is to be put into a glass retort, and distilled with a sand heat, not exceeding 500° Fahrenheit. The heat of an Argand lamp even is sufficient. The gas may be collected over water, and allowed to stand a few hours before it is used; during which time it will deposit a white colour, and will become perfectly transparent. The great peculiarity of this gas is, that it supports combustion, and not the life of animals. Most inflammable bodies, as charcoal, sulphur, phosphorus, and even iron wire, burn in this gas with nearly as much rapidity and splendour as in oxygen gas. The nitrous oxide is decomposed, and its oxygen unites to the inflammable body. When an animal is wholly confined in this gas it speedily dies, but when breathed for a short time from a bladder or oiled silk bag, it has a very extraordinary effect. Most persons express their feeling on the occasion as highly pleasurable. They experience great exhilaration, and feel an irresistible propensity to laugh, as well as an unusual disposition to muscular action. Care must taken that the gas thus administered is pure. The discovery of nitrous oxide was made by Priestley in 1776, but Sir Humphry Davy first pointed out the peculiarity which won it the name of "laughing gas," and also the more poetical title of "the Gas of Paradise," on account of the pleasurable sensation experienced by those who inhale it. It is now often used for anæsthesia in dentistry. Its peculiarity, when thus applied, resides in the rapidity with which action commences and ceases, and the advantage of its leaving no such headache, sickness, or feeling of prostration as sometimes follows the use of chloroform.

Nun's Sauce.—Put into a stewpan

veal and ham sliced, add two mushrooms, a spoonful of oil, a little parsley, a clove of garlic, cloves, and half a laurel leaf slightly burnt. To this add broth, a little gravy, and some white wine; let it simmer over the fire, skim and pass it through a sieve, adding, when it is ready, a couple of green shallots and a dozen whole pistachio nuts.

Nursing.—There are many advantages to be gained by allowing an infant to suck within a few hours after birth. It prevents the breasts from becoming full and hard, and draws the nipples into shape. If the infant is not applied to the breast until after the third day, the breasts will have enlarged, the nipple sunk, and only to be drawn out with difficulty. Another advantage of applying the infant to the breast as early as possible, is that the first milk of the mother acts as a very gentle aperient on the child, and thus prevents the necessity of giving it any medicine immediately after birth. It sometimes happens—especially in a young mother with a first child—that the nipples happen to be so small and short as to hinder the flow of milk, and also prevent the infant from drawing them out. This may be remedied by frequently fomenting the breasts with a sponge or piece of flannel wrung out of warm water, as hot as the patient can bear it with comfort. During suckling it is advisable to give the child its nourishment from each breast alternately, otherwise the breast not used is very liable to become inflamed. In cases where the mother is unable for the first few days to furnish sufficient milk for the proper nourishment of the infant, other food must be given in addition. The best nourishment in these cases is either asses' milk diluted with an equal part of hot water, and allowed to cool to the temperature of 96° to 98°, which is that of the mother's milk, or—which is more generally employed—one part of good cow's milk mixed with three of hot water, sweetened slightly with loaf-sugar, and suffered to cool to the same temperature. For feeding infants under these circumstances, a feeding-bottle is better than a spoon or pap-boat, because, by having to suck it, the child takes it slower, and does not run so much risk of taking too much at once. After a few spoonfuls of the milk properly diluted have been given to it, by little and little, it should be allowed to rest for at least half an hour. The infant should be raised while the nourishment is being given it: it is both more comfortable for the child, and also lessens the risk of the food going the wrong way, and exciting cough. As soon as the mother can supply her infant with sufficient milk, other nourishment should be relinquished for a time. While the infant is very young it should be put to the breast whenever it appears to require it, but as soon as it grows older it should be given it at regular hours: the practice of observing regularity in the hours of applying the infant to the breast being attended with advantage to the child by promoting digestion. The infant's digestion being weak for the first week or ten days, owing to its stomach being unaccustomed to food, it can take but little milk at a time, but requires it very frequently. But at the end of that period, the child's digestion being stronger and more accustomed to nourishment, the breast should be given about every four hours during the night and day. Sufficient time will thus be given for one meal to be digested before another is taken. At this stage of the infant's life extreme care should be anxiously devoted to all that concerns the health, for a sound body is the real foundation of both intellectual power and a moral worthy character. "The seeds of unsoundness, both in mind and body," says a talented M.D. (Mr. G. Moore), "are sown like poison-germs on a dank and darkened soil by ignorant mismanagement of the body during infancy."

Nursery, Noise in the.—Great care should be taken to exclude as much light and noise from the nursery as possible. This should be more especially attended to in the case of a young infant, since any noise that may cause its sleep to be disturbed, although not enough to wake it, will have an injurious effect on the child's nervous system, and render it more liable to convulsions and similar complaints. This is also as necessary for the sake of the mother as of the infant; for while nursing the mother should sleep as undisturbed as possible during the night; for without sound sleep the mother's health suffers, and the milk becomes diminished in quantity, and injured in quality. This is more especially necessary for women of a nervous temperament; want of sleep being one of the causes which compel mothers to relinquish suckling their infants.

Nutmegs.—The nutmeg is the seed of the *Myristica moschata*. There are two kinds of nutmegs, distinguished as the male and the female, the former large and oblong, the latter soft and round. The females have the most aroma and fragrancy, the males are spongy. The nutmeg itself is enclosed in a hard shell. *Mace* is the soft fleshy coat which envelopes it. It is inferior to and cheaper than the nutmeg, in the place of which it is often used. By pressure nutmegs yield a fatty oil used in medicine.

Nutmegs, Essential Oil of.—Nutmegs yield by distillation a very fine essential oil, which is very grateful, and possesses the flavour of the spice in perfection, two drops being nearly equal to a pound of the powder.

Nutritive Drink.—A nutritive drink is prepared by rubbing the yolks of two or three eggs, and a little white sugar with a pint or two of cold water, afterwards adding to it a glass of good light wine and a little lemon-juice to give it a flavour. Without the wine this forms a good remedy for hoarseness, coughs, costiveness, &c.

Oats.—The nutritive quality of oats is comparatively small, and the proportion of saccharine matter ready formed in oats is not enough to render the conversion of this grain into malt profitable, although brewers used it formerly with oatmeal in the formation of a drink called *mum*. Oats are now chiefly used for feeding horses and fattening poultry. For these purposes they are found excellent. The heaviest in weight, brightest in colour, and the sweetest are the best. Oats newly housed and thrashed should be avoided, as they require that proper degree of firmness which is given by time, and without which they are apt to ferment when mixed with the gastric juices. If old oats cannot be procured, a few beans added to the new grain prevents the debilitating laxity they are apt to produce.

Oatmeal is light, unstimulating, and easily digested as food, and is therefore often given to children and to the dyspeptic.

Oil.—Weight is the surest measure of oil in allotting the quantities in cookery, as it swells and contracts so considerably under the influence of heat and cold.

Oil Brushes, How to Clean.—The readiest way of cleaning brushes from oil colour—which should always be done directly after using them—is first to squeeze out all the pigment between the folds of a piece of rag, and secondly, to rinse them in camphine, and wipe them upon a piece of oiled rag. If the pigments have been allowed to dry in the brushes, the brushes will have to be kept in the camphine for a longer period; but brushes are very quickly spoiled by such treatment.

Oil-cloths.—In buying an oil-cloth for a floor (and there is nothing so good for the hall or vestibule of a house), endeavour to obtain one that was manufactured several years before, as the longer it has been made previous to use, the better it will wear, the paint having become hard and durable. We have seen an oil-cloth that, not having been put down till five years after it was made, looked fresh and new, though it had been ten years in constant use on an entry floor. An oil-cloth which has been made within the year is scarcely worth the buying, as the paint will be defaced in a very little time, it requiring a long while to season. An oil-cloth should never be scrubbed with a brush, but after being first swept, it should be cleaned by washing with a large soft cloth, and lukewarm or cold water. On no account use soap, or take water that is *hot*, as either of these will certainly bring off the paint. When it has dried, you may sponge it over with milk, which will brighten and preserve the colour, and then wipe it with a dry soft cloth. For a kitchen floor that is not matted, there is no better covering than a coarse stout plain oil-cloth, unfigured, or all of one colour; for instance, dark red, blue, brown, olive, or yellow ochre. These common oil-cloths are very generally used, and save the trouble of scrubbing the floor, it being necessary only to wash them, and as they are impervious to damp or to cold, from open cracks between the boards, they make the kitchen as dry and warm as a carpet, and they have the advantage of collecting or retaining the grease or dust.

Oiling Leather.—(See *Leather.*)

Ointment is a composition of animal fat or fixed oil, with other substances, for external uses; it differs from liniment and plasters in consistence only, being thicker than the latter and thinner than the former. When it contains a large proportion of wax, and of a consistence between that of ointment and plaster, it is called *cerate.* Ointments are not only used to defend wounds from the action of the cold air, but also to assuage pain and inflammation, to produce a healthy discharge from ulcers, and often as an external dressing, to retain on the part such other applications as may be necessary to destroy fungus, &c.

Old Age.—A celebrated author says that "Old age, though it is the natural consequence of living, and the commencement of death, can itself, on the other hand, be a means for prolonging our existence. It does not, indeed, increase the power to live, but it retards life from being exhausted; and we may thus affirm, that a man in the last period of life, at the time when his powers are lessened, would, were he not old, finish his career sooner." This seeming paradox is thus explained:—In age the capacity of supplying "waste" is diminished, but as the vital power is also weakened, less demands are made upon it. If the vital powers were still strong and active, the capacity for restoration could not keep pace with it, and destruction would ensue more rapidly. It is in this way that we can account for those who have attained a great age with all its debility continuing their hold upon existence until their years far exceed the allotted threescore and ten. To prolong life in the aged, the system must be well nourished, and due regard paid to the food given, being such as is nutritious and easy of digestion, and at the same time stimulating. (See *Diet.*) Warm, strong, well-seasoned soups, tender roast meat, nutritive digestible vegetables, and nourishing drinks will be suitable. As the natural heat of the body decreases with age, we must supply warmth artificially by warm clothing, warm bed and apartments, stimulating nourishment, &c. The tepid bath is well calculated to increase the natural heat, to promote excretion, particularly of the skin, and to lessen the dryness and stiffness of the entire frame. Everything that has a tendency to decrease the vital power, such as over-exertion, exciting perspiration, strong purging, blood-letting, &c., should be avoided. It is of great importance that food, exercise, and sleep should be taken at regular intervals. The mind should be kept calm, and provided with agreeable occupation. The diet and exercise of the aged should be moderate, and regulated according to the habit of body. An old person cannot safely do without flannel.

Old Paint, to Remove.—Lime and pearlash dissolved in water will remove old paint without injuring the wood.

Oleaginous Food (see *Diet*).—Food of an oily nature.

Olive Oil.—The olive (*Olea Europea*) is extensively cultivated in the south of Europe for the sake of the oil obtained from its fruit. The best kind of this oil is obtained from France, but that consumed in England is, as we believe, still chiefly obtained from Tuscany or Naples, and from Spain. Some comes from the Ionian islands. Abroad, many oils beside that of the olive are used for food.

Opium is the most prevalent of narcotics. The use of it has become most extensive in China, where it is so prevalent that most of the Chinese manufactured tobacco is said to contain an infusion of it. Opium is mostly procured from poppies, which are intensely impregnated with it. In the fluid state, called laudanum, it is often procured from lettuces, and this is quite as poisonous as that of the poppy. Hence the drowsiness observed after eating lettuces, especially when the full flavoured stalks are eaten. Happily for England, the smoking and eating of opium are comparatively rare. Opium is too extensively used by idle and ignorant persons in charge of children to save them the trouble of doing their duty as nurses. All the "soothing" messes sold for giving to children are more or less impregnated with laudanum, which always injures, and often proves fatal. Amongst the very poor, where syrup of poppies is esteemed too costly a luxury, a coarse preparation of opium called "crowfig" is extensively used, and there is reason to believe that it is administered so effectually as to account for a considerable percentage of the prodigious mortality common amongst the children of the poor.

Orange Marmalade (*Scotch recipe*).—To nine pounds of bitter oranges allow ten pounds of good lump sugar; grate off the rinds very slightly, and cover up the grated rind in a little boiling water; quarter and peel off the skins, putting them into a large pan of cold water; boil them pretty briskly, filling up with boiling water as they require it, till tender enough for the head of a pin to pierce the thickest part easily. If the oranges are very ripe, three hours may boil them; but sometimes they may require five hours. Separate all the pulp carefully from the seeds and inner skins. Have ready a stewpan, with the sugar, and one and a half pints of water, to run through a strainer. If you wish the marmalade very clear and high-coloured, take out with a spoon the whole of the thready inside of the skins (less of it taken out makes the marmalade thicker and more economical; but when the fruit is cheap, it may be made like a preserve by the chips being thin and clear). Cut down the skins into thin chips, not too long; put the pan with the pulp and sugar on a clear fire (not too strong), boil it five minutes, throw in the cut slips; boil this twenty minutes, then mix in the rind which was grated off at first, and boil all ten minutes. When it sinks it is done enough. Some prefer pounding the chips to keeping them in chips, which makes the syrup blend better, and also increases the flavour.

Ox-gall.—Clarified ox-gall combines readily with colouring matters or pigments, and gives them solidity, either by being mixed with or passed over them upon paper. It increases the brilliancy and durability of ultramarine, carmine, green, and in general all delicate colours, while it contributes to make them spread more evenly upon the paper, ivory, &c. When mixed with gum-arabic it thickens the colours, without communicating to them a disagreeable glistering appearance; it prevents the gum from cracking, and fixes the colours so well that others may be applied over them without degradation. Along with lamp-black and gum it forms a good imitation of China-ink. When a coat of ox-gall is put upon drawings made with black-lead or crayons, the lines can no longer be effaced, but may be painted over safely with a variety of colours previously mixed up with the same ox-gall. Miniature-painters find a great advantage in employing it. By passing it over ivory it completely removes the unctuous matter from its surface; and when ground with the colours it makes them spread with the greatest ease, and renders them fast. It serves also for transparencies; it is first passed over the varnished or oiled paper, and is allowed to dry; the colours mixed with the gall are then applied, and cannot afterwards be removed by any means.—*Dr. Ure's Dictionary of Arts, &c.*

Oxygen Gas.—Take a small apothecary's phial, into which put an ounce or two of manganese, and pour thereon a sufficient quantity of sulphuric acid to form a liquid paste. Afterwards fit a cork to the mouth of the phial, with a hole through it, into which insert a recurved tube, with one of its extremities entering the bottle, whilst the other is placed under the mouth of a jar or phial filled with water, and inverted in a tub of the same. The tub should be furnished with a shelf, with holes in it, upon which the phial may rest in its inverted position. When the apparatus is thus disposed, apply the heat of a lamp to the phial containing the manganese, and a gas will be immediately disengaged, which is called oxygen gas, or vital air. It derives the first name from its property of converting a variety of substances into acids, when combined with them, and from its being indeed the acidifying principle of all acids. It is called vital air because its presence is absolutely necessary to support the life of animals. Besides these two properties, it has that of supporting and being necessary to combustion. These three are the distinguishing properties of oxygen gas, and are possessed by no other simple gas. Common air has the same, only in consequence of its containing oxygen; and in proportion as it contains more, it supports animal life and combustion in a greater degree.

Ozone.—This term is applied to a recently demonstrated element of the atmosphere, existing in various proportions, according to localities, being greatest near the sea or on the mountain tops, where the air is purest, and smallest in the atmosphere of populous, over-crowded cities, where it is least pure. It is probably oxygen gas in some peculiar form of its existence.

Paint, to Remove the Smell of.—Take three or four broad tubs (such, for instance, as hold about eight gallons), fill them with cold water, and put into each an ounce of sulphuric acid, which you can obtain from a druggist. Place these tubs near the wainscot, in a newly-painted room. The water will absorb and retain the effluvia of the paint. Next day fill the tubs with fresh water, and add to each another ounce of sulphuric acid. Repeat this a third day, and on the fourth the smell of the paint will not be perceptible. Raw onions, sliced, and set on plates about a newly-painted room, are said to take away the smell of paint, or rather, we suppose, to change it for their own, which certainly has the advantage of not being unwholesome, though to some persons far from agreeable. The onions that have been standing in the atmosphere of the paint should be thrown into the fire and destroyed at once, as if eaten they would be poisonous.

Paper and Parchment.—These are sold as follows:—One quire is twenty-four sheets of paper; one quire outsides is twenty sheets; one printer's quire is twenty-five sheets; one ream is twenty quires; one printer's ream is twenty and a half quires; one bundle is two reams; one bale is ten reams; one roll is five dozen skins of parchment, or one folio.

Sizes of Drawing Paper.

	Ft.	In.		Ft.	In.
Wove antique ...	0	52	by	0	27
Double elephant ...	0	40	,,	0	26
Atlas	0	33	,,	0	26
Columbier	0	34	,,	0	23
Elephant	0	27	,,	0	23
Imperial	0	31	,,	0	21
Super royal ...	0	27	,,	0	19
Royal	0	24	,,	0	19
Medium	0	22	,,	0	17
Demy...	0	20	,,	0	15

Parsley.—Like most vegetables, this may be regarded as diuretic, and it has been described as a mild aperient, but this is doubtful. Ancient physicians ascribed all sorts of wonderful virtues to parsley. There are two kinds of parsley, the best being that which has a curly leaf. It is cultivated by seed which is sown between March and June, and should be sown not less than an inch deep.

Partridge Pie.—Four birds will make a good-sized pie, but a brace will suffice for a supper-dish. Suppose the largest size to be required, proceed as follows:—Pluck and draw the birds, take out the livers, chop them up with two or three sprigs of parsley, a spoonful of salt and cayenne pepper, two shallots, and a small portion of powdered mace; then beat them up with a couple of eggs and some bread-crumbs, till you have made a proper forcemeat. Fill the birds with this, and then either lard them or wrap them in slices of fat bacon or dressed ham. Cover the bottom of the pie-dish with the forcemeat, ornament the top to taste, glaze the crust. This is a savoury dish, equally good for supper, breakfast, or luncheon.

Paste for Naturalists. — A cement composed of three parts of gum-arabic, two parts of starch, and one part of brown sugar makes a paste which is excellent for mounting specimens of natural history, and for similar purposes. White sugar is generally recommended instead of brown, but this is a mistake. The sugar does not serve any very important purpose as a *cement;* it is added merely for the purpose of keeping the other ingredients in a proper condition, and brown sugar does this better than white.

Paste for Scrap-Books.—When poor paste or common mucilage is used for making scrap-books several difficulties are encountered. Many of the scraps are rendered so transparent as to be illegible, and they are so greatly expanded that when they contract, as all paper does when it dries, they wrinkle up the leaves to which they are attached, and render them unsightly in appearance. If any of our readers should desire to make a really handsome scrap-book, we would advise them to proceed as follows:—Procure some good paste, well boiled, but quite thick. Paste made from wheat flour will answer, but that made rom rice flour is a great deal better, as it does not diminish the opacity of the scraps. Use a very stiff brush, as with a soft brush you cannot spread such stiff paste as you ought to use. Such a brush is best obtained by getting one of the stiff brushes that are usually put up with tin ferrules, and cutting the bristles off to a length of, say, half an inch. Spread a very thin layer of paste over the back of the scrap, and place the latter on the page of the scrap-book, rubbing it down lightly with a smooth ivory paper-folder. If you wish to make a *very* neat scrap-book, it will be advisable to get a dozen pieces of the thin, smooth pasteboard known as millboard, place them between the leaves of the book, and lay something heavy on the latter until it is dry. The leaves will then be quite smooth.

Pastiles, to Make Odoriferous.—Of benzoin gum and frankincense, each two and a half drachms; gum myrrh, gum styrax, cascarilla-bark in powder, and nitrate of potass, of each one and a half ounce. Mix, and pound into a mass with mucilage of gum arabic and tragacanth.

ANOTHER METHOD.—Of camphor, flowers of benzoin, powdered charcoal, powdered cascarilla-bark, powdered Turkey myrrh, powdered nitre, each equal quantities. Beat them up with syrup sufficient to form a mass, and divide into pastiles of a conical form; or they may be mixed with rectified spirits of turpentine.

Pea-shell Pottage.—Take three quarts of the water in which meat has been boiled, season it to your taste, and place it in a saucepan on the fire; add the shells of half a peck of peas, some herbs, including a good proportion of chives and sweet leeks, with a sprig or two of tarragon. When sufficiently boiled strain off the liquor, pound the shells and herbs well together in a mortar, and then rub them through a cullender; add these to the soup with a cupful of green peas, two lettuces in shreds, a sprig or two of mint, and an ounce of white sugar.

Pearls.—A real pearl, if no larger than a pea, is regarded as a very large one. Its value depends mainly upon its perfect roundness and the purity of its colour. The larger pearls are generally pear-shaped, in which form they are greatly valued. Pearls sometimes assume other shapes, but they are generally round. Real pearls are injured by moisture, even by the moisture of animal warmth, for which reason those who wear pearl rings should not sleep with them on, nor wash their hands without removing them. The origin of pearls inside oyster-shells has never yet, we believe, been satisfactorily explained.

Peat.—A substance which seems to be closely allied to coal, and which, there is no doubt, has been produced by the decay and decomposition of vegetable matter. There are different kinds of peat, therefore, according to the different kinds of plants of which it is composed, and the different situations in which the process has been carried on, such as marsh, forest, and marine peat. Some extensive bogs have been formed within the memory of man, by the decay and natural fall of forests, over which the *Sphagnum palustre* and other mosses rapidly spread; agricultural implements and various domestic utensils have been found under them; and we may therefore assume, that as peat appears to be in the act of progressive increase, it belongs to an order of causes still in action. When examined, peat appears to be an entire mass of vegetable fibres; towards the surface they are nearly in an unchanged state, but in the middle the peat becomes more compact; and at the bottom of a very deep, ancient bog they are almost obliterated, the substance being dense and black, and having all the chemical characters of jet. In some instances beds of peat alternate with beds of mud and sand, which must have been deposited in the bottom of lakes, and in these cases they appear something like an incomplete coal formation. (See *Fuel.*)

Pemmican.—This a kind of portable food which travellers in out-of-the-way places have frequently extolled. It is a mixture of about five-ninths of dry meat pounded with four-ninths of melted grease put into a tin or skin while still soft and warm. It is largely used in the Hudson Bay territory, and was prepared by the Government for those who went out with the Arctic Expeditions. In preparing it, Sir John Richardson took the round of beef, removed the fat and membranous part from it, and then cut it into thin slices, dried it over an oak-wood fire in a malt kiln, and then had it ground into powder in a malt mill. Afterwards it was mixed with an equal weight of melted beef or suet. In drying the meat loses more than three-quarters of its weight. It is sometimes mixed with sugar. Pemmican is good, wholesome, palatable food, which keeps fresh for a considerable length of time.

Pencil Drawings, to Fix.—Four ounces of spirits of wine, half a drachm of camphorated spirits of wine, one drachm of volatile oil of rosemary, one drachm of white resin. This should be laid with a broad flat brush on the back of the drawing. You will be aware of its being fixed by seeing it clear through. Be careful not to let the drawing touch anything while laying on the mixture. While it is drying in you may lay it on the table with the back upward to let the spirits evaporate.

Pentagraph.—This valuable instrument is used for the purpose of copying drawings either upon an enlarged or reduced scale, or upon the same scale. It consists of four rulers, two long and two short, connected together by a centre round which they have a motion. The shorter rulers are connected with each other and with the longer rulers, and the entire instrument is supported upon small pillars made to revolve in all directions. The rulers have each an equal number of uniform divisions and a sliding index, which can be fixed to any one of these divisions by means of a mill-headed clamp-screw. The sliding indexes have each of them a tube arranged to slide upon a pin rising from a round heavy weight, which acts as a fulcrum on which the entire instrument turns when in use. This is fitted with the pencil or tracing-point. Several other forms of pentagraphs are in use, all based on the same principle.

Pepper is a generic name for various productions. Black and white pepper are the dried seeds of a creeping plant of the equinoctial region of Asia and America ground to powder. The plant is known as the *Piper nigrum*. The white only differs from the black from its having been blanched by soaking in water and the removal of its black skin. But much of the white pepper consists of the inferior seeds, which having shrivelled and fallen from the tree, have been blanched by exposure to the air and sun.

Pepper Water.—This recipe comes from India, where it is in great repute. Put a pint and a half of water into a pan, with a piece of tamarind or the juice of a lemon. Take an onion sliced, and pound it in a mortar with a table-spoonful of curry powder, three or four cloves of garlic, and twelve pepper-corns. Add this to the water and tamarind, mix well, place it on the fire, and add a dessert-spoonful of salt. Cover it, let it boil for a quarter of an hour, and then strain it through muslin into a basin. Chop a very small onion fine, and fry in a tea-spoonful of butter, pour in the strained liquor, and give it a boil up.

Perambulators — Hints for their Use.—Concussion of the spine is a subject which occupies a full share of the medical world's attention, and one form of it, under the name of "railway spine," frequently forms the subject of discussion in the medical and other journals. We feel sure, though it is a matter scarcely susceptible of rigid proof, that "perambulator spine" must be at least as common as its fellow of the railways. How many times have we watched Tilly Slowboy, while wheeling a perambulator containing a limp baby of a very tender age, proceed to cross the road in the most judicious manner. Theoretically, of course, the front wheel ought first to be lowered carefully off the kerbstone on the roadway, which is often a full foot beneath it, and then the front wheel being lowered, the hind wheels ought to be carefully lifted after it, and the transference of the baby thus effected entirely without any jerk, and without any concussion of the spinal column. The ordinary samples of the genus nursemaid perform this operation in a manner totally at variance with the advice tendered above. The front wheel is lifted off the ground, and the perambulator being tilted backwards is deliberately shoved over the little precipice before it, and alights below with a tremendous concussion, not only trying the springs of the little carriage, but giving the baby a jerk which keeps its head bobbing up and down for some seconds. We have frequently seen babies burst out crying after the concussion, which must be most injurious to them, and must be frequently the cause, repeated as it is many times daily, of inducing caries of the spine, or at all events of fostering the tendency to that crippling and often fatal disease in those who are constitutionally predisposed towards it. We advise the reader to caution mothers as to the very serious evils which may thus arise from the carelessness of those to whom their offspring are entrusted.—*The Lancet.*

Perfuming an Apartment.—Put into a spirit-lamp, or narrow-necked bottle, any essence, or scent not containing water; provide the lamp, or bottle, with a thick lamp cotton, and place slightly above the cotton a small ball of spongy platinum; then put a light to the wick, and after the platinum is red-hot (which it will be in a few seconds), blow it out. The platinum ball will continue in a state of ignition as long as there remains any spirit in the bottle, evaporating the perfume as it rises by means of the wick. We have tried this, and seen it tried often, and can answer for its being good.—G. W. R.

"Peristaltic Persuaders" (Dr. Kitchener's).—Turkey rhubarb in powder two drachms, oil of caraways ten drops, simple syrup one drachm; mix and divide into forty pills. Dose, two or three. These curiously christened pills act usually within twelve hours. They should be taken early in the morning.

Peruvian Bark.—The tree from which this bark is procured is called *Cinchona*, from the name of a countess whose cure is said to have first brought Peruvian bark into reputation. It is a native of Peru, where it grows in great abundance. The bark is removed from September to November. The bark is exported in pieces of different sizes, some rolled up into short quills and others flat. The outside is either brownish or whitish, but the inside is of a fine ferruginous brown. This bark gives its virtues to both hot and cold water, but the decoction is thicker and gives its taste out most readily. Not only in fevers is the bark found to be a very important remedy, but in numerous other cases. For want of appetite, for rheumatism, mortification, and hæmorrhages it is in common use.

Pewter, to Clean.—Scour the articles with silver sand and water, and a bung covered with leather; then rinse them well in cold water, and polish with fine whitening.

Phosphori.—Natural phosphori, by which term are meant such bodies as emit light similar to that of phosphorus, and regulated nearly by the same laws as those which govern that substance. They include living animals that possess this property, dead animal matter, and decayed vegetable matter. Of living animals that appear luminous in the dark, there are in this country two land insects, and on our coasts several marine insects and fishes. The two land insects are both vulgarly called glow-worms, but are very different both in their manners and appearance. The one is a scolopendra (*Scolopendra electrica*) something like the centiped, being a thin and flattish worm, with a great number of feet. It is often found in houses about old furniture. The other is a soft, broad, and flat insect, something like the milleped (the wood-louse or old-sow), extended and flattened. It is apterous, or without wings, but is the female of a winged insect of the beetle tribe (*Lampyris noctiluca*). The insect is very common on the heaths in Norfolk, and in similar situations elsewhere. The light emitted by this insect proceeds from the three last rings of the abdomen, is of a beautiful sulphur colour, and appears, when accurately examined, to proceed from distinct but numerous small globules within the abdomen, which are probably the ova or eggs. It is a subject worthy further attention of the naturalist. In other countries, particularly in warm climates, there are several luminous insects, and much larger ones than we have here. Such are the lantern-fly of China, and the candle-fly or fire-fly of the West Indies, which emit a very strong light from the proboscis or snout. Of dead animal matter almost every kind has at times been observed to be luminous, as whole joints of mutton and venison, pieces of veal bones, lobster claws, &c.; but what peculiar circumstances determine these substances to emit light at one time and not another have hitherto eluded our inquiries; for although they never shine but when in a state of putrefaction, they more frequently pass through the whole putrefactive process without assuming this appearance. There are other substances that constantly shine when in a state of putrefaction. These are various kinds of fish, as mackerel, herrings, whitings, and some others, which may be noticed in considering the cause of the brightness of the sea. In the vegetable world, rotten wood, when in that light spongy state called touchwood, is the most remarkable. This requires moisture to emit its phosphorus light. It is yet uncertain whether the access of air is necessary to support the light. When it becomes quite dry its light is extinguished, but reappears when the wood is moistened. The colour of the light in all these instances is pale blue, exactly resembling that of phosphorus. In all cases, except that of rotten wood, the light is increased and rendered more intense by immersing the body in oxygen gas, and is extinguished by immersion in azotic or in nitrous gas. It is in all cases, too, except that of wood, attended with the extrication of an oily matter, which adheres to the fingers, and makes them appear luminous, which circumstance tends strongly to support the opinion, that the light is emitted in consequence of the formation of a phosphorated oil, or solution of phosphorus in animal oil.

Phosphorus is one of the chemical elements. It is a solid substance, but is so soft as to be easily scraped or cut with a knife. It is generally of a flesh colour, and, when pure, it is transparent. In the air it emits a white smoke, a peculiar smell, and a beautiful, though faint, light, which becomes visible in the dark. It inflames by the application of a gentle heat, and then burns with a very brilliant flame. This curious substance is of animal origin. It exists in a compound state in all kinds of bones, and likewise, in considerable quantity, in urine. The means of obtaining it from either are not very simple, and the process cannot be well understood until we have treated more at length of its properties. If any device is traced with a stick of phosphorus on paper, as with a crayon, every line becomes beautifully luminous in the dark, and continues so for some minutes. If held before the fire for a moment the brilliancy is increased, but this must be done with caution, as very little heat is required to inflame the phosphorus, and then the paper will take fire. By handling the phosphorus part of it adheres to the fingers, and covers them with the same ink. This is not at all dangerous, as no sensible heat is emitted; but if you rub your hand much, with a view of getting rid of it, the heat excited by the friction will inflame the phosphorus; and if there is much of it, it will then burn the hand. We have observed great inconvenience from persons getting small pieces of phosphorus under their nails, by handling it injudiciously, for when they have approached the fire to warm their hands, such pieces have inflamed and given great pain. To prove how easily phosphorus is made to burn, rub it on a piece of tow, wrap this tow round a Florence flask, or other glass vessel, and pour hot water into it. The heat of the water will instantly inflame the phosphorus and the tow on the outside. Phosphorus is soluble in oils, particularly the volatile oils, which it renders luminous like itself. This solution may, without danger, be rubbed about the face and hands, so as to render them luminous. The solution of the phosphorus in ether, when thrown upon boiling water, exhibits a pleasing appearance, the heat inflaming the phosphorus, and rendering it beautifully bright. This solution is also luminous of itself. Phosphorus is also soluble in hydrogen gas, or inflammable air, which renders it spontaneously combustible on exposure to the atmospheric air. This very amusing compound may be obtained by boiling a little phosphorus in a solution of pure potash. The water is decomposed in this experiment, and affords the inflammable air. The retort should be entirely filled with the solution, otherwise the gas will inflame, and diminishing the volume of air in the retort, occasion the water to rush in from the trough. When this phosphorated hydrogen gas is in contact with common air it takes fire, and, like phosphorus itself, undergoes combustion, but when it is mixed with pure oxygen gas it immediately detonates. When phosphorus is consumed, either by the slow combustion that spontaneously takes place when it is exposed to the air, or by the more rapid one produced by inflaming it, the pure part of the air (oxygen) combines with the phosphorus and forms phosphoric acid. This acid, like others, unites with the simple earths and alkalies, forming neutral salts. It is the compound resulting from its union with lime that forms the hard osseous matter that is the basis of all bones. The urine contains this acid, united both to the lime and the alkalies. After being made acquainted with these facts, we shall more easily comprehend the nature of the processes by which phosphorus is obtained.

Photographs.—Instead of ordinary water-colours dilute solutions of Judson's dyes are sometimes employed in colouring photographs with excellent effect.

Photographs, Colouring in Oil. — Photography supplies form, painting, colour, and where both are governed by artistic taste and technical knowledge sufficient for their judicious and harmonious combination, a painted photograph becomes a very attractive work of art — the twofold means of appealing to the senses, viz., form and colour, being necessarily more effective than either can be alone. "It is by the combination of form and colour that the irresistible influence of art is established." Passing over the necessary implements, pigments, and materials, all necessary information concerning which may be easily enough obtained from any respectable dealer, we come to

THE PHOTOGRAPH.—This should be so taken as to give a bolder and more vigorous effect than would be quite suitable for a picture not intended for colouring. If on paper, the better plan is to mount it on a stout millboard with good glue. By far the better plan, however, is to have the negative printed direct upon prepared canvas, by Mr. Pouncy's or Mr. Palmer's process, as there is then no danger of the picture ever leaving the mounting-board, and it is on a much more permanent and reliable ground for oil-paint than paper forms. If on paper, the paper must be sized—we use isinglass for this purpose. If great finish be required, it is best to follow up the sizing by hot-pressing, by which means a very smooth, even ground is secured.

VEHICLES.—The only oils we find necessary are linseed and a little drying oil. The former should be clear, transparent, and of a light yellow colour. In warm weather it will dry in a day. As a vehicle it is the most reliable we have. Boiled or drying oil may be used with a mastic varnish (equal parts) as a second vehicle, when you find the first too thin for your purpose. A little linseed-oil added sometimes improves it. The varnish we prefer for all purposes is mastic—a solution of gum-mastic in spirits of turpentine.

PIGMENTS.—The colours have different degrees of transparency or opacity, and vary in their drying qualities, their powers, purity, &c. These things can only be well learned in practice. Pigments are obtained from vegetable, mineral, and animal sources, and something should be understood of their chemical effect one upon another, and in connection with different vehicles.

FIRST PAINTING. — For the first painting there is nothing better than a mixture of drying oil with spirits of turpentine. You first proceed to model out and round up the face, and for this purpose we use only black, white, and a little light red. By doing this, we separate the modelling out from the colouring, and consequently, as we do not muddle and dirty the colours, they are more brilliant and pure, from being more expeditiously applied. This done, we put the painting aside to dry.

SECOND PAINTING.—In the second painting we use the two vehicles (given under the head "vehicles") using, however, as little varnish as possible. To prepare the palette for this painting, we put—1, white; 2, a little Naples yellow; 3, yellow ochre; 4, raw sienna; 5, burnt sienna; 6, light red; 7, Indian red; 8, crimson lake; 9, madder lake; 10, vermilion; 11, purple madder; 12, brown madder; 13, Vandyke brown; 14, burnt umber; 15, raw umber; 16, terra verte; 17, emerald green; 18, French ultramarine; 19, indigo; 20, ivory black.

Very little colour should be put out upon the palette at a time. In the second painting all the drawing and details must be carefully made out, the lights impasted—that is, laid in with thick colour—and the general flesh tints scumbled* (see list). Keep your colour, when painting the shadows, very thin. Carefully unite the half-tint with the shadows, so as to secure roundness and gradation. Put the work aside to dry.

THIRD PAINTING.—In this painting the processes employed are glazing and scumbling. Scumbling we have described. Glazing is the application of a thin film of transparent colour chiefly employed to enrich a colour, or modify its tone, or subdue its brightness, or produce harmonies of analogy in colour, such as may be supposed by imagining a variety of colours seen through a piece of stained glass, which imparts its own colour in a greater or less degree to every other colour seen through it.

OILING OUT.—Sometimes a first or second painting is allowed to become so dry that the new colours do not take kindly to its surface. When this is the case, a damp, soft sponge is applied to it, and the painting carefully rubbed dry with a silk handkerchief. Then a very little poppy oil is applied with a brush, and afterwards removed with a silk handkerchief. This has the effect of making the after unite with the previous painting.

HANDLING.—Every object in nature has a peculiar texture: some are smooth, others rough; some glossy, others without gloss; and nearly all such effects may be more or less secured by the mode of handling or pencilling adopted.

TINTS FOR FLESH—SECOND PAINTING.—White and raw sienna. White and raw sienna, with light red. White, vermilion, and light red. White, burnt sienna, and madder lake. White and light red. White, light red, with yellow ochre.

FOR HALF-TINTS OF FLESH.—White, light red, and emerald green. White, light red, and terra verte.

FOR SHADOWS.—White, black, Indian red, and raw umber. White, black, and burnt umber.

FOR CARNATIONS.—White and vermilion. White, vermilion, and madder lake. White and Indian red.

SHADE TINTS.—Indian red and black. Vandyke brown and lake. Madder brown.

VARNISHING.—The painting should have been allowed to get thoroughly dry before varnish is applied, as otherwise it would be sure to crack, and become more or less horny-looking. We prefer mastic varnish, and proceed as follows:—Having washed the painting with a damp sponge, and got it thoroughly dry in a warm room, out of cold draughts, remove all the dust with a flat camel-hair brush, and place the picture down on its back. Take a flat brush, large as compared with the picture, and beginning at the left-hand side top of the painting, draw the brush quickly over the surface to the bottom, descending in a straight line, and repeating the stroke until the entire surface is covered. Then with the same brush, but without varnish, go lightly over the surface in an opposite direction. Let the picture remain in an horizontal position until the varnish becomes nearly dry. If the varnish has been thinly applied, a second coat may be given to it when the first is perfectly dry. The varnish must never be touched while wet, for the purpose of removing anything that may have fallen upon it accidentally.

COLOURING PHOTOGRAPHIC LANDSCAPES.—This branch of the art is, strange to say, one which has been, save by some few artists, little practised. There is not the slightest reason why photography should not provide the drawing and light and shade of a landscape for the purposes of the artistic colourist, as well as the original sketch for a portrait. A somewhat different print must be secured, it is true, because it would with water-colours be ab-

* Scumbling is using the colours stiff, or nearly dry.

solutely impossible to secure the more luminous greens of foliage, or the delicate and tender aërial tones of the distance upon the dark surfaces representing these in the ordinary photograph; but a proper print may very easily be secured by the simple process of placing the sensitised paper in the pressure-frame for printing with the non-sensitised surface in contact with the negative. The landscape is then printed *through* instead of *on* the paper, and the proof so secured is a faint but perfectly distinct one, giving all the detail and gradation without the intense masses of dark in the foliage, or the strong definition and undue depth of the distance; whilst if this print be held up to the light, the landscape will then have all the vigour and force of an ordinary proof on albumenised paper. Such proofs as these are frequently produced to serve as transparencies for decorating windows, lamp shades, &c., especially when rendered more transparent by waxing or coating with mastic varnish, after being coloured in water or other colours. A print prepared as above, after receiving broader washes and touches, may be fastened to a sheet of plate glass, so that by merely holding it up to the light, all the minuter details and delicate half-tones can be clearly traced and secured, although when the picture is again seen by reflected instead of transmitted light, such are indefinite and faint, until strengthened and brought up to the proper depth by the painter. The following will be found among the most useful pigments for our present purpose:—

Chinese white.	Yellow ochre.
Vermilion.	Raw sienna.
Rose madder.	Gamboge.
Crimson lake.	Brown madder.
Indian red.	Purple madder.
Venetian red.	Brown pink.
Light red.	Sepia.
Burnt sienna.	Olive green.
Mars orange.	French blue.
Orange chrome.	Cobalt.
Cadmium yellow.	Payne's grey.
Lemon yellow.	Indigo.
Indian yellow.	Ivory black.

The brushes most in use for landscape purposes are the brown sable and camel-hair; but the red sable is of service for body-colour effects, especially in large works. These brushes, being of various sizes, are named after the quills which contain them, viz.:—Eagle, swan, goose, duck, and crow quill. Besides these, flat brushes will be required for large washes, and even hog-hair and fitch brushes are of frequent service for certain purposes when using body colour.

Preparing the Picture.—The picture having been previously sized in the manner before described, is fastened to your desk by drawing-pins, and a faint general wash, composed of brown madder, and Indian yellow or yellow ochre, is carried over the whole surface. This wash should be applied with a large soft brush, the desk or drawing-board being sloped at an angle of, say, forty-five degrees. Keep the colour fully supplied in the brush until you near the bottom of the picture. The wash, if the brush has not been either too full of colour or too dry, should, when completed, be flat, even, and of an equal depth all over.

Skies.—When dry, a wash of clean water may be carried over the whole, and absorbed with blotting-paper, to leave the surface damp, but not wet, as in this state it will receive the other washes for the sky better. Next take a large soft brush charged liberally with pure cobalt, not too strong, and proceed to wash downward from the top, adding water as you approach the horizon, but carrying the tint well down over the distance towards your foreground. When this second wash is dry, a third and rather stronger wash of the same, with a little madder pink, may be again carried over the whole surface, merely omitting the spaces occupied by clouds, if such there be, and the high lights of the more prominent objects, but, with these exceptions, covering the whole surface from top to bottom. The clouds now demand attention. We will suppose them to be simple in form, warm in colour, and not too massive or elaborately defined, such being most easily described.. The last wash being dry, use the clean water and blotting-paper once more; and while the surface is still damp, carry over the lights of your clouds a dilute mixture of cadmium and madder pink, with a very little Chinese white. Letting this dry, after softening it well off with pure water as it recedes from the illuminated passages, the thin and delicate shadows of the clouds may be laid in with a cobalt and light red, by a series of faint washes, reducing the comparative size of each succeeding wash, and keeping the surface damp, in order, as we have before said, that the edges of the washes may not be too crude and hard. In washing carefully prevent the colour from settling in pools at any spot, as it will then dry into a disagreeable hard-edged blot very difficult to get rid of by any after process of washing with clean water or by stippling. For the sky washes use plenty of water with your colours, obtaining the effect rather by repetition than at once. The extreme high lights of the clouds are best "taken out," that is to say, by the following means:—Take clean water and lay it on the high lights, preserving the same shape. Let it remain for a few seconds, and then apply the blotting-paper, when, by rubbing the surface *lightly* with a piece of crumb from a rather stale loaf of bread, the colour will be entirely removed from the space covered by the water, and the white paper may afterwards be tinted with the requisite colour or colours, say with cadmium and rose madder. To obtain very soft gradation in clouds, begin with pure water, gradually adding colour until the darker or shadowed portions are reached; and if you desire to soften off again from these, add water gradually to the tint until the desired result is obtained. We need hardly add that the lighter portion of the sky will be that nearest the sun. An appearance of brilliancy and force may be secured by occasionally relieving the sprays, branches, and twigs of trees against a luminous cloud.

TABLE OF TINTS, &c.

For Skies and Clouds.

Cobalt or French blue (the first is more easily managed).
Cobalt, a *little* indigo, and rose madder.
Cobalt and Indian red.

For Twilight Effects.

Indigo and cobalt.
Indigo and Prussian blue.
French blue, Indian red, and yellow ochre.
Indigo, cobalt, and Indian red.
Indigo and purple madder.

For Sunrise and Sunset Effects.

Cobalt and rose madder.
Purple madder and French blue.
Indian red and yellow ochre.
Yellow ochre, pure.
Yellow ochre and Indian yellow.
Cadmium yellow.
Ditto, with rose madder.
Rose madder, with purple madder.
Cadmium yellow and Indian red.
Mars orange.
Mars orange and rose madder.
Raw sienna and rose madder.
Indigo and rose madder.

For Stormy or Twilight Effects.
(Warm and cold.)

Indigo and Indian red.
Indigo, lake, and sepia.
Indigo and purple madder.
Lamp-black and French blue.
Lamp-black and light red.
Blue black and cobalt.
French blue, purple madder, and yellow ochre
Lamp-black and lake.
Sepia and indigo.

For more Delicate Effects.

Cobalt and light red.
Light red, rose madder, and cobalt.
Cobalt, yellow ochre, and Indian red.
Rose madder, raw sienna, and cobalt.
Emerald green and pink madder.
Payne's grey (used thin).
Lamp-black, light red, and cobalt.

For the Illuminated Clouds or their High Lights.

Roman ochre and a little rose madder.
Cadmium yellow and rose madder.
Light red and yellow ochre.

For Sunset and Sunrise Clouds.

Cadmium yellow and rose madder.
Indian yellow and rose madder.
Mars orange and rose madder.
Gamboge and rose madder.
Yellow ochre and rose madder.
Light red and ditto.
Lake and ditto.
Cobalt and purple madder.
Brown madder, indigo, and cobalt.
Purple madder.

From the above list nearly every tint

likely to be required in the treatment of the large range of sky effects may be obtained.

TABLES OF TINTS FOR DISTANT EFFECTS.

*Mountains or Hills.**

Rose madder and French blue.
Cobalt and rose madder.
Light red, cobalt, and rose madder.

Mountains when Nearer.

Yellow ochre (for the lights).
Madder brown and French blue for shadows, and
Yellow ochre and rose madder for the lights; with
French blue, indigo, and brown madder for the shades, or
Rose madder, cadmium yellow, cobalt, and purple madder.

Mountains if still Nearer.

Brown madder and cobalt.
Light red and cobalt.
Indigo and rose madder.
French blue, rose madder, and yellow ochre.
Indian red and cobalt.
Cobalt, Indian red, and yellow ochre.
Indian red and indigo.

For Distant Foliage, &c.

Yellow ochre, light red, and French blue.
Roman ochre, cobalt, and rose madder.
Yellow ochre, indigo, and light red.
Raw sienna, indigo, and Indian red.
Cobalt, raw sienna, and a little rose madder.

TABLES OF COLOURS FOR WATER.

Still Water in Clear, Fine Weather.

Cobalt and raw sienna.
Cobalt, rose madder, and raw sienna,

Still Water in Cloudy Weather.

Indian red and cobalt.
Brown madder, cobalt, and raw sienna.
Light red and indigo.
Indigo and brown madder.

For Brooks and Streams.

Raw sienna, } if yellowish.
Raw sienna and brown madder }

Raw sienna and indigo, }
Indian yellow, indigo, and burnt sienna, } if greenish.
Indigo and brown pink, }
Cobalt and burnt sienna,
Raw sienna, cobalt, and brown madder, } if greyish.
Raw sienna, cobalt, and purple madder, }
Vandyke brown and brown madder, }
Lake, indigo, and Vandyke brown, } if brown or very dark.
Sepia, lake, and raw sienna, }

For the Sea.

Raw sienna and French blue.
Raw sienna and indigo.
Raw sienna and cobalt.
Raw sienna and Prussian blue, with a touch of madder pink.
Bistre, Prussian blue, and gamboge.
Brown madder, indigo, and raw sienna.
Cobalt and gamboge.
Indigo and Roman ochre.
French blue and cadmium yellow.
Sepia and gamboge.

For the Lights.

Yellow ochre.
Raw sienna.
Raw sienna and sepia.
Brown madder and raw sienna.

If under a Stormy Sky.

Cobalt and Vandyke brown.
Cobalt, with indigo.
Cobalt, with burnt sienna.
Sepia and raw sienna.
Raw umber and indigo.

Of course a judicious selection, consistent with considerations already urged, must be made from the above tables, which the student himself may soon render more comprehensive if he be an artistic observer of nature.

TABLE OF COLOURS FOR ROCKS.

Various for Cold and Warm Effects.

Lamp-black and French blue.
Lamp or blue black.
Light red and indigo.
Indigo and Indian red.
Indigo, burnt sienna, and lake.
Indigo, lake, and Indian yellow.
Emerald green and lamp-black.
French blue and burnt umber,
Lake and lamp-black.
Payne's grey.
Raw sienna and brown madder.
Prussian blue and raw umber.
Light red and yellow ochre.
Indigo, Indian yellow, and burnt sienna.
Brown madder.
Vandyke brown and lake.
Sepia and purple madder.
Brown pink, burnt sienna.
&c. &c. &c.

* "Mountains only become pure blue when there is so much air between us and them that they become mere flat shades, every detail being totally lost. They become blue when they become air, and not till then. . . . . A mass of mountain seen against the light may at first appear all of one blue, and so it is, as a whole, and by comparison with other parts of the landscape; but look how it is made up. There are black shadows in it under the crags, there are green shadows along the turf, there are grey half-lights upon the rocks, and there are faint touches of stealthy warmth and cautious light along their edges."—*Ruskin.*

Tables of Colours for Trees.

A variety of Greens for Foliage from which to Select.

Gamboge and indigo.
Gamboge and sepia.
Gamboge, burnt sienna, and indigo.
Cobalt, gamboge, and madder pink.
Lake, French blue, and Roman ochre.
Black and Indian yellow.
Brown pink, indigo, and lake.
Bistre and Prussian blue.
Indian yellow, Prussian blue, and madder lake.
Raw sienna, cobalt, and indigo.
Gamboge, brown pink, and indigo.
Olive green.
Sepia and Prussian blue.
Vandyke brown and indigo.
Burnt sienna, indigo, and yellow ochre.
Indigo and yellow ochre.
Indigo, Indian yellow, and burnt sienna.

Autumnal Tints, or for Glazings.

Brown madder and gamboge.
Raw sienna and rose madder.
Burnt sienna.
Purple madder.
Brown madder.
Brown pink.
Indian yellow.
Indian yellow and Indian red.
Cobalt and Italian pink.

For Stems and Branches.

Lamp-black and rose madder, } if grey.
Lamp-black, } if grey.
Payne's grey and light red, } if grey.
Indigo, lake, and yellow ochre, } if grey.
French blue and burnt sienna, } if grey.
Indian yellow, burnt sienna, and indigo, } if grey.
Vandyke brown.
Brown madder.
Sepia and purple madder.

Tables of Colours for Foregrounds.

Greens for Grass in Light and Shadow.

Raw sienna and indigo.
Indigo and Indian yellow.
Yellow ochre and indigo.
Indigo and gamboge.
Sepia and Prussian blue.
Burnt sienna and indigo.
Burnt sienna and indigo, with Indian yellow.
Lake, yellow ochre, and indigo.
Sepia and gamboge.

For Decayed Leaves in the Foreground.

Brown madder and burnt sienna.
Brown madder, with gamboge.
Brown pink.
Burnt sienna.
Burnt umber and burnt sienna.
Gamboge and Vandyke brown.
Italian pink.
Madder brown.
Rose madder and gamboge.

For Banks and Roads.

Chiefly for the general Wash.

Light red and yellow ochre.
Yellow ochre.
Burnt sienna.
Sepia.
Vandyke brown.
Purple madder.
Indian red and yellow ochre.

For Darker Passages and for Shadows.

Lamp-black and burnt sienna.
Lamp-black and rose madder.
French blue, Indian red, and raw sienna.
Payne's grey.
Purple madder.
Indigo and light red.

For Buildings.

Bricks or Tiles in Shadow.

Brown or purple madder and burnt sienna.
Vandyke brown, French blue, and purple madder.
Indigo and Indian red.
Lamp-black and Indian red or lake.

For Wood.

Lamp-black and yellow ochre.
Light red and cobalt.
Light red and indigo.
Sepia or Vandyke brown.
Raw or burnt umber.
Brown madder and French blue.
Payne's grey and burnt sienna.

For Slate.

Lamp-black.
Lake, indigo, and raw sienna.
Sepia, indigo, and lake.
Payne's grey.

For Thatch.

Brown madder and yellow ochre.
Sepia.
Sepia and yellow ochre.
Vandyke brown.
Lake and indigo.
Purple or brown madder.

These tables are equally useful for all kinds of landscape painting.

Photography, Elementary Instruction in.—How to Take a Negative.—So slowly and surely has the art of photography gained ground in public estimation that many persons are anxious to learn the various processes used in its practice, and become photographers on their own account. We shall now give an outline of the collodion process, for the benefit of those who wish to learn how to take a negative. The following directions are the plainest and simplest we can devise. Without further preface we proceed to describe the negative collodion process, which is that now almost universally used. We have given only one set of formulæ, but that may be safely relied on as a good and safe one. One thing must be urged on the learner above all others, as essential in his operations, and that is the most scrupulous cleanliness. Beyond this, all that is required is a fair share of patience and perseverance.

APPARATUS. — On this very little need be said. It will be far better for the amateur to apply to some respectable dealer, who will supply him with a complete set, than that he should attempt to select for himself until he has obtained some experience in the art. Perhaps the best size to commence with will be about 6 inches by 4½ inches, or, as it is technically called, the "half-plate." On this really pretty pictures can be taken, and failures will not be so expensive as they would be on plates of larger size.

CHEMICALS.—The dealer will also inform the young photographer on this point, and supply a proper quantity of each for a start; the only care required is that all should be of the best quality, and perfectly pure. The chemicals and apparatus being ready, next proceed to prepare an operating chamber, or "dark room," in which to manipulate.

THE DARK ROOM.—A small room, having only one small window, and a door which fits light-tight, will answer best. There should be a good supply of water, and, if possible, a sink to carry off the waste developer and the water used for washing the plates. To prepare the room, darken all the window except over a space of about eighteen inches square; procure about three—certainly not less than three—thicknesses of yellow calico, and fasten them over the opening, *so as to exclude all white light.** If a sink is not procurable, a large pan or dish should be placed on a table immediately under the window, and one or two towels and a piece of soap should also be provided. We may now proceed to mix the various solutions required. The nitrate of silver bath:—Into a perfectly clean stoppered bottle, pour as much distilled water as will fill the vessel provided, and called a "bath," say 20 oz., and to it add 700 grains of nitrate of silver, and agitate until dissolved. Filter it through perfectly clean white blotting-paper, pour it into the "bath," and set it carefully away in the "dark room" for use. The developing solution:—

Take of

Protosulphate of iron ...	200 grains.
Glacial acetic acid ...	2 drachms.
Alcohol	2 ,,
Distilled water	10 ounces.

Dissolve the iron in water, then add the acetic acid, then the alcohol.

INTENSIFYING SOLUTION.

Pyrogallic acid	10 grains.
Citric acid	5 ,,
Distilled water	5 ounces.

SILVER SOLUTION FOR INTENSIFYING.

Nitrate of silver	50 grains.
Distilled water	5 ounces.

FIXING SOLUTION.

Hyposulphite of soda ...	10 ounces.
Common water	10 ,,

Dissolve and keep in a spouted jug.

It will be well to keep these solutions in bottles of different shapes, so as to be easily distinguishable in the dark room. Place all these solutions in the dark room ready for use, with a good supply of clean water, and, if there is not a tap, provide a large spouted jug, for washing the plate after development. Keep the hyposulphite solution quite out of the way until wanted.

COLLODION.—This can be procured ready iodised for use; and if purchased of a well-known maker, can always be depended on.

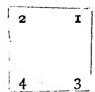
MANIPULATION.—Place the camera on the stand, and in front of the subject to be photographed (it will be best to select one near the dark room for practice), and examine the image on the ground glass, throwing a cloth, or some dark material, over the head to

* *Always remember,* that from the time a collodionised plate is put into the nitrate bath until it is fixed, it must not "see" a ray of white light, except only in the camera during exposure.

exclude the light. Probably it will not be perfectly "sharp," or distinct. To make it so, turn the lens in, or out, by means of the rack and pinion. Having arranged this, proceed to prepare a plate as follows:—

CLEANING THE PLATE.—The glass plate having been washed in clean water, take a tuft of cotton wool, and with a little tripoli powder and alcohol, rub it over the plate on both sides. Then take a clean linen cloth, and polish it over both sides. Now lay it on a sheet of clean paper, and polish it on one side with a clean soft piece of clean wash-leather; wipe the edges clean, and place it in a plate-box. A number of plates may be thus prepared ready for use.

COATING THE PLATE.—Take the plate by one corner, marked 4, and coat it with collodion, by pouring it from the bottle in a little pool on the corner marked 1 in the diagram; now tilt the plate gently, so that it flows across to 2, then towards the thumb, and finally off the plate into the bottle at 3.



Now raise the plate to an angle of 45°, and rock it gently until the lines coalesce and produce a smooth surface. Do not hurry this process, but keep the hand steady. (It will be well to pass a broad, soft brush over the plate before coating it as above described.) Should any collodion run over the back of the plate, wipe it off with a clean cloth kept for the purpose. Thus far the operator may work in daylight; but the next, and all subsequent operations, must be performed in the dark room by yellow light alone. When the collodion is "set"—that is, when it is dry enough to bear a light touch of the finger without sticking—it is ready for sensitising.

SENSITISING THE PLATE.—Take the plate into the dark room, and carefully shutting out all white light, rest it on the ledge of the dipper, and lower it without any hesitation into the nitrate bath solution. Allow it to rest about two minutes, and then raise and lower it alternately, until all greasiness disappears and the liquid flows off in a uniform sheet. It is now ready for exposure in the camera. Remove it from the dipper, and carefully drain it for two or three minutes, and wipe the back with a piece of blotting-paper. Dust out the dark slide, and lay the plate in it, face downwards; shut the back, and throw over the slide a dark cloth to exclude light, in case any should stray into the slide. Set the slide containing the plate upright; and do not alter its position until after exposure, lest the solution should flow back, which would cause stains.

EXPOSURE TO LIGHT IN THE CAMERA.—Having ascertained that the image is sharp on the focussing-screen, place the cap on the lens, remove the ground glass, substitute the slide containing the plate in its place, and draw up the shutter, throwing the cloth which contained the slide over the camera. Now remove the cap of the lens, and allow the light to act on the plate. No definite time can be given during which a plate should be exposed, but for a plate of 7 inches by 4, and with a single lens of 6 inches' focus, with a $\frac{1}{4}$-inch stop, about fifteen to twenty seconds will be required, if the subject be well lighted. The requisite time having elapsed, replace the cap on the lens, lower the shutter, and having thrown the dark cloth over it, remove it to the dark room for development.

DEVELOPMENT OF THE IMAGE.—Pour into a measure (for a plate 6 by 4) one ounce of the developing solution. Remove the plate from the slide, and take it by the same corner as you held while coating it with collodion. Now, holding it over the sink or pan, pour over it the developing solution, beginning at the corner where the collodion was poured off. The developer must be thrown gently over the plate in an even wave, or stains will result from unequal action. Keep the solution gliding backwards and forwards for a few seconds, when the image will appear, the highest lights first, such as the sky, and the whole will gain in intensity and detail until fully out. When the details in the deepest shadows begin to appear, wash off the developer, and examine the picture. If it be clean, and fully developed, wash thoroughly, and proceed to intensify if required. It will rarely happen that the negative is sufficiently intense at this stage, unless the operator be skilful in retaining the whole of the silver on the plate during development.

INTENSIFYING THE IMAGE.—Measure about half an ounce of the intensifying solution into a clean measure, and pour it over the plate. Now add to it five or ten drops of the silver solution for intensifying, and mix thoroughly. Pour this mixture over, and off and on, the plate. The image will speedily gain intensity and vigour, and as soon as the lights become semi-opaque, discontinue the operation. Should the solution become discoloured, and turbid, before sufficient intensity has been obtained, throw it away and begin with a fresh supply. This will, however, rarely be the case if the light be favourable, and the chemicals in good order. When the negative is sufficiently dense, wash well, and proceed to fix the image.

TO FIX THE IMAGE.—Holding the plate as before directed, pour over it the fixing solution of hyposulphite of soda. This will speedily dissolve out the unaltered yellow iodide of silver, and leave the shadows transparent. The deepest shadows should be nearly like bare glass, only a trace of an image visible. When the whole of the yellow iodide is dissolved, wash very freely, in order to remove the whole of the hyposulphite; for if the smallest trace remains it will crystallise, and destroy the negative. The negative may now be taken into daylight and examined; if the sky be semi-opaque, just showing light through it, the shadows in the deepest parts nearly clear glass, and the half-tints well rendered, it will print well, and the operation may be considered successful. The only operations now remaining to be performed are those of drying and varnishing.

VARNISHING THE NEGATIVE.—It will be best to allow the negative to dry spontaneously, but if required it may be dried by the fire. When cool, take the plate in one hand, and pour the varnish over it precisely as if coating it with collodion, drain the superfluous varnish into the bottle, and warm gently by a clear fire until a hard, bright surface is obtained. The negative is now ready to be printed from, and may be used as directed in the following way:—

PRINTING FROM THE NEGATIVE.—The only apparatus required for this process will be a pressure or printing frame, to hold the negative and paper in close contact, and a few flat dishes of porcelain.

THE PAPER.—The paper most generally used is that called "albumenised;" that is, coated with albumen, or white of egg. This may be purchased ready prepared, and should be cut to the size required (about half an inch larger than the negative), and carefully kept flat in a dry portfolio, taking care not to touch the glossy side with the fingers, or stains will result. The sensitising solution should be as follows:—

SOLUTIONS REQUIRED.

Nitrate of silver	...	...	400 grains.
Distilled water	...	...	10 ounces.

TONING SOLUTION.

Acetate of soda	...	...	200 grains.
Chloride of gold	...	...	10 ,,
Distilled water	...	...	20 ounces.

FIXING SOLUTION.

Hyposulphite of soda	...		10 ounces.
Common water	...	...	20 ,,

The toning bath must be mixed twenty-four hours before use. To sensitise the paper, filter the silver solution into a flat dish, and lay the albumenised paper on it, with the glossy side downwards, taking care to avoid air-bubbles, which would leave white spots. Allow it to remain for four minutes. Take it by one corner, and gently raise it off the solution. Drain it well, and pin it up by one corner until dry. This must be performed with black pins in the dark room. Take the pressure-frame, and having cleaned the glass, lay the negative, *face upwards*, in it. Place the sensitised paper with the glossy side against the negative. Lay a few thicknesses of blotting-paper on it; put in the hinged-back, and screw all tightly together. The frame may now be taken into the daylight and allowed to remain a short time, say a quarter of an hour. Now examine the print by opening one-half of the shutter and turning the paper back. This should not be done in a strong light. If the print be not dark enough, expose to light again, examining from time to time. When the print appears a little darker than required, when finished take it into the dark room, and remove it from the pressure-frame. Now pour some clean water into a dish, and immerse the print to remove all the free nitrate of silver from the surface. Change the water until all milkiness disappears, and to the last water add a little common salt. To tone the print, which would be of an unpleasant colour if fixed without this process, pour into another dish sufficient of the toning solution to immerse the print, and place the proof in it, keeping it in motion to avoid unequal action. It will soon be seen to change from a red to a purple tone, and when a very little more purple than required it should be removed from the toning solution, and well washed. The proof is now ready for fixing. Into a dish pour a good quantity of the hyposulphite of soda solution, and plunge the print into it, keeping it in motion as before. In about fifteen minutes the fixation will be completed, and all now required is thorough washing to remove the hyposulphite. The print should be well rinsed under the tap, and then placed in a clean dish to soak, the water being changed frequently, for at least twelve hours. Finally, the print should be washed in warm water for a few minutes, and pinned up to dry. The print is now finished, and may be mounted as the taste of the operator may suggest.

Pickling is the term used to express the mode of preserving animal or vegetable substances from putrefactive fermentation, or decomposition, by immersion in vinegar.

Plants used for Pickling.—Almost any eatable plant may be pickled, and the number so used is very great. The principal plants used in this country for pickling are the leaves of red and white cabbage, samphire, the flower-buds of the cauliflower, the leaf-buds or bulbs of the onion, garlic, shallot; the fruit of the capsicum, both the green and the scarlet; love-apples, nasturtiums, gherkins, cucumber, melon, caper, pumpkin, radishes, and French beans. But the finest is perhaps that we have not mentioned, the Indian and South American mango. The vegetables or fruit selected for pickling should be free from injuries, well cleaned and dried, cut into pieces. and laid in salt and water for two days or more, in order that they may imbibe all the salt they can. The best and strongest vinegar is boiled with such spices as bird and long pepper, cloves, mace, allspice, and ginger in abundance. (See *Spices.*) When the vinegar is sufficiently boiled to evaporate any water it may contain, as well as to fully extract the flavour of the spices, it is poured over the plants prepared, and allowed to grow cold. It is then strained away from them and boiled again. This process is repeated a third time, and finally it is poured hot upon the vegetables in stone-earthenware jars, which are filled to the tops for the purpose of excluding air, which object is still more furthered by placing pieces of bladder over the mouths of the jars and fastening them securely with string. The small quantity of air enclosed being in a rarefied state, due to the heat, a smaller volume of it occupies the empty space that would otherwise be present. Pickles improve with keeping, and should not be eaten for some months after their manufacture.

Pickles must not be kept in common

earthenware, as the glazing contains lead, which combines with the vinegar. Vinegar for pickling should be sharp, though not the sharpest kind, as it injures the pickles. If you rashly use copper, bell-metal, or brass vessels for pickling, never allow the vinegar to cool in them, as it then is poisonous. Add a teacupful of salt to each three gallons of vinegar, and tie up a bag with pepper, ginger-root, with spices of the different sorts in it, and you have vinegar prepared for any kind of pickling Keep pickles only in wood or stoneware; anything that has held grease will spoil them. Stir pickles occasionally, and if there are soft ones take them out and scald the vinegar, and pour it hot over the pickles. Keep enough vinegar to cover them well. If it is weak, take fresh vinegar and pour on hot. Do not boil vinegar or spice above five minutes.

Pickles, Seasons for Making.—The following notice may serve to assist the recollection of the housewife with reference to the times when the articles used for making pickles are in season:—In July and August cauliflowers and artichokes; capsicum and cucumber pods at the end of July and the commencement of August; French beans in July; mushrooms in September; nasturtium and radish pods and onions in the middle of July; red cabbage and samphire in August; and from the end of July to that of August tomatoes or love-apples.

Pictures, Hanging.—If you have good pictures (oil-paintings) they will be worth taking every means of showing to advantage. Therefore, as bright colours around them would overpower their tints, let the walls be one uniform shade, of a quiet and sober colour, something like grey, olive, or stone colour; but on no account anything of a blue, red, green, or yellow tinge. On each side of all the principal pictures it is well to place a bracket supporting a lamp, thus doing justice to the work of the artist, and assisting at the same time to light the room. Oil-paintings and engravings should not be hung together.

Pigeon-pie.—Line the bottom of a pie-dish with a pound of rump-steak cut into slices, not too thin; season with a little salt, pepper, and cayenne, and dip into flour. Have ready picked and drawn a couple of pigeons. Cut off their feet, turn in their legs, fold up the pinions of the wings, and lay them breast to breast upon the meat; put at the sides the yolks of four hard-boiled eggs, lay a bay-leaf upon the top, pour in a little water, cover with paste, stick the feet in the top, and bake in a moderately hot oven rather more than an hour.

Pigeons, to Broil.—Clean the birds thoroughly, split their backs, pepper, salt, and carefully broil them; pour over them either stewed or pickled mushrooms in melted butter, and serve hot.

Pigeons in Jelly.—Take the liquor boiled with a knuckle of veal, and put it into a pan with a blade of mace, sweet herbs, white pepper, lemon-peel, a slice of lean bacon, and the pigeons trussed, with the heads and feet (the nails of the latter being cut close). Season them to taste and bake. When done remove them from the liquor and cover them closely up. Clear the jelly by boiling it with the whites of three eggs, first removing the fat. Put the jelly round the birds rough.

Pigs, Hogs, and Pork.—The young pig, termed the "sucking-pig" or "roasting-pig," is not changed in name, like the full-grown animal, by the fact of slaughtering. Living or dead it is named pig, a roaster or a roasting-pig. When dressed for choice eating it should not be less than three or more than six weeks old. The skin of the roaster should be white (unless it has been a spotted or black-haired pig), plump, hard, and well cleaned. The flanks, when it is opened, should be thick and fat, and it ought to weigh from eight to fourteen pounds. Its season is best in the autumn and winter months. The name of the half or full-grown hog and its varieties when prepared by the butcher is changed to pork. When living and of different ages and sexes they are known by several distinct names; those under one year are either called pigs, shoats, or porkers. If the female within one year have pigs she is known as a "young sow," and no longer by the name of shoat, &c. When spayed the animal is known as a "spayed sow." Above one year the male is named a "young boar," when aged an "old boar;" and when altered a "barrow," or "barrow hog" or "hog," and when altered late or aged it is called a "stag-hog." The female is similarly named "sow," "sow hog," or "hog." These terms are applied to live animals. Experience and information in relation to the varieties which will produce the best kind of pork may be placed in the following order:—1, Barrow pigs or shoats, from three months to one year old; 2, hog pigs or shoats, from three months to six months old; 3, barrow pigs (milk and grass fed), three months to one year; 4, sow pigs, from three to four months old; 5, barrow hogs and spayed sows, when one year, corn-fed, selected usually for bacon hogs; 6, sow hogs, ditto selected usually for bacon hogs; 7, stag hogs; 8, boar hogs or boar, youngest best. The general appearance of the most choice pork is from an animal the carcase of which will not weigh less than 50 and not more than 120 lbs. The skin should present a thin, transparent appearance, approaching white in colour. The fat on the back should not be less than half an inch thick, white, and firm, and the lean of a pale reddish colour and sappy. The skin of the older animals or bacon hogs is thicker and coarser, while the lean is of a darker colour, but equally sweet, juicy, and tender. Hogs selected for bacon, clear pork, hams, shoulders, back fat, or for salted or barrelling pork, are usually from 150 lbs. to 500 lbs.; some, indeed, have weighed above 1,200 lbs. By many, fresh pork is considered to be exceedingly unwholesome during the months of the year of high temperature. This, no doubt, to a great extent is true, the fatty, gross character of the flesh not being assimilated when the animal economy of the human system requires less heating nourishment to the blood, and therefore requires less irritating food to the digestive organs. Animals procured from those who properly feed them —the food producing a great influence on the quality of the flesh—must prove good and wholesome food, although not so firm; but if the animals are allowed to run at large, which is generally the case with shoats and hogs in the spring and summer, eating whatever they can pick up—their uncleanly character is too well known both as to habit and the filth or animal substances they select for food—there can be no doubt that pork from such animals offers unfit and unwholesome food. The carcase of pork, being intended for immediate use while in a fresh state, is hung by the foot of its right hind leg, then cut down through the skin of the centre of the back from the tail to the neck, followed with the splitting down of the back-bone through the line of the incision, dividing it into halves or sides. These are again divided, after taking off the head, into quarters. The hind-quarters are first divided by taking off the leg of pork, which is generally used fresh for roasting, after having the bone neatly taken out and finely scored; but when intended for corning it should be kept in pickle ten or twelve days before use. The loin of pork being left, if not too fat presents the finest piece for roasting; it should also be finely and evenly scored, as all pork ought to be when intended for roasting. The scoring should be a quarter of an inch in width, to prevent its blistering and render the joint more readily carved. The loin also furnishes fine pork-chops and small corning pieces. The fore-quarter of pork, if small, is often roasted whole, after having the blade-bone removed; if large, it is divided across the ribs, using the thin part or brisket of pork for corning after taking off the hocks and feet.

The chine of pork is used for roasting, or the ribs are used for rib-chops up as far as the blade-bone, and the remaining part for pork-steaks. The carcase being very large and fat, and the lean portions intended to be used fresh, we must first separate the head from the carcase; then split (or saw if frozen) the carcase through the back-bone with a chopper. This done, with a sharp knife loosen the leaf and kidney fat, and tear it away towards the leg or fresh ham; the kidney is brought away with it. Each side is then divided into its fore and hind quarters by leaving two ribs in each of the latter. The next cut loosens the tender-loin from where it is connected with the fresh ham, when it is torn out upwards towards the ribs or head. The fresh hams are then removed, beginning at the tail-side and cutting circularly to the flank, after sawing the small-bone about half-way and chopping or sawing off the feet. Next cut off the brisket of pork, which is usually corned; the chine-piece turn over, that the thick clear fat can be easily cut off close to the lean. This fat is usually salted, and is known as back-fat. It is used for various purposes in cookery, and also by many butchers in the dressing of calves. Sometimes a very thin slice will be observed on a fat-appearing loin of veal; this deceit is called plating, although in fact it may be considered an addition to the veal by aiding its cooking and its flavour. It is usually done, however, with the intention of hiding the uncovered kidney of a poor, young veal, which too often is not fit to be eaten. The chine of pork without the back-fat is much used for chops, steaks, or roasting, while some prefer this part (after taking out all the bones) for sausage meat. This kind of pork is now usually preferred instead of the small quarters, or that which has the skin usually left on it, the flesh being considered more luscious from having been better fed and cared for, while it is leaner and thicker. The hog for bacon is large and fat. The head is divided by cutting off the cheeks, beginning from the corner of the mouth, and sawing off the jaw-bone which separates the cheeks from the throat; then crack the bone of the under jaw, between the front teeth, and the cheeks are held together to hang up by. Next take off the shoulder by cutting straight across the side; then trim off the spare-ribs by cutting under the breast-bone, and so follow the ribs as far as the chine-bone, when the knife is continued on directly to the end of the long bones in the back, which leaves the shoulder about one thickness, and the spare-ribs (not too spare) with meat enough under them to make a roast. Then trim the shoulder round, saw off the feet which form the shoulder similar to the ham. The brisket and flanks are now cut off; the ribs and loin pieces are cut in suitable sizes, when all are ready to salt except the trimmings, and some other pieces can be used for sausages. The beef-fat and pieces of fat can be rendered into lard. The pork tender-loins, when they are cut out, are usually sold separately at a higher price than the other pieces. Their ordinary weight is from half to one pound each.

Measly Pork.—The flesh of the hog when measly is exceedingly unwholesome as food, and is not fit to be used for any purpose. It may be known by many lumps and kernels seen through the fat and lean, as well as the flesh having a heavy, dull appearance.

Pink Pancakes.—Take a pint of cream and the yolks of eight eggs, a little sugar and a little grated nutmeg, three large spoonfuls of orange-flower water, a little butter with the cream added over the fire, and three spoonfuls of flour. Mix these well together. Butter the frying-pan for your first pancake, and let run into it as thinly as possible. Fry quickly, and serve up hot.

Plants, Hints on Watering.—Plants in pots should be examined every day, and if the earth is dry they should be watered. If the mould is an inch from the top of the pot, water enough to fill it will be sufficient for one dose. If the earth has become so dry as to have shrunk from the sides of the pot, the water will run outside the roots and do the plant no good. To avoid this, apply enough to soften the earth, which press to the sides, and then water again, so that the entire mass of earth may be moistened. In winter plants require water less frequently, but when they do have it—say once a week—they should have as much as you would give them once a day in the summer. Saucers of the same material as the pot should be put under it, to keep the lower soil cool and moist. This will be beneficial to all plants. The following plants require plentiful watering:—Fuchsias, begonias, arums, calceolarias, and many ferns. The pans under the pots should be, however, neither too small nor too large; each pot has a size belonging to it, and this only should be used. If they are too large, they contain more water than the plant will absorb before the water grows unfit for it; if too small, the water is insufficient.

Plants in Bedrooms.—Plants should never be kept in bedrooms. Gardeners who are compelled to remain for some time in hot-houses where a number of plants are collected together, are very subject to painful headaches, in consequence of being compelled to breathe an atmosphere loaded with this destructive agent. On this account the practice of having plants in apartments where persons are in the habit of sleeping cannot be too severely censured. The following instructive fact was recorded in the *Times* of Oct. 17th, 1814:—"Mr. Sherbrook having frequently had his pinery robbed, the gardener determined to sit up and watch. He accordingly posted himself, with a loaded fowlingpiece, in the greenhouse, where it is supposed he fell asleep, and in the morning was found dead upon the ground, with all the appearance of suffocation, evidently occasioned by the discharge of mephitic gas from the plants during the night."

Plants in Winter are more frequently killed by damp than by cold. Give them all the air and light you can, water them but little, and if the frost catches them keep them out of the warmth of a fire or sunshine until they are thawed. When the spring comes on it is a good plan to lightly wipe each leaf and stem with an old cloth dipped in water from which the chill has been taken.

Plaster Casts.—These can be greatly improved by adopting the following French mode of coating them with wax:—Lay on with a soft brush, the cast being perfectly dry, thin coats of hot melted white wax until it ceases to be absorbed. Then, when quite cold, hold a hot plate of iron, or, for large articles, a brazier of lighted charcoal, so near to all parts that all the outside wax shall be entirely absorbed, and the operation will be complete. The plaster will then be dull, and a tolerable representation of white marble. Objects treated in this manner may be exposed out of doors in a garden without damage, and will always preserve their whiteness. They would bear careful washing with a soft brush.

Plaster Casts, to Bronze.—Bronzing is colouring plaster or other busts and figures with metallic powders, to give them the appearance of metal. The powders used for this purpose are either copper filings (*aurum musivum*) or copper precipitated from its solution in aquafortis by iron. Having done over the substance to be bronzed with either isinglass, size, japanner's gold size, or in some cases with drying oil or oil paint, the powders are rubbed on, taking care that the projecting parts receive more of the powder than the cavities, to imitate the brightness on those parts of bronze which are liable to be rubbed. We give another method with isinglass:—Dissolve insinglass in water over the fire, with a hair pencil lay it over the medal, and let it dry. When it is hard raise it up with the point of a penknife, and you will then have a sharp impression of the medal. Breathe on the concave side of the impression, and lay gold leaf on it, which by shining through will make it appear like a gold medal or like a copper one by mixing a little carmine with the isinglass, and laying gold leaf as before, or any colour may be given to the isinglass by mixing the requisite colour with it.

Plaster Casts, to Polish.—Put into four pounds of clear water one ounce of pure curd soap grated and dissolved in a well-glazed earthen vessel; then add one ounce of white bees'-wax cut into thin slices; as soon as the whole is incorporated it is fit for use. Having well dried the figure before the fire, suspend it by a twine, and dip it once into the varnish; upon taking it out, the moisture will appear to have been absorbed in two minutes' time; stir the compost, and dip it a second time, and this generally suffices; cover it carefully from the dust for a week, then with a soft muslin rag or cotton wool rub the figure gently, when a most brilliant gloss will be produced. Another method is adopted sometimes by brushing it over with a camel's hair-brush until it will imbibe no more; shake or blow off any that remains on the surface, and lay it by perfectly free from dust; when dry it will look like polished marble, and answers equally well with the former, except it is put outside the house in wet weather. If the milk is not carefully skimmed it will not answer. A third method is to fuse half an ounce of tin in a crucible; when melted add half an ounce of mercury, and when perfectly combined take the mixture from the fire and cool it. This substance mixed with the white of an egg forms a most beautiful varnish for plaster of Paris casts.

Plate-cleaning, &c.

To Clean Japanned Candlesticks.—Pour on water just warm enough to melt the grease, for if scalding hot it will melt the japan. Next wipe them well with a soft cloth, sprinkle them with flour from a dredging-box, let them rest awhile, and then wipe it off with a silk handkerchief.

To Clean Decanters.—Cut some raw unpared potato into small squares, or pound some egg-shell. Have ready, in a small tub, some strong soap-suds of white soap in cold water, which will be the better for having a little soda dissolved in it, or a few drops of muriatic acid mixed with the water will greatly improve the polish of the glass. Dip out some of the suds, pour it into the decanter, and shake it about for five or ten minutes, till you see all impurities disappear from the inside of the glass. Then empty it out, put in some more suds, and wash round the inside with a bit of sponge tied to a stick. It is as well to have a regular glass-stick, which should be more than a foot long, with a flat knob at the end, on which to fasten a sponge or a bit of rag. After having washed the decanters in the above manner, rinse them out twice with cold water. Next put them into a tub of clean soap-suds, and wash them well on the outside with a glass-brush, and afterwards rinse the outsides in cold water. Dry them inside by fastening a dry, clean piece of rag to the end of your glass-stick, and wipe the outside with a soft towel, finishing with a silk handkerchief or wash-leather.

Wine-glasses and Tumblers should be washed in cold soap-suds in the same manner as the above, and dried in the same way.

For Cruets from the castors, it will be necessary to have warm water for them. After the cruets are emptied of their contents, fill them as far as the neck with warm water, shake them, and let them stand awhile to soak. Then proceed as directed for decanters.

Plate-cleaning Mixture.—Take one pound of prepared chalk, and rub it to a fine powder; then sift it. Mix together four ounces of spirits of turpentine, two ounces of spirits of wine, one ounce of spirits of camphor, and half an ounce of spirits of hartshorn. Then add the whitening gradually to the liquid, stirring in a little at a time, and mixing the whole thoroughly till it is of the consistence of cream; put it into a close vessel (a large bottle or a jar), and cork it tightly, tying down a leather over the cork. To use the mixture, pour out a sufficient portion into a bowl or pan, and with a soft clean sponge cover the silver with it, so as to give it a coat like whitewash. Set the silver aside for ten minutes or more, till the paste has dried into a powder; then brush it off, and polish with a leather, afterwards with a silk handkerchief. It is very convenient to keep this mixture in the house ready for use, as it will make the plate look beautifully new.

Another Plate-powder. — Pulverise a lump of camphor, mix it with fifty drops of sweet oil, and dissolve it in a pint of whisky; put it into a bottle, and keep it very closely corked. When required for use, mix with it a sufficiency of powdered whitening or prepared chalk to make a thin paste, and coat the silver all over with it. After it has dried on, brush it off, and polish with a leather, and then with a silk handkerchief, using a small brush for the chasing and crevices.

To get a Very Fine Whitening. —Pour water on it; then after a while pour off the water from the whitening that has settled at the bottom, and replace it with more water. Let it settle for a time, and then again pour off the water from the top. By repeating this process several times, you will obtain a whitening which, after it has been spread out to dry in the sun, is very fine and soft. Put it away for use in a closely-covered bottle.

Cleaning Plated Ware.—Plated ware must not be cleaned so frequently as silver, lest the plating should be worn off. If not greasy, it will be sufficient, after using, to wipe it with a cloth. If greasy, wash it in a small tub of strong hot soapsuds, taking out each article quickly, and wiping it immediately with a soft towel, using a change flannel to dry it thoroughly, and polishing it off with a silk handkerchief. Once a fortnight it may be cleaned by covering it with prepared chalk finely powdered and made into a paste with sweet oil. When the mixture has dried on, wash it off with a sponge dipped in spirits of wine or whisky. Then rub the article dry with a soft flannel, and finish with a silk handkerchief. It is best to use no brush for plated ware, and to give it less rubbing than you give silver. With careful washing, the best plated ware will last a long time.

Chandeliers should be dusted at least once a week (or oftener, if necessary) with one of those long-handled soft feather-brushes made for such purposes. Great care is requisite in dusting these, as the drops and other ornaments must be touched with the utmost delicacy. Bronzed chandeliers, lamps, &c., should be merely dusted with a feather-brush or a soft cloth. Washing them will take off the bronzing.

Plethora.—A condition of body in which the vessels are fuller of humours than is in accordance with its healthy condition, the general mass of fluids being too largely increased. When symptoms of languor and oppression indicate this state of the body, means should be taken to restore it to a better condition. The amount of food taken should be decreased, the natural discharges encouraged, more exercise taken, and less sleep indulged in.

Polished Iron.—Polished ironwork may be preserved from rust by going over it lightly with copal varnish, mixed with nearly an equal quantity of spirits of turpentine, and as much sweet oil as will give the mixture a little greasiness. Lay on this mixture with a bristle brush (which must afterwards be washed in warm water), and see that no dust or ashes get to it while drying.

Pomade for Curing Baldness.—(Dupuythren's). — This celebrated pomade is composed of six ounces of beef marrow, two ounces of nervine balsam (the latter is made by melting together four ounces each of beef marrow and oil of mace, with the addition of two drachms of balsam of tolu and one drachm each of oil of cloves and camphor, dissolved in half an ounce of rectified spirits with sixteen grains of extract of cantharides). Melt the marrow and nervine balsam with the oil; strain, add the balsam of Peru, and lastly the extract dissolved in a drachm of rectified spirit. Apply night and morning after first washing the head with salt and water. If any soreness is produced, apply less frequently.

Ponche à la Regence.—A small piece of vanilla, the same of cinnamon and cloves, two citrons, and two bitter oranges; infuse these ingredients for several hours in hot syrup, add the juice of twelve lemons, rum and brandy according to taste and the strength you wish for; pass the whole through a sieve or fine napkin, put it into bottles or decanters, and then into ice until it is served up.

Ponche à la Romaine.—This recipe has long been a desideratum of the amateurs, but since its invention it has been in few hands only. From Rome it was brought to Paris, and from Paris to London, and was known to a few private confectioners only. First make a lemon ice, say of twelve lemons. They must be peeled and put into fresh water. Rub the peel of two lemons on a piece of sugar to obtain the essence, which gives the good taste of lemon by putting the sugar in the mixture. Peel the lemons with a small knife, so that you take off the fine yellow surface, which is the essence, whereas the white is bitter; cut the lemons in half, and squeeze the juice into a basin, with as much filtered water and sugar, or syrup, as will make lemonade agreeable to your palate; put it into a freezing pot, and work it as usual in freezing ices. Then take the whites of six new-laid eggs, let them be well whipped *en neige;* when quite firm take a pound of syrup boiled *au soufflet* from it. While boiling in the whites of the eggs mix them well together; the heat of the sugar unites the eggs, which makes the quality of the punch. When you mean to serve it, put in a pint of best rum and a pint of French brandy, with two glasses of real Zara Maraschino; mix the whole together, and serve it in champagne glasses. If wanted for balls, and a great quantity is required, add a bottle of champagne; but the quantity of ice, to be perfect, must be proportioned to the liquid. It should be smooth and white like a thick cream.

Pontiff's Sauce.—Take of veal, ham, carrots, parsnips, celery, or sliced onions, of each a pound; of lemon-peel, coriander-seed, and shallots, of each one ounce; boil them in two quarts of vinegar, one quart of catchup, and one quart of white wine, adding the wine about ten minutes before it is removed from the fire. Boil gently for several hours, until the whole is well incorporated; then strain and bottle when cold, after skimming.

Port Wine Sediment gives a pleasant flavour to coffee.

Potash, or the vegetable alkali, is generally obtained from wood ashes, but sometimes from the tartar or from the lees of wine, in which case it is called *salt of tartar.* Most of our potash is imported from the North, where wood is in sufficient abundance to allow of its being burnt for this purpose. The hard wood affords the most salt; but every vegetable when burnt affords some. The ashes are washed in water, which dissolves the potash; the solution is then concentrated by boiling and evaporating in iron boilers, and the salt thus procured is sometimes heated in the fire, to purify it from colouring matter. The vegetable alkali is used in bleaching, in making soap and glass, and as a medicine. Wood ashes are frequently used in washing, in which it is the potash that proves serviceable; for by uniting with grease and other filth, it renders them soluble in water. For the same reason salt of tartar is sometimes used to take out grease-spots.

Potatoes.—The general use of that most valuable root, the potatoe, renders any observations upon its qualities quite unnecessary. It must not, however, be imagined that potatoes contain the same nutritive powers as bread, weight for weight. It has been estimated, as the result of experiments by two French chemists, MM. Percy and Vauquelin, that one pound of *good* bread is equal to two pounds and a half or three pounds of potatoes; and that seventy-five pounds of bread, and thirty of meat, are equal to three hundred pounds of potatoes. Potatoes are superior in nutriment to turnips and carrots—three parts of turnips, or two of carrots, being equal to one of potatoes.

MODES OF COOKING POTATOES.—Large quantities of potatoes are wasted in many families by bad modes of cooking. In Lancashire they are generally admirably dressed; and there, contrary to the practice in some parts of England, they are first peeled. The larger potatoes are cut in pieces of the same size as the smaller ones, so that they may boil equally; a little salt is thrown into the water before it begins to boil; when they are done thoroughly the water is poured from them; and the saucepan is placed for a very short time on the fire to dry them, and that all may be equally dried, the pan is shaken, that those at the bottom may be brought to the top. The following are Count Rumford's directions for boiling potatoes, which differ materially from the preceding, in the circumstance that the root is neither pared nor scraped before boiling:—"The potatoes should be, as much as possible, of the same size, or the large and small ones boiled separately. They must be washed clean, and, without paring or scraping, put in a pot with cold water, not sufficient to cover them, as they will produce themselves, before they boil, a considerable quantity of fluid. They do not admit being put into a vessel of boiling water, like greens. If the potatoes are tolerably large, it will be necessary, as soon as they begin to boil, to throw in some cold water, and occasionally to repeat it, till the potatoes are boiled to the heart, which will take from half an hour to an hour and a quarter, according to the size; they will otherwise crack, and burst to pieces on the outside, whilst the inside will be nearly in a crude state, and consequently very unpalatable and unwholesome. During the boiling, throwing in a little salt occasionally is found a great improvement; and it is certain that the slower they are cooked the better. When boiled, pour off the water, and evaporate the moisture, by replacing the vessel in which the potatoes were boiled once more over the fire. This makes them remarkably dry and mealy. They should be brought to table with the skins on, and eaten with a little salt, as bread." The mould about potatoes should not be removed until just before they are wanted for cooking.

GROWING POTATOES.—The potato thrives best in a light, dry, loamy soil, and is raised from small pieces of potato, each of which has an "eye" in it. Much manure of any kind is not required, and the planting usually takes place in March or April. During its growth the potato requires a considerable quantity of tillage; the ground must be kept free from weeds by frequent hoeings, and to support the young stems the earth must be packed up about them from time to time. The crop is gathered about October or November.

STORING POTATOES.—If stored in a cool, dry place, the potato will keep for many months, though in spring the tubers will begin to put forth roots, especially if the place in which they are kept is damp. Should this vegetation proceed too far, the potatoes will be unfit for eating, in consequence of certain chemical changes resulting from their vitality. Dip them for a moment in hot water before storing them. This will prevent them from sprouting.

Potatoes as a Substitute for Soap.—Cold boiled potatoes may be used instead of soap; they cleanse the hands effectually without rendering them rough. (See *Rough Hands* and *Soap*.)

Potato Souffle.—This dish has the double advantage of being excellent and economical. Take as many large potatoes as you expect guests for dinner, as the potatoes do not look well when cut; wash them well, and select the best shaped; put them into the oven, and when sufficiently baked cut an aperture at the top of each, scoop out the inside with a spoon, and put it in a stewpan with two or three spoonfuls of double cream, a small bit of butter, a little salt, some sugar, a little lemon-peel rasped on sugar, yolks of two eggs, adding nicely the white thereof. Put this mixture into the hollow potatoes, placing them in a pretty hot oven. The taste may sometimes be varied with lemon, orange-flower water, &c. Apple souffle may be prepared in the same way, excepting that it must not be baked previously to being filled with the ingredients, but merely cored, and the interior scooped out as above directed.

Potato Water.—The water in which potatoes have been boiled is often recommended for sponging out dirt from silk.

Potting.—Animal substances are potted after cooking by being reduced to a pulp in the mortar and mixed with salt and spices. The pulp is then put into jars, and covered with a thick coat of melted butter or lard to exclude the air. The muscular parts of meat are best for potting. The mouth of the jar is covered with a piece of bladder-skin tied down tightly. (See page 314.)

Poularde au Riz. — Wash a quarter of a pound of Carolina rice in water, which you must pour away till it becomes clear and the rice retains no odour. Have a good and white fowl well dressed; wash the inside with hot water, then put the fowl in an oval stewpan with the rice, and an onion with two cloves stuck in, with some salt, and broth enough to cover the fowl. You must reduce the liquor to mix with the rice. Let it boil gently for an hour and a half, then take out the onion and the cloves, and skim all the fat. Serve this fowl with the rice, but mind that the fowl is not too liquid, or it will have a bad appearance. This is a cheap, pleasing dish.

Poulet à Stamboul. — Wash the inside of a fowl with hot water until you have completely cleaned it out. Prepare some rice as follows:—Soak the required quantity in warm water till it begins to swell, then drain it and put it in a dry sieve over a saucepan of boiling water, not suffering the grain to touch the liquid; stir gently with a wooden spoon over a slow fire till the rice is completely done. Moisten it with well-seasoned veal broth, and stuff the fowl with it, securing both ends, then wrap the bird in slices of fat bacon, and cover all with oiled paper. Roast for an hour before a slow fire. When ready to serve, place a portion of the rice warmed up in the veal broth around the dish, take off both paper and bacon, and place the fowl in the centre. Garnish with slices of lemon or fresh barberries.

Poultry, To Draw.—In drawing poultry the greatest care should be taken not to break the gall-bladder, as nothing will afterwards remove the bitterness. All poultry should be drawn through the vent, and when that is cut off a string or skewer should fasten it close to the fore-part. Some persons draw poultry from the side, but this is a very wrong thing to do. It is an excellent plan, when the fowl is drawn and clean, to put a piece of butter the size of a walnut, covered with pepper, into the inside. This gives it a pleasant flavour, and removes all dryness from the back and side bones.

Preserving in Spirits. — To preserve birds, fishes, insects, or reptiles, &c., from decay, place them with rectified camphorised spirits of wine in a bottle or other glass vessel, hermetically sealed, to preserve the object from contact with air.

Preserving, Various Ways of.—Wheat, barley, rye, &c., and their flour, may be preserved for an indefinite length of time if they be kiln-dried, put up in vessels or chambers free from damp, and excluded from the air. Well-dried grain is not liable to the depredations of insects. To preserve fruits in a fresh state various plans are adopted. Pears, apples, plums, &c., should be gathered in a sound state, altogether exempt from bruises, and plucked in dry weather, before they are fully ripe. One mode of preservation is to expose them in an airy place, to dry a little, for eight or ten days, and then to lay them in dry sawdust or chopped straw spread upon shelves in a cool apartment, so as not to touch each other. Another method consists in surrounding them with fine dry sand in a vessel, which should be made air-tight, and kept in a cool place. Some persons coat the fruit, including their stalks, with melted wax; others lay the apples, &c., upon wicker-work shelves in a vaulted chamber, and smoke them daily for four or five days with vine-branches or juniper-wood. Apples thus treated, and afterwards stratified in dry sawdust, without touching each other, will keep fresh for a whole year. The drying of garden fruits in the air, or by a kiln, is a well-known method of preservation. Apples and pears of large size should be cut into thin slices. From five to six measures of fresh apples, and from six to seven of pears, afford in general one measure of dry fruit. Dried plums, grapes, and currants are a common article of commerce. Herbs, cabbages, &c., may be kept a long time in a cool cellar, provided they are covered with dry sand. Such vegetables are in general preserved for the purpose of food by means of drying, salting, pickling with vinegar, or beating up with sugar. Cabbages should be scalded in hot water previously to drying; and all such plants, when dried, should be compactly pressed together and kept in air-tight vessels. Tuberous and other roots are better kept in any place where they dry a little without being exposed to the winter's frost. A partial drying is given to various vegetable juices by evaporating them to the consistence of a syrup, called a "rob," in which so much water is dissipated as to prevent them running into fermentation. The fruits must be crushed, squeezed in bags to expel the juices, which must then be inspissated either over the naked fire or on a water or steam bath, in the air or in vacuo. Sometimes a small proportion of spices is added, which tend to prevent mouldiness. Such extracts may be conveniently mixed with sugar into what are called conserves. Salting is employed for certain fruits—as small cucumber, gherkins, capers, olives, &c. Even for peas such a method is had recourse to for preserving them a certain time. They must be scalded in hot water, put up in bottles, and covered with saturated brine, having a film of oil on its surface to exclude the agency of the atmospheric air. Before being used they must be soaked for a short time in warm water, to extract the salt. The most important article of diet of this class is the sour kraut of the northern nations of Europe (made from white cabbage), which is prepared simply by salting—a little vinegar being formed spontaneously by fomentation. The cabbage must be cut into small pieces, stratified in a cask along with salt, to which juniper berries and carraway seeds are added, and packed as hard as possible by means of a wooden rammer. The cabbage is then covered with a lid, on which a heavy weight is laid. A fermentation commences, which causes the cabbage to become more compact, while a quantity of juice exudes and floats on the surface, and a sour smell is perceived towards the end of the fermentation. In this condition the cask is transported into a cool cellar, where it is allowed to stand for a year, and indeed where, if well made and packed, it may be kept for several years. Another excellent plan of preserving all kinds of butchers' meat, fish, poultry, and also for the importation of turtles from the East Indies:—Let the substance be first parboiled, or rather somewhat more, the bones of the meat being previously removed. Put the meat into a tin cylinder, fill up the vessel with seasoned rich soup, and then solder on the lid, pierced with a small hole. When this has been done, let the tin vessel thus prepared be placed in brine, and heated to the boiling-point to complete the remainder of the cooking of the meat. The hole of the lid is now to be closed perfectly by soldering whilst the air is rarefied. The vessel is then allowed to cool, and from the diminution of the volume in consequence of the reduction of temperature, both ends of the cylinder are pressed inwards and become concave. The tin cases, thus hermetically sealed, are exposed in a test-chamber for at least a month, to a temperature above what they are ever likely to encounter, from 90° to 101° Fahrenheit. If the process has failed, putrefaction takes place, and gas is evoked, which in process of time will cause both ends of the case to bulge, so as to render them convex instead of concave. But the contents of those cases which stand test will infallibly keep perfectly sweet and good in any climate and for any number of years. If there be any taint about the meat when put up, it evidently ferments and is detected in the proving process. This preservative process is founded upon the fact that the small quantity of oxygen contained within the vessel gets into a state of combination, in consequence of the high temperature to which the animal substances are exposed, and upon the chemical principle that free oxygen is necessary as a ferment to commence or give birth to the process of putrefaction.

Printing on Cotton or Velvet.—French Method.—Extend some tracing-paper upon the object to be copied, and trace the design upon it with a pencil. Rub the contrary side of this paper all over with fine lac in powder, and apply this reddened surface upon a smooth piece of parchment. With a pencil go over every object separately, using as many pieces of parchment as there are different objects and different colours in the design, so as to transfer every object on a different piece. Afterwards cut out all the pieces of parchment by the transferred lines; and, this done, extend the piece of velvet intended to be painted upon a table covered with a green cloth; place every piece of parchment, one after another, on that part of the velvet where the portion of the drawing ought to be which has been cut in the piece of parchment, and with a pencil charged with colour suited to that part of the drawing, go over the velvet where it is not covered by the parchment. The same is done for each piece of parchment separately till the whole drawing is completed. The execution of this process requires a great deal of care and attention, in order to avoid obliterating the design; for the whole process is performed continuedly, without waiting for the part which has first been painted to dry before commencing another. At last the parts which may not have taken well are corrected and finished with a pencil, or by means of new pieces of parchment.

Printing on Glass, by laying on Mezzotinto Prints, for Magic Lanterns, &c.—To begin, you must cut off the margin of the print you intend to use, and lay it in a flat vessel of hot water; let it remain on the surface till it sinks. Take it out, and press it between cloths or papers, so that no water may appear on the surface, leaving the print quite damp. Then lay it, with the face uppermost, on a flat table, and have ready a piece of crown glass, free from blemishes; lay some Venice turpentine all over one side of the glass with a soft brush, hold it to the fire that it may be quite equal and thin, then let it fall gently on the print. Press it down, that the turpentine may adhere to the print; also press the print with your fingers, from the middle to the edges of the glass, that no blisters may remain. Wet the print now with a soft cloth, and rub it gently with your finger, and the paper will peel off, leaving the impression on the glass. When it is dry, moisten it with oil of turpentine, till it is transparent, and set it by to dry, when it will be fit for painting. The colours used for the painting are the usual transparent oil colours. Subjects for magic lanterns may be painted by those who cannot paint in oil, in water colours, on the paper,' which must be afterwards varnished to make them transparent.

Prints.—To Clean and Restore when Discoloured.—Let a glass bottle be half filled with a mixture composed of one part of red lead minium and three parts of common muriatic acid. Close the bottle immediately with a ground-glass stopper, and set it in a cool dark place. A degree of heat will take place spontaneously in the mixture, showing that new combinations are forming, the red lead giving out a great part of its oxygen, which, combining with the acid, causes it to acquire a beautiful gold colour, and the peculiar smell of oxygenated muriatic acid. A small portion of lead is dissolved in the acid, but this does not diminish its power. Observe that the bottle used for this purpose must be very strong, otherwise the elastic vapour that arises will burst it if firmly stoppered, as it ought to be. Having prepared the liquor as above, take a large pane of glass and fix around its edge a border of wax, about an inch in height, forming a kind of trough, in which the print is to be soaked for three or four days in water mixed with a small quantity of ox-gall. At the end of that time pour off the liquor, and supply its place with warm water, which must be changed every four hours until it comes off quite clear. If there is any dirt of a resinous nature upon the print, it may be removed by washing it with a little alcohol. Having thus cleaned the print, let all the moisture drain from it, and then having placed it on a glass, pour on a sufficient quantity of the mixture from the bottle to cover it entirely. Another pane of glass, of the same size as the first, may be placed upon the wax border, to keep off dust, and prevent the disagreeable smell arising from the acid. The most yellow print may be seen under this process to assume its original whiteness, and one or two hours will be sufficient to produce the desired effect. Nothing remains but to pour off the acid, and wash the print two or three times in pure water, and then dry it in the sun.

Prints, to Transfer.—Prints are frequently transferred to painted surfaces or wood, and may be seen on fans, fancy boxes, &c. To transfer a picture, let the ground to which you wish your print transferred be well rubbed down with pumice-stone and water. Then apply a thin coat of very light-coloured varnish. (White hard-drying varnish is good.) When this is not quite dry—"tacky," like gold size—damp the print on the back with clean water, and lay it between some newspapers to remove any surplus water: then put it carefully on the varnished surface, pressing it close with a damp cloth, or the finger, until there are no bubbles of air underneath. If there should be bubbles not easily pressed out, prick them with a pin to let the air escape. Then put the work aside to dry, and, when hard, damp the paper, and it can be rolled off by the finger in small rolls, until the picture is left quite perfect on the paint. After this has dried well, a coat of clear light varnish will finish the operation. The same process is used to transfer pictures to glass, and when coloured on the back they have a neat appearance. Almost any one can do this kind of ornamentation easily. Try it on a small scale. Another method is to use Grecian varnish—Canada balsam and turpentine—but copal varnish is better where you desire durability.

Probate of a Will (see *Wills*).—After a testator's death it is the duty of the executors, if they mean to act, to make an inventory of the deceased's property, and have it properly valued. This being done, they should go to the registrar of the Probate Court (local registry offices exist in all parts of the kingdom), and before him they must take oath to their belief in the signature attached to the will, an official copy of which is then made, called the probate copy, and, probate being duly paid, delivered to the executors of the warrant, on which they can act in the administration of the estate. If the will should be disputed, it must be proved *in solemn form*, when witnesses are examined and cross-examined, and the will is proved or not according to the evidence. This solemn form may be demanded at any time within forty years, but after a will has been proved by it no further dispute is allowable. (See *Executors*.)

Promissory Notes, or Notes of Hand.—These are written promises of an absolute nature to pay a specified sum, in which the party promising is called the *maker*, and the party who is to receive is called the *payer*, and they are usually drawn up in the following form :—

Manchester, August 1st, 1872.

£100 10s. 0d.

On demand (or at sight or so long after sight) I promise to pay to Jonas Chuzzlewit, or order, the sum of one hundred pounds ten shillings for value received.

PETER PICKWICK.

It must be borne in mind that the law presumes interest to run from the maturity of the bill or note if it is not paid on the specified date.

Protractors. — Instruments used for laying down angles. These are circular and semi-circular. The plate is in either case divided into degrees and half-degrees, and it is either provided with a means of measuring from the centre to the degree of angle required (a *vernier*), or is plain.

Provisions, Curing of.—The best mode of drying the animal fibre is to cut the flesh into slices from two to six ounces in weight, immersed in boiling water for five or six minutes, and then laid on open trellis-work in a drying stove, at a temperature kept steadily about 122° Fahr., with a constant stream of warm dry air. That the boiling water may not dissipate the soluble animal matters, very little of it should be used, just enough for the meat to be immersed by portions in succession, whereby it will speedily become a rich soup, fresh water being added only as evaporation takes place. It is advantageous to add a little salt and some spices, especially coriander seeds, to the water. After the parboiling of the flesh has been completed, the soup should be evaporated to a gelatinous consistence, in order to fit it for forming a varnish to the meat after it is dried, which may be completely effected within two days in an oven. By this process two-thirds of the weight is lost. The perfectly dry flesh must be plunged piece by piece in the fatty gelatinous matter liquefied by a gentle heat; then placed once more in the stove, to dry the layer of varnish. This operation may be repeated two or three times, in order to render the coat sufficiently uniform and thick. Butchers' meat dried in this way, kept for a year, affords when cooked a dish similar to that of fresh meat, and is therefore much preferable to salted provisions. The drying may be facilitated so that larger lumps of flesh may be used if they be imbued with some common salt immediately after the parboiling process, by stratifying them with salt, and leaving them in a proper pickling-tub for twelve hours before they are transferred to the stove. The first method, however, affords the more agreeable article. Smoking consists in exposing meat previously salted, or merely rubbed over with salt, to wood smoke, in an apartment so distant from the fire as not to be unduly heated by it, and into which the smoke is admitted by flues at the bottom of the side walls. Here the meat combines with the empyreumatic acid of the smoke, and gets dried at the same time. The quality of the wood has an influence upon the smell and taste of the smoke-dried meat; smoke from the twigs and berries of juniper, from rosemary, peppermint, &c., imparts somewhat of the aromatic flavour of these plants. A slow smoking with a slender fire is preferable to a rapid and powerful one, as it allows the empyreumatic principles time to penetrate into the interior substance without drying the outside too much. To prevent soot from attaching itself to the provisions, they may be wrapped in cloths, or rubbed over with bran, which may be easily removed at the end of the operation. The process of smoking depends upon the action of the wood acid, or the creosote volatilised with it, which operates upon the flesh. The same change may be produced in a much shorter time by immersing the meat for a few hours in pyroligneous acid, then hanging it up in dry air, which though moderately warm, makes it fit for keeping without any taint of putrescence. After a few days' exposure it loses the empyreumatic smell, and then resembles thoroughly smoked provisions. The meat dried in this way is in general somewhat harder than by the application of smoke, and therefore softens less when cooked, a difference to be ascribed to the more sudden and concentrated operation of the wood vinegar, which effects in a few hours what would require smoking for several weeks. By the judicious employment of pyroligneous acid diluted to successive degrees we might probably succeed in imitating perfectly the effect of smoke in curing provisions.

SALTING.—The meat should be well rubbed with common salt, containing about one-sixteenth of saltpetre and one thirty-secondth of sugar, till every crevice has been impregnated with it; then sprinkled over with salt, laid down for twenty-four or forty-eight hours, and lastly, subjected to pressure. It must next be sprinkled anew with salt, packed into proper vessels, and covered with the brine obtained in the act of pressing, rendered stronger by boiling down. For household purposes it is sufficient to rub the meat well with good salt, to put it into vessels, and load it with heavy weights, in order to squeeze out as much pickle as will cover its surface. If this cannot be had, a pickle must be poured on it composed of four pounds of salt, one pound of sugar, and two ounces of saltpetre, dissolved in two gallons of water. Pickling with vinegar dissolves or coagulates the albumen of flesh, and thereby counteracts its putrescence. The meat should be washed, dried, and then laid in strong vinegar. Or it may be boiled in the vinegar, allowed to cool in it, and then set aside with it in a cool cellar, where it will keep sound for several months. Fresh meat may be kept for some months in water deprived of its air. If we strew on the bottom of a vessel a mixture of iron filings and flowers of sulphur, and pour over them some water which has been boiled, so as to expel its air, meat immersed in it will keep a long time if the water is covered with a layer of oil from half an inch to an inch thick. Meat will also keep fresh for a considerable period when surrounded with oil, or fat of any kind, so purified as not to turn rancid of itself, especially if the meat be previously boiled. This process is called potting, and is applied successfully to fish, fowls, &c. To preserve eggs, new-laid ones should be chosen. The principal point towards their preservation is the exclusion of the atmospheric oxygen, as their shells are porous and permit the external air to pass inwards, and so excite putrefaction in the albumen. There is also some oxygen always in the air-cells of the eggs, which ought to be expelled or rendered inoperative, which may be done by plunging them into water heated to 140° Fahr. The eggs must be then taken out, wiped dry, besmeared with some oil (not apt to turn rancid) or unctuous matter, packed into a vessel with their narrow ends uppermost, and covered with sawdust, fine sand, or powdered charcoal; they will keep fresh for a year. Lime-water, or rather milk of lime, is an excellent vehicle for keeping eggs in, as has been verified by long experience. Some persons coagulate the albumen partially, and also expel the air by boiling the eggs for two minutes, and find the method successful. When eggs are intended for hatching they should be kept in a cool cellar; for example, in a chamber adjoining an ice-house. Eggs exposed in the holes of perforated shelves to a constant current of air, lose about three-fourths of a grain of their weight daily, and become concentrated in the albuminous part, and are then not liable to putrefy.

For long sea-voyages the surest means of preserving eggs is to dry up the albumen and yolk by first triturating them into a homogeneous paste, then evaporating this in an air-stove or a water-bath, heated to 125°, and putting up the dried mass in vessels which may be made air-tight. When used it should be dissolved in three parts of cold or tepid water.

Prussic Acid.—This acid is found in its natural state in bitter almonds, the leaves and blossoms of the peach, the kernels of apricots, &c. Its taste is sweet, and it is a very powerful poison, smelling like bitter almonds, and producing convulsions, paralysis, and death. It is used as a medicine, and in the event of an over-dose being taken two or three drachms of the spirit of ammonia, largely diluted with water, is the most common antidote. Brandy, ether, and camphor may also be employed.

Prussian Cakes.—Prepare your dough and mix it with currants; form it into a round, flat cake of the required size, and place it on a buttered tin for proving. When it is about half proved divide it with a sharp-edged piece of wood into as many sections as you please, and again prove it. When it has sufficiently risen, whisk white of egg to a strong froth and brush it lightly over the top; dust on it powdered loaf sugar, and sprinkle over it sufficient water to render it moist. Bake slowly.

Prussian Soup.—A very economical dish, popular in Prussia, which we will therefore call Prussian soup, is prepared as follows:—Take four heads of celery, two carrots, two onions, turnips, potatoes, and also two large leeks. Cut these into small pieces, and fry them in a little beef or mutton dripping. Take half a pound of beef or mutton cut into slices, and put it with the other ingredients into a large saucepan. Keep it "sweating" without water for about an hour, then pour into the saucepan two quarts of water, and stew gently for about two hours.

Pudding-cloths are best when made square and of very thick linen. After use rinse them in clean water using no soap.

Puff Puddings.—Four tablespoonfuls of flour (Hungarian flour is the best for this purpose), four eggs very well beaten, four ounces of butter free from salt worked to a cream, and one pint of cream. Beat all well up together with powdered loaf sugar to taste; they ought to be pretty sweet. Bake in little patty-pans half an hour; grate a little sugar over them before serving, with white wine sauce as an accompaniment, but not poured over. The addition of a little almond flavouring or a few currants is sometimes an improvement.

Puffed Eggs.—A pint and a half of cream, four eggs beat well, with a little salt; pour it into a mould and steam it, turn it into a dish, and, in sending to table, pour over it a little meat gravy.

Puffets for Tea or Breakfast, American.—Take a pint of milk which has been previously boiled, one pint of home-made yeast, half a pound of butter, and five eggs; mix into a batter, which must be put into baking tins to rise, and then baked in the usual way without removal from the tins.

Puffs of Larks.—Make a rich and very light puff paste. Let the larks, after being drawn, be browned in a stewpan. Then into the body of each put a small lump of fresh butter, a bit of truffle, a little pepper and salt, and fill up the remaining space inside with cream. Wrap the bird so prepared in fat bacon, then cover it with paste rolled out a convenient thickness, but not left too thick. Give it any form you please. The puffs are then laid separately on tins, and baked until the paste is done in a brisk oven for ten minutes.

Pumps.—To prevent freezing during the night, set the pump-handle as high as it will go.

Putty, to Soften when Hard.—For this purpose use soft soap, which should be applied, and allowed to remain on it about one hour.

Queen Cake.—Work to a cream half a pound of butter, dredge in one pound of flour, and add half a pound of pounded loaf sugar and the same weight of currants; mix well. Whisk three eggs, mix them with a teacup-ful of cream, flavour with essence of lemon, and add to the flour. Stir, add a little carbonate of soda, beat the whole well up. Bake in buttered pans.

Queen Victoria's Favourite Soup.—Some years ago, and for many years, although we cannot speak so postively of late years, the royal bill of fare constantly included the following excellent potage:—Skin and clean the outside of three fat fowls or chickens, wash them well in warm water, stew for an hour with veal broth sufficient to cover the meat and a bunch of parsley. Remove the birds and soak the crumb of two French rolls in the liquor, remove the skin, cut the meat from the bones, and pound it in a mortar with the soaked crumb and the yolks of five hard-boiled eggs. Force this through a coarse sieve, and put into a quart of boiled cream, then make it hot for the table.

Quin's Sauce.—We owe this to our old oft-quoted, but not always acknowledged friend, Dr. Kitchener. It is a favourite sauce not likely to be forgotten. "Two wine-glasses of port and four of walnut pickle, four of mushroom catchup, and half-a-dozen anchovies pounded; the like number of eschalots sliced and pounded, a tablespoonful of soy, and half a drachm of Cayenne pepper. Let them simmer gently for ten minutes, strain, and when cold, put the sauce into bottles, well corked and sealed over. It will keep a considerable time."

Rabbit Pie.—Cut two fine *wild* rabbits into joints, and lay them in a little lukewarm salt and water, so as thoroughly to cleanse them of the unnecessary blood. Dry them in a clean cloth, flour them nicely and season with Cayenne and salt; then arrange these joints neatly in a suitable sized pie-dish, parboil the livers and beat them in a mortar with their weight of fat bacon, a few bearded oysters, sweet herbs and parsley chopped fine, a dust of flour, a few bread-crumbs, and with an egg, make this up into small balls, and distribute in the dish with some antichoke bottoms cut into dice; amongst your rabbit also place one pound of fat pork that has been at least a week in pickle; cut the pork into small pieces, and judiciously place it with the balls and rabbit. Grate over all half a good-sized nutmeg, and then add half a pint of port wine and the same quantity of water. Cover with a tolerably thick, *good* crust, and bake one hour in a quick but not violently heated oven, when nearly done placing over the crust a buttered paper to prevent its becoming too brown. When time will permit, the rabbits attain a much finer flavour if the nutmeg and wine are placed over them the night before wanted, so as to allow the meat to absorb the spiced wine. A small piece of tender rump-steak placed at the bottom of the dish is also certainly an improvement to the gravy, although a good cook should never be without a stock-pot, so as to have *gravy* at command when needed, either to add to a pie when finished baking, or for serving with poultry or game.

Radiation of Heat.—Heat travels in straight diverging lines from the points where it is created, and these lines are called rays, hence the term "radiation" as applied to heat. These rays pass freely through air and gas with great velocity, and are reflected and refracted in the same way that rays of light are refracted, *i.e.*, bent and reflected—sent back. In the same way, too, that rays of light are brought together and condensed by means of lenses and mirrors, heat-rays are brought to a focus where it is most intense. Certain transparent bodies absorb a certain proportion of the heat they receive, and transmit the remainder; and certain opaque surfaces absorb a portion of the heat and reflect the remainder. The power of transmission, absorption, and reflection vary according to the nature of the body and the character of its surface. Rays of heat, like those of light, are refrangible in various degrees, the calorific or heat-giving rays being less refrangible than the light-giving rays are. (See also *Heat*, *Fuel*, *Fire-Balls*, and *Cooking*.)

Radishes, Boiled. — Common radishes selected when young and boiled for twenty minutes are very nice with buttered toast.

Rain-water, Different Characteristics of.—Rain-water varies greatly in character, according to the source from which it proceeds and the locality where it falls. Falling on the coast and coming from the sea, it contains chiefly common salt, which crystallises readily. The proportion of sulphates to chlorides is larger in rain than in sea water. This is a general rule, holding good from central Germany to the most northern Hebrides, and as we advance inland the rain-water sulphates increase. These sulphates are derived from the sulphuretted hydrogen, which otherwise would be intolerable, and which is given off by decomposing matter. The pure oxygen of the air combines with the stinking gas, oxidises it, and makes it harmless, so far as the gas itself is concerned. Just as the nitrates in the water supply of London are a measure of the "precious sewage contamination" of that fluid, so the sulphates washed out of the air by rain are a measure of similar contamination affecting the atmosphere.

Rats and Mice.—The common traps are the best and cheapest. There are spring traps, so constructed as to kill the mice the moment they are caught, but these are difficult to fix, and very soon get so much out of order as to be useless. Bait the trap with toasted cheese, bread and butter, or sweet cake. You may as a decoy lay a train of crumbs from the mouse-hole to the trap. Mice soon learn to know a trap, and avoid it; therefore set it in a dark place, and cover it as much as possible with rags, waste paper, hay, or anything that will conceal it from them, all but the entrance. When mice or rats become numerous, the most effective way of clearing them off is by poison. Whatever poison is prepared for rats or mice it is well to place close beside it a shallow vessel of water. If the animal can obtain water it will drink as soon as it has swallowed the poison, and die directly on the spot, instead of running to its hole, perishing there, and so causing a disagreeable smell.

Rectification.—A second distillation in which substances are purified by the effect of heat upon their more volatile parts.

Red Sago Pudding.—Boil in milk two ounces of sago. When it is quite thick beat into it six eggs, leaving out three of the whites; add half a pint of cream and two spoonfuls of sherry, with nutmeg and sugar according to your taste. Put a paste round the dish.

Results of Perspiration.—The perspiration which finds its exit through the microscopical pores of the skin consist chiefly of water, of which it has been estimated that about three pounds are daily conveyed to the surface of the body and pass away in the form of vapour. It contains, in addition to water, muriate of soda and potash, together with an earthy phosphate, oxide of iron, and animal matter. If the perspiration of the skin were completely obstructed, say by varnishing the skin, death would ensue in about six hours. This was demonstrated in the case of a child in Florence whom Pope Leo X. caused to be gilded to represent the golden age in a pageant which celebrated his accession to the Papal throne. The result of this piece of ignorance was that the poor child died in a few hours. The experiment of covering the skin of a pig with a solution of india-rubber in naphtha has been found to produce death in about two hours. It will therefore be at once seen how important the expulsion of this perspiration from the system must be, and if the reader will refer to our remarks on the subject of *Ablution* (page 1), this importance will be found still more forcibly illustrated. The effect of medicines on the secretion of the skin is well known: some acting by diminishing the violence of the circulation when it is too rapid, others by increasing the action of the heart when it is too languid. The passions of the mind also affect the exhalations of the skin by exciting or depressing the heart's action. Frequent washing keeps the pores of the skin free and promotes health, but it must be remembered when the pores are open, warm clothing becomes of greater relative importance. Reluctant as we may be to admit the fact, yet it is a fact, that dirt and grease are protections against inclement weather. Francis Galton, in his work on "The Art of Travel," says, "The leader of a party should not be too exacting about the appearance of his less warmly clad followers. Daily washing if not followed by oiling must be compensated by wearing clothes. Take the instance of a dog. He will sleep out under any bush, and thrive there so long as he is not groomed and kept clean, but if he be, he must have a kennel to lie in. The same is the case with a horse; he catches cold if he is groomed in the day and turned out at nights. A savage will never wash unless he can grease himself afterwards—grease takes the place of clothing with him. There must be a balance between the activity of the skin and the calls made upon it; and where the exposure is greater there the pores must be more defended." (See also *Medicine.*) In summer, when the atmosphere is dry and warm, all the moisture which escapes from the pores of the skin passes away in the form of vapour, or in other words, as what is called "insensible perspiration." But when the quantity of perspiration poured forth is in excess of that which can in a given time be converted into vapour, sweating occurs. When circumstances are very favourable to the evaporation of fluid, there may be an excessive loss of moisture through the skin without the slightest indication of sweating; while in a contrary case, there may be sweating, though no more than a moderate quantity is poured forth. (See also *Evaporation by Heat.*)

Restive Horses. — The term "restive" is usually applied to horses which are obstinate, spiteful, or have what is called a vice. When young horses display restiveness, patient and kindly treatment should always be tried first. Harsh and violent proceedings will often only confirm the evil. For riders the most dangerous vice is that of rearing on end, as it is called. Suddenly backing or turning round, or refusing to pass particular places or objects, are the more common forms of restiveness displayed by young horses.

Respiration. — The process of animal respiration serves to preserve life by mixing air with the digested food, which is thereby fitted to become a constituent part of the body. It is divided into aquatic respiration and atmospheric. But, whatever the medium breathed, the only real life-preserving agent is air. In water-breathing animals respiration is effected by means of less complex organs than those required for the respiration of air. In the mammalia respiration is less extended through the system, and becomes concentrated in the organs we call the lungs, which consist of membraneous bags divided into an immense number of distinct cells. (See *Lungs.*) The volume of air which is usually present in the lungs has been estimated at nearly twelve pints, and the quantity received in a single respiration at one pint, while a single expiration expels from the lungs a very little less than that quantity. In five-sixths of a second a fourth part of one pint of air becomes decomposed by one action of the heart, and the time in which one circuit of the blood is performed—160 seconds—is identical with the time required for the entire decomposition of the whole volume of air then in the lungs. In twenty-four hours 540 times the twelve pints of air contained in the lungs has been decomposed.

RESPIRATION, NATURE OF.—No two classes of animals breathe alike, there being as great a variety in the mechanism as in the apparatus of respiration. When the frog inspires he closes his mouth and draws the air into a large membranous bag attached to his under jaw, which, contracting, forces the air down into his lungs. The muscles of the abdomen contract, the lungs are compressed, and expiration is performed. Fishes cannot inspire air unmixed with water, nor water unmixed with air (see *Aquarium*), air being the vitalising principle of their blood, and water the vehicle by which only it can be conveyed to their blood-vessels. The lungs of birds are so perforated by air-holes that they neither expand as the chest swells, nor collapse as it sinks, but remain unalterably of the same size. When the bird inspires his chest is elevated, a vacuum is formed within, and air rushes into the lungs; but being prevented by the air-holes from remaining in them it passes out into the abdominal cells. Then the process of expiration commences. The ribs fall, the air in the large air-cells being compressed again enters the air-holes, passes a second time through the lungs, and is expelled through the windpipe. In man the process of respiration consists of a succession of alternate acts by which air is received into and removed from the lungs. Its reception is called inspiration; its expulsion, expiration: and the one depends upon the other. Air cannot be expired until it has been inspired; nor can a second inspiration be taken until the air received in by the first has been expired. But in filling the lungs with air a considerable effort is required on the part of the living agent, while the process of emptying them is performed mechanically, or by virtue of the physical construction of the respiratory system. The natural state of the lungs is that of collapse. After death, when every living principle has departed, the state of the chest is always that of expiration. The muscles of inspiration begin to act about one second and a half after expiration. Before birth, when the fœtus, or unborn child, is excluded from air in a separate state, it is virtually an aquatic animal, enveloped in membranes filled with a watery fluid, and nourished with blood already purified and fitted for supporting life. Its lungs being unable to act for want of air, its blood is arterialised (see *Blood*) without these organs. When the child is in the world, dependent upon its own resources, a double circulation is at once established, and respiration begins, the first respiratory act being purely mechanical, and the result of a change of position which the child undergoes in the process of being born.

EFFECTS OF RESPIRATION.—The necessity of air for the support of animal life is sufficiently apparent to even the most ignorant and superficial observer, but few understand its important effects in connection with themselves, and with the air by which they are surrounded. (See *Ventilation.*) An ordinary man, in a state of health, is found to take into his lungs at an ordinary inspiration about forty cubic inches of air. We breathe on an average 1,200 times per hour, inhale 600 gallons of air, or 24,000 gallons per day. The aggregate surface of the air-cells of the lungs (see *Lungs*) exceeds 20,000 square inches, an area very nearly equal to the floor of a room twelve feet square. Having shown in another place (see *Air*) how the oxygen of the atmosphere is essential to life, it remains for us to state that every variety of air is respirable in proportion as oxygen enters into its constitution. (See *Oxygen.*) In the process of respiration the oxygen in the air is decreased, and it is replaced by an almost equal volume of carbonic acid (see *Atmosphere* and *Ventilation*), the azote with which it is largely intermixed serving chiefly as a vehicle for its introduction to the lungs. Our article on blood (see p. 27) will plainly show that the principle which renders arterial blood venous is carbonic acid, and that oxygen is the agent by which venous is converted into arterial blood. As carbonic acid is composed of oxygen and carbon, and as it is certain that oxygen is the arterialising principle, it is obvious that carbon is the only part of this acid which can deteriorate the blood. It will be seen in our article on ventilation how the oxygen of inspired air is converted into carbonic acid during its stay in the air-cells; and that the removal of carbon from venous blood renders it arterial; and that carbonic acid is composed of oxygen and carbon. It has therefore been reasonably inferred that the carbonic acid expired from the lungs results from a union of the carbon of venous blood with the oxygen of inspired air. To this union it is due that the carbon of venous blood enters into chemical combination with the oxygen of the atmosphere. The first and most important effect of respiration is the purification of the blood and the generation of animal or vital heat—caloric, as the scientific term it. Respiration renders us capable of speech and the power of articulating letters. A wonderful power it is, for the articulation of each letter requires the action of many muscles, and the performance of several thousand distinct muscular contractions and relaxations. The muscles of the larynx are said to be at least seven pairs, that is to say, fourteen muscles which can act separately, or in unison, and are capable of producing 16,386 different movements, without bringing into the calculation the different degrees of force, or the infinitely varied order of succession on which they have the power to act. In addition to these, there are, it is said, fifteen other pairs of muscles which are employed in preserving the articulation of the larynx steady, or in regulating their general movements, and these, when acting alone, are susceptible of 1,073,741,823 different combinations. When co-operating with the succeeding seven pairs these give as a gross estimate of the different varieties of movement which the various parts of the human larynx are capable of producing the astounding number of 17,592,186,044,415. Again, as each of these movements will elicit a distinct tone of voice, and each movement may be modified in intensity and indefinitely combined, it follows that no limit can possibly be ascribed to the range and variety of tones belonging to the human voice. These are some of the vastly important and wonderful services rendered to man by his organs of respiration. In ordinary respiration, 16 or 17 cubic inches of atmospheric air pass in the lungs 20 times in a minute, or a cubic foot every 5¼ minutes; 274 cubic feet in 20 hours, or a cube of 6½ feet each way. At each expiration, 1·375 of the oxygen is converted into carbonic acid gas; in 63 minutes a cubic foot, and nearly 23 feet in 24 hours. The loss of the air in bulk by respiration is but 0·12 per minute. The nitrogen inspired and expired is exactly equal.

Rheumatism. — Rheumatism is the term applied to pains felt in the large articulations and muscles. When felt in the back the pain is called lumbago, when in the sciatic nerve it is known as sciatica. It usually arises from exposure, while heated, to cold and damp air or draughts, and prevails most in December and January. Acute rheumatism is attended with a high degree of fever. Chronic rheumatism is seldom attended with fever, but it is by far the most constant and obstinate. (See pages 29, 273, 289.)

Rice, American Mode of Cooking.—Take a nice clean stewpan, with a closely-fitting top. Then take a clean piece of white cloth, large enough to cover over the top of the stewpan, and hang down inside nearly to, but not in contact with, the bottom, and thus form a sort of a sack, into which put your rice. Then pour over it two cupfuls of water, and put on the top of the stewpan so as to hold up the cloth inside and fit tight all around. Put it on the fire, and the steam generated by the water will cook the rice beautifully. More water may be added, but only enough to keep the steam up.

Rice-cake, very Light.—Take a quarter of a pound of flour, six ounces of rice-flour, twelve ounces of sugar, twelve eggs, and the raspings of two lemons; separate the whites from the yolks, whisk up the whites to a strong froth; then mix in the yolks, pounded sugar and lemon raspings; whisk this over a slow fire till you observe it come quite thick and light, which will require half an hour's whisking; take it off the fire and whisk it till quite cold, then stir in the flour and rice; bake the cake in paper cases in a moderate heat; put four or five sheets of paper under them, and ice before you bake them.

Rice Decorations.—Rice decoration is very effective, and looks like carved ivory. The required shape should be cut out on cartridge-paper, firmly glued down to its intended foundation, and then covered with a coating of thick, warm paste, or very strong white gum, on to which the rice-grains must be dropped. Afterwards arrange them so that they lie closely and regularly together, when the whole must be left until perfectly stiff and dry. Immortelles, and other coloured dried flowers, may be used in the same manner. The best plan of applying the rice is first to take a small quantity in, say, a paper funnel, and scatter it over the design till dry; pour on more gum, then scatter the rice on again, and repeat the process till the proper thickness and evenness are obtained. When finished a sharp penknife will remove all superfluous grains. Monograms made in this way, if the shadows are picked out with Indian ink roughly put on, give a very good effect. Alternate letters of rice and sealing-wax berries look very fanciful and gay.

Rice Froth.—A cheap and ornamental dish. For one-third of a pound of rice allow one quart of new milk, the whites of three eggs, three ounces of loaf sugar finely pounded, a stick of cinnamon, or eight or ten drops of almond flavouring, or six or eight young laurel-leaves, and a quarter of a pound of raspberry jam. Boil the rice in a pint of water. When the water is absorbed, add the milk, and let it go on boiling until quite tender, keeping it stirred to prevent burning. If cinnamon or laurel-leaves are used, boil them with the milk, and remove them when the rice is sufficiently done; if essence of almonds be used as flavouring it may be dropped among the sugar. When the rice-milk is cold put it into a glass dish or china bowl, beat up the whites of the eggs to a froth with the sugar, cover the rice with it, and stick bits of raspberry jam on the top.

Rice Pudding.—It is not generally known that the cheap broken rice is better for puddings than the more expensive article. One table-spoonful of this well washed, the same quantity of milk and sugar, and a pinch of pounded mace will make an excellent rice pudding, which should be baked very slowly. Eggs spoil rice puddings as food.

HOW TO BOIL RICE.—Wash well a pound of good rice in two separate waters; then boil two quarts of water in a stewpan. When the water is boiling, throw in the rice. When the rice is three-parts done, drain the water from it in a sieve. Butter the interior of a stewpan, and put the rice into it. Close the lid tightly, and put the pan in a warm oven, or by the side of the fire, until the rice is perfectly tender. Prepared thus, every grain will be distinct, and beautifully white. Serve it separate with curry, or with any other dish.

Roasting.—To roast well is an important accomplishment in cookery, and one which is by no means common. A joint of meat should be so dressed during the operation of roasting that no portion of its juices is dried up, for which purpose due consideration must be given to the time, distance from the fire, character of the meat whether old or young, general temperature, frequency of the basting, and proper size and condition of the fire. Roasting preserves the nutritive elements of flesh from dissipation in a greater degree than boiling. It has been stated that one pound of roast meat is, in real nourishment, equal to two or three pounds of boiled meat.

In the process of boiling the gelatine is extracted to a certain extent by the water. Cold water extracts the whole of the soluble albumen, upon which the tenderness of the meat depends. (See *Food* and *Diet*, also *Boiling* and *Digestion.*) The fire should be a brisk and clear one, but not too strong, and its breadth should be sufficient to spread above and beyond the joint with two or three inches to spare in each direction. The perfection of roasting depends upon the meat cooking neither too slowly nor too rapidly, and it is a good plan to put the meat further from the fire at first, and afterwards decrease the distance; but when once warmed through it must not be allowed to remain far from the fire, or it will become soddened. Roast meat is unnutritive and indigestible when either under or over-done. By over-cooking the fluids of the meat are expelled and the fibres contracted; in other words, it becomes dry and hard. By under-cooking, that is to say by subjection of the interior of a piece of meat to a temperature below 144°, it is indigestible, inasmuch as it leaves the stomach to do that work imperfectly which the cook ought to have done for it in a more sattisfactory way. As Dr. Kitchener says, in his "Art of Invigorating Life," "That meat which is under-done contains more nutriment than that which is over-done is true enough, but that which is not done at all contains a great deal more," and therefore we suppose those who support the claims of under-done to superiority would act with greater consistency if they ate it raw. Dr. Paris, in his useful work on "Diet," very pithily said, "The spit and the stewpan spare the stomach the drudgery of loosening the texture and softening the fibres of food." These considerations will give emphasis to our remarks upon the importance of roasting well. The more meat is basted, the better it will be for the table. The fat should be protected by covering it with oiled paper tied on with twine. As the fat of roasted meat suffers a degree of decomposition from exposure to heat, which renders it less wholesome, this method of protecting it ought not to be neglected. The paper should be removed just before sending the joint to table. Meat which has been newly killed will take longer to roast than meat which has been previously kept. In warm weather the roasting will be completed in less time. After removing the roast meat, the fat should be poured from the dripping-pan into a basin previously wetted with cold water. So much depends upon the nature and condition of the meat, that it is difficult to say how long a joint of any given size should be roasted. As a general rule, presuming that the fire is well kept up, a piece of, say beef, weighing twelve or fifteen pounds would require, supposing the weather to be cold, from three to three and a half hours. The rule generally given is a quarter of an hour for each pound. A thick joint, such as a sirloin of beef or leg of mutton, will require more time than the ribs or shoulder. Mutton requires a little less time than beef. Veal, pork, and all kinds of white meat ought always to be thoroughly well done. For turning meats while roasting or broiling, forks let out the gravy. Small tongs are best.

Roasting Mutton.—If you wish the fat of roast mutton to eat with peculiar delicacy, lay a paste over it in the same way as is usually adopted with venison.

Roast Pork.—It is not generally known that those parts of pork which are usually roasted, and require prolonged cooking, are much better flavoured when previously steamed. Through long exposure to heat the skin is usually too hard and burnt. By steaming before roasting you secure what is called cracknell. In roasting pork a little salt sprinkled over it greatly improves its flavour.

Roots.—Amongst the roots eaten as vegetables, or used for condiments and other purposes, are the following:—Caraway, carrot, common ginger, onion, tulip, turnip, heath pea, Jerusalem artichoke, male orchis, parsnip, radish, horse-radish, potato, rampion, beet, yam, shalot, &c. &c. Roots are not very readily digested, nor are they so nourishing as animal food. Horse-radish, the root of an indigenous plant of the cruciferous order, is more wholesome than most other strongly stimulating vegetable products.

Rosemary Hair Wash.—In one pint of camphor mixture dissolve two drachms of carbonate of potash (pearlash), and add two ounces of rectified spirits of wine in which have been dissolved twenty drops of the oil of rosemary. To make the camphor mixture, tie up some small pieces of camphor in a muslin bag, which is to be placed in a bottle of water, and when it smells strongly of camphor, decanted.

Rôti de pauvre Homme.—Take a fine pullet or capon, the fattest procurable. Make a forcemeat consisting of finely-chopped sausage-meat, raw veal and lean ham, cocks' kidneys and combs, dried artichoke-bottoms, mushrooms, truffles, some shred parsley, a little lemon, thyme, and sweet basil, one anchovy washed, boned, and chopped fine—the whole chopped and well mixed together, seasoned with salt, pepper, and a little grated nutmeg, with a good lump of fresh butter well incorporated with it. With this forcemeat the fowl is filled by the vent, which is then sewed up. Saturate with butter or olive-oil three or four sheets of writing-paper, and carefully dredge the fowl with flour. Envelop the bird in the paper two layers thick, and cover the whole with another layer slightly buttered. The bird thus prepared is buried in hot wood ashes until it is cooked, or it may be put into a range oven, and covered with a dish which must exclude the air from beneath it.

Rôti de Rognons de Veau.—Take kidneys which have been carefully roasted before the fire, chop them up with fat, and mix them with mushrooms cut small and fried in butter, and also with parsley, chives, bay-leaves, and thyme. Season these with pepper and salt, and make them into a paste of the proper consistence for forcemeat with the yolks of some raw eggs. Thick layers of this being placed on slices of fried bread from which the crust has been cut, bread-crumbs are sprinkled over them mixed with raw eggs. The slices of bread so prepared are placed on a dish, put over some live cinders, and covered with a hot cover.

Rough Hands.—The roughness of the hands consists in the hardness of the skin, which, instead of being soft and pliable, is parched and brittly. One is not surprised to see labourers have such hands, and in them it is no deformity; but it is looked upon as a vulgar deformity in persons of a superior rank. In the latter it proceeds from various causes, either from the want of a certain balsamic liquor which Nature uses to supply the skin with, and which serves for its nourishment; or from the oozing forth of an acrid serum from the skin, which breaks its texture and renders it rugged; or from the hands being too much exposed to the cold air, which shrivels and hardens the pores; or from washing them with water that is either too cold or too hot, for in this respect they have both the same effect; or from washing them too often in soap and water (see our remarks on *Soap*, p. 351); or, lastly, from employing them in dirty work. Never exposing the hands too long to the air when it is very cold, and dabbling as little as possible in very cold water, or in soap-water, washing instead in tepid water, in which a little bran is mixed, are the means for avoiding rough, hard hands. It is necessary in some cases to take aperient medicine to carry off the acrid salts of the blood, and to adopt the use of some sweetened drink, such as the water of wild poppies, which is prepared by boiling gently for two or three minutes a pod of the flowers to a pint of water. A work on this subject says: "It appears that the best way to soften the hands is to wrap them up on going to bed in a linen cloth done over with the yolk of an egg, or they may be rubbed with the following ointment:—Cream and deer's grease, of each half an ounce; white wax sufficient after melting over a slow fire. The hands must be smeared with this every night, and washed in the morning in tepid water with a little white wine in it." In some habits the hands assume the appearance of sealskin, an effect which proceeds from a dryness of the skin and a sharp humour supplied by the cutaneous vessels, which spreads itself over the surface of the hand, fretting the texture of the skin, and raising it up into little scales, which produce inequalities like those of a file or grater. Others have the skin of their hands chapped, that is to say, full of little chinks or crevices, in which, as in so many furrows, is heaped up a thick matter, that renders them so much more deformed that no paste, whether dry or moist, is capable of improving them. These chinks proceed commonly from neglecting to dry the hands after they have been wet, which is frequently the case with children. Bleachers of linen, and persons who follow similar occupations, are very liable to the evil in this respect. The following recipe may be found useful in correcting the above unpleasantness:—Melt a quarter of a pound of fine wax with an ounce of the oil of St. John's wort, and apply this to the hands as often as you can conveniently; or a little glycerine rubbed well into the skin before retiring to rest will generally remove any kind of roughness of the hands, and will leave the flesh soft and pliable.

Ruby.—A genus of precious stone of various colours, although only those inclining to crimson are called rubies.

Rumfustian, to Make.—Whisk up the yolks of six eggs until they are well frothed, and put them into a quart of strong beer, to which is added a pint of gin; boil up a bottle of sherry in a saucepan, with a stick of cinnamon or nutmeg grated, a dozen large lumps of sugar, and the rind of a lemon peeled thin; when the wine boils it is poured on the ale and gin, and then it is called rumfustian. It is drunk hot.

Russian Cabbage Soup.—Lauded and loved as far as the Russian name extends, this ancient national dish enjoys an immense reputation. Rich and poor alike patronise it, and the mere mention of its name, *schstchi*, moves Russians to patriotic fervour. The mode of preparing this remarkable dish varies exceedingly, and there are perhaps more varieties of *schstchi* than of the cabbage. The following is, however, one of the best-known methods:—Take six or eight white cabbages shredded, half a pound of pearl barley, a quarter of a pound of butter, a handful of salt, and two pounds of mutton cut into small pieces, with two quarts of *kwas* or broth. The meat, salted for thirty-six hours, is put into a press, cut in small pieces, and not thrown into the pot till the cabbage has boiled. Some artichokes cut into four are added, and when the whole is dished three spoonfuls of thick cream are poured over it. It is sometimes made with oil instead of butter, and with fish instead of meat, usually during the fasts.

Rust.—Oxide of iron is usually called by this name. It is due to the presence of damp in the air, when the oxygen of the air, receiving an affinity for the metal, therefore combines with the surface of iron, copper, or other metal. Grease, by preventing the humid air from coming in contact with the surface of the metal, prevents rust.

How to Prevent Fire-irons, &c., from Rusting.—When you are going to put away your fire-irons for the summer, have ready some mutton suet melted, and while hot smear it all over the irons. Next dredge or sprinkle them well with unslaked lime, powdered and tied up in a thin muslin bag. Then wrap them tightly in thick brown paper, so as entirely to exclude the air, securing the paper with twine. Keep them in a dry place, and previously to again taking them into use, wipe them elean, first with old flannel, then with soft rags.

To Take the Rust out of Steel.—Rub the steel with a piece of flannel dipped in sweet oil; then cover it with slaked lime, put it in a dry place, and let it rest for two days. Afterwards wipe it clean, and then rub in some whiting finely powdered. Finish with dry whiting and a leather.

Rustic Summer Houses.—Select a dry secluded spot in which to build your summer house, where it will be sheltered from the sun. The flooring should be raised on brick-work piers, so as to allow a current of air to circulate under it. For the uprights, Scotch firs or young larch-trees will be most durable, and these should be sunk into the ground to a depth of about three feet. For lattice-work, timber of the same kind may be used, unless it should have to be carved, when a more pliable wood should be used. Boards nailed outside the uprights will form a back for the house. Ornamental mouldings may be made of pine-cones or sections of sticks nailed side by side. Larch and oak boughs, birch, and hazel will be found the best kinds of wood for the lighter and more decorative portions of the work.

Rye contains a greater proportion of gluten than any other of the cereal grains (see *Gluten*). It also contains saccharine matter in the proportion of five to every hundred parts. Rye bread is commonly eaten in some countries; but the rye is subject to a disease called *horned*, in which condition it is quite unfit for the food of either men or cattle. In different parts of the Continent the effects of eating bread made of diseased rye have been at times extensive and terrible. In 1596 an epidemic prevailed in Hesse, in which epilepsy and insanity were the chief features, which was wholly ascribed to the use of horned rye. (See *Bread.*)

Saccharine Food.—(See *Diet* and *Dessert Fruits.*)—Honey, dates, figs, apricots, peaches, &c., are included under this name. (See also *Sugar.*)

Sack.—A term in old times applied to wines made from half-dried grapes; a corruption of the word *sec*, signifying dry. The sack of Shakespeare's day, which is that referred to in the following directions, is believed to have been what we now term sherry. Sack posset was in great favour with our predecessors; and as some of our readers may like to taste it, we shall venture to tell them a few of many ways how to make it. The following is known as Sir Fleetwood Fletcher's Sack Posset:—

"From famed Barbadoes, on the western main,
Fetch sugar ounces four; fetch such from Spain,
A part: and from the eastern coast,
Nutmeg, the glory of an Eastern toast;
O'er flaming coals let them together heat,
Till the all-conquering sack dissolve the sweet,
O'er such another fire put eggs just ten,
* * * * *
Stir them with steady hand, and conscience pricking,
To see the untimely end of ten fine chicken;
From shining shelf take down the brazen skillet;
A quart of milk from gentle cow will fill it;
When boiled and cold, put milk and sack to eggs,
Unite them firmly like the triple leagues;
And on the fire let them together dwell,
Till Miss sing twice—you must not kiss and tell:
Each lad and lass take up a silver spoon,
And fall on fiercely, like a starved dragoon."

Another is known as Sir Walter Raleigh's:—Boil a quart of cream with a sufficient quantity of nutmeg; take half a pint of sack, and the same quantity of ale, and boil them well together, adding as much sugar as may be necessary. Heat a pewter dish till it becomes very hot, cover your basin with it, and let it stand by the fire two or three hours.

Another Way of making sack posset is called Lady Mallet's:—Take eighteen new-laid eggs, white and all; but remove what is called the "tread" (a piece of membrane). Heat them well all together; then take a quart of cold and a pint of boiled sack, which being skimmed, add three-quarters of a pound of sugar and a little nutmeg; boil the whole for a short time, then remove them from the fire, stirring them all the while; add the fluid to the eggs gradually, then mix them all together. Keep stirring it on the fire till it becomes sufficiently thick to serve.

ANOTHER is known as Master Rudstone's :—Take sack, one part (or brandy the same quantity), a quarter of a pint of ale, and three-quarters of a pound of fine sugar, and boil the whole well together; take the yolks of two eggs, and the whites of sixteen, let these be well beaten together, add them, and mix them well with the boiling liquor; then take three pints of milk or cream, and boil down to a quart. Let it now stand and cool till the eggs thicken, then add the milk, stir the whole well together, cover it with a plate, and serve it. For "sack" in each of the foregoing recipes, read "sherry."

Sal Ammoniac, from which the volatile alkali is chiefly procured (see *Ammonia*), is a compound of ammonia and muriatic or hydrochloric acid; hence its name of muriate of ammonia. This compound salt is obtained by distilling the soot that arises from burning the dung of certain animals. It is mostly imported from Egypt, where the dung of the camel is dried in the sun, then burnt, and the soot carefully collected, from which the sal ammoniac is procured by simple distillation. It is only the dung of such animals as feed on saline vegetables that will afford the sal ammoniac. There is nothing peculiar in that of the camel, as has been very generally believed. It depends solely on the kind of food; and unless the animal has eaten the saline vegetables, such as grow on the sea-shore and near to it, its dung will afford no ammonia. This salt is used in some processes in the art of dyeing. It is used also as a flux in soldering, and in some cases as a medicine. (See p. 265.)

Salad Oil when not fresh acquires an unpleasant taste. Instead of throwing it away, save it for the mixtures that are used in cleaning furniture. (See page 206.)

Salads.—THE QUIHI SALAD MIXTURE.—Four mustard-ladles of mixed mustard, four saltspoonfuls of salt, three dessert-spoonfuls of essence of anchovies, four of mushroom ketchup, three of finest salad oil, six of vinegar; the yolks of three eggs boiled hard and worked down quite smoothly in a mortar, or wanting a mortar, then in a basin, with the bowl of a silver spoon, gradually adding the oil drop by drop till all is well blended with the egg, then the vinegar in like slow manner, or the oil and vinegar will refuse to mix smoothly, afterwards the other ingredients. If you have a little rich, good cream, it is a great improvement, especially if previously mixed with a well-mashed mealy potato. The white of the eggs should be cut in rings and added to the salad. The great art in having a nice salad is to take care after washing it thoroughly that, though crisp and fresh, it shall be perfectly dry—the small salad by draining and shaking up in a collander, the lettuce or larger portions by carefully drying leaf by leaf on a dry clean cloth before cutting up, and be sure not to bruise it in cutting.

SWEDISH SALAD.—Wash and trim a pickled herring, cut it in small dice, and put it in a basin; take the same quantity of cold roast beef, boiled potatoes, and beetroot, russet apples, and four anchovies previously steeped in water; cut the whole in small dice, and add it to the cut herring, with one tablespoonful each of well-drained capers and chopped pickled gherkins, a hard-boiled egg chopped fine, two tablespoonfuls of chopped chervil, one of chopped tarragon, and twenty stoned olives. Season with salt, pepper, oil, and vinegar; mix, put the whole in a salad bowl, and lay twenty-four fresh-opened oysters on the top. This salad should be highly seasoned.

GERMAN SALAD.—Blanch one pound of sauer-kraut in boiling water for five minutes; cool, and drain it well; throw one pound of red pickled cabbage into cold water, drain, cut it with the sauer-kraut into thin shreds, and put the whole in a basin; chop two onions very fine, blanch in boiling water, drain, and add them to the sauer-kraut, together with one ounce of grated horse-radish and a table-spoonful of chopped chervil; season with salt, pepper, six table-spoonfuls of oil, and one table-spoonful of vinegar, and dish the salad. The above are extracted from Gouffe's "Royal Cookery Book." A recipe for making sauer-kraut will be found on p. 330.

Saliva.—The saliva issues from distinct sets of glands existing in different parts of the mouth, and the quantity of it secreted daily is very considerable, although it varies according to circumstances. This secretion is more copious in children and aged persons than it is in adults, more copious in cold than warm climates, and in the day than the night. The smell or sight of agreeable food makes it flow into the mouth, and the same result arises from the practice of smoking tobacco, or from the presence of sour or bitter substances in the mouth. The quantity of saliva is sometimes largely increased or considerably diminished by disease Its office is that of keeping the mouth moist, and preparing the food for digestion. (See *Mastication.*) Under the influence of rage and some other violent passions it assumes a frothy appearance, and in many animals becomes poisonous. When the saliva is secreted in a healthy proportion, and the various muscles of the mouth perform their proper office, it is never discharged from the mouth unless voluntarily, but passes rapidly from the fauces into the gullet.

Salivary Glands.—These glands are situated just under the ear and under the tongue, and in a state of health they pour forth large quantities of saliva, by which the mouth is kept moist and thirst prevented. In sickness these glands sometimes become inactive, and the supply of saliva greatly decreases. (See *Mastication.*)

Salmon Cooked in a Mould.—A Pretty Supper Dish.—Take the skin off half a salmon; cut it in pieces, and fit it into your mould; fill up the crevices with fresh butter; season it well with pepper and salt, cover your mould, and boil it a good hour before dishing up.

Salt, Common, from which muriatic acid is procured, is a compound of this acid with the fossil alkali. It is found in three situations—in large beds in the bowels of the earth, when it is called rock-salt; in springs of water which derive their source in or near these beds, when it is called spring-salt; or in the water of the sea, when it is called sea-salt. The rock-salt is seldom used till it has been dissolved in water, and separated again by evaporation. Brine may be evaporated either by exposure to the sun's rays or by artificial heat. In warm countries the former method is adopted, where, by receiving the sea-water into proper reservoirs, that are made extensive and shallow, the salt is left covering the bottom of the pits, after the water has been evaporated by the heat. Salt thus procured is called bay-salt. In our climate the heat is insufficient, and the rains too frequent, to allow this plan to be adopted with advantage; our salt is procured by boiling the brine, and is of different degrees of purity according to the heat, and as it is deposited in the latter or early part of the process. The uses of common salt as a condiment, and as a preservative of meat, are sufficiently well known; but it is not so generally understood that in small quantities, instead of retarding, it promotes putrefaction, which is really the case. Salt contains chlorine and the metal called sodium, which is found very widely distributed over the earth, and is one of the most important of all minerals to mankind. It is indispensable among the aliments of animals to the preservation of health. The useful products obtained from or by the aid of salt—chloride of sodium—are very numerous. One of its two constituents—chlorine—enters into the composition of soda, glass, and most kinds of soap, and also of that invaluable aid to the chemist and physician, hydrochloric or muriatic acid. The chlorine used in bleaching, the hydrochloric acid used in sick rooms and hospitals, &c. &c., are all derived from salt. The variations in the quality of commercial salt are worthy of notice. All native brines contain more or less of two other compounds—the chlorides of calcium and magnesium, which are very deliquescent, and therefore communicate to the salt the property of abstracting moisture from the atmosphere. It is curious, however, to note that this deliquescent salt, although entirely unfit for the table, is preferred for some purposes to pure salt—the foreign chlorides having a stronger salt taste than the pure. It is said, also, to be more antiseptic than pure salt. In horticulture salt is found serviceable in preventing the depredations of insects. It is also used as a manure.

A really heavy tax on salt is the cruellest impost that can afflict a nation. The first settlers of a colony have described the want of salt as a most severe privation, and stated that the arrival of red-herring, salt cod, or stockfish has been hailed with public rejoicing. Salt is good for man and beast. For our useful allies, the ruminants, salt is the first condition of health and vigour, and succulence. The experience of most farmers will show the benefit derived from mixing salt with the food of cattle. It appears to be the natural and universal stimulus to the digestive organs, and frequently recalls the appetite more speedily than any other stomachic. It is, besides, a vermifuge which, with cattle, very seldom fails. It improves the condition of sheep when occasionally sprinkled over their food or placed within their reach. It is the basis of nearly every medicine which has real power over their disease—the rot—and it has often completely arrested its fatal progress. Coarse salt herbage growing near the sea is preferred by cattle to the fattest pasture of the interior, and in many markets the highest price is given for mutton fed in salt marshes or meadows. It was said by One who spake as never man spake, "Ye are the salt of the earth." Salt is a pledge of hospitality. The Arab feels bound to protect and shelter the stranger who has tasted salt beneath his tent. Salt is eminently the element of salubrity and preservation. The household article most highly valued by people living at great distances from the sea is salt. In besieged cities the commodity whose price rises most quickly is salt. Salt is the principle of growth and vigour. Man's stature and strength are said to be in proportion to the quantity he consumes. The Patagonians and Otaheitans, the tallest of men, use, or did once use, sea-water for cooking their food. The British, who live in a saline atmosphere, are the most hairy race of mankind in Europe. Repairers and beautifiers of ladies and gentlemen are advised to note this remarkable fact. Without salt men would not be able to preserve the provisions which they have obtained by their toil and industry. Deprive men of salt, condemn them to eat unsalted food, and they soon become infested with all sorts of parasitic vermin. The Abyssinians, who eat much meat and have no salt, are generally afflicted with tapeworms. It is recorded in some book that amongst certain Northern nations the interdiction of salt was the capital punishment reserved for the aristocracy. After weeks or months of a saltless regimen, the culprit sank under the attacks of innumerable parasites. North American stags traverse immense distances for the purpose of drinking at saline springs; instinct or family tradition has taught them that it is the only means of getting rid of the ticks with which they become infested while browsing in the woods. Pigeons are passionately fond of salt. There are sundry recipes, some not too cleanly, not only to keep them from deserting their dove-cote, but to entice and retain vagabond and wandering pigeons. There is the bit of salt cod, the roast joint of pickled fox, the lump of clay kneaded with brine and aromatic seeds; but, in all, it is the salt which is the real attraction. Pigeons peck at walls, as goats and sheep lick them, to obtain the saltpetre which sometimes effloresces on their surface. Bees are fond of drinking water decidedly charged with saline substances.

SALT FOR TABLE.—When you dry your salt for table, let it grow cold before it is put into the salt-cellars, for when this is not done the salt is apt to cake together in lumps.

Salting.—Food preserved from decomposition by being impregnated with salt is called "salted," and the process "salting," to distinguish it from pickling, in which vinegar is used, and preserving, in which sugar is made use of. (See page 314.)

Salt Leg of Mutton.—Pound one ounce of bay-salt and half an ounce of saltpetre. Rub this all over the leg of mutton, and let it lie all night. The next day salt it well with common salt, and let it lie a week or ten days. Then hang it up to dry.

Salt, New Aperient.—A new aperient salt, called the sulphovinate of soda, has been discovered; it is nearly free from bitterness, it has a pleasant sweetish after-taste, and is three times as powerful as Epsom salts.

Salt, Spoons in.—Salt-spoons should not be left in the salt-cellars, or they will spot and canker. When taken from the table they should be washed, and put aside until again required.

Salts of Lemon.—Salts of lemon serve to remove ink-stains. Put some boiling water into a teacup, and stretch the stained fabric over the hot water, dipping it from time to time in the water, and putting a little of the salts of lemon upon the stain. Only white things can be treated thus, as the salt discharges colours.

Samphire grows on the sea-coast, has a spicy aromatic flavour, and, pickled with vinegar and spice, makes a wholesome and pleasant condiment.

Saubaglione.—For as many persons as you expect to supper, put yolks of eggs and glasses of Frontignac, or other sweet wine, into an extremely clean pan or chocolate pot, with half as many table-spoonfuls of finely-powdered loaf sugar. Place this on a hot plate or very clear gentle fire. Whisk the mixture until it is of the consistence of thick cream, then pour into glasses and serve up, or, if preferred, it may be eaten cold. This is an exquisite dish.

Sauce for a Boiled Veal Olive.—Pour half a pint of very rich but not too thick melted butter to the well beaten-up yolks of two fresh-laid eggs. Be sure to stir briskly while you are adding the melted butter, or the heat may cause your eggs to curdle. Put your sauce again into the pan, adding the juice of a fine lemon. Shake high over the fire, keeping it well stirred and not for a moment allowing it to boil, or your sauce will curdle. When sufficiently hot pour over your olives and serve up quickly, your dish being suitably garnished.

Sauce for Wild Ducks, Woodcocks, &c.—Put in a saucepan half a pint of veal gravy; then add to it half a dozen leaves of basil, a small onion, and a roll of lemon-peel or orange-peel, let it boil up for a few minutes, and strain it off. Put to the clear gravy the juice of a Seville orange or lemon, half a teaspoonful of salt, the same of pepper, and a glass of red wine. Send it up hot. Schalot or cayenne pepper may be added.

Sauce Piquante for Fried Fish.—Take a piece of butter the size of a walnut, melt on the frying-pan, and add one table-spoonful of vinegar and a shalot chopped fine.

Sauce, Poor Man's.—Put some parsley, chopped shalots and onions, salt, pepper, and a teaspoonful of vinegar, into a saucepan with water, and let them boil until the schalots are cooked. This sauce is very good to cook shrimps or prawns. If you wish to make it a little better, put the ingredients in beef broth, take out the onions, and add some yolks of eggs. In this sauce you can warm meats left from the day before.

Sauer-Kraut.—To make this famous German dish, take as many hard firm cabbages as you wish to preserve, tear off the loose leaves, cut them into quarters, cut out the hearts or stalks, and chop them up small. To every one hundred pounds of cabbage add three pounds of salt, a quarter of a pound of caraway-seed, and two ounces of juniper-berries, mixing these well together. Procure sweet, clean, iron-hooped casks, lay the chopped cabbage three inches deep, then as each layer is put in sprinkle it with the mixture of salt, &c. After each cask is filled it must be covered with a linen cloth and the wooden cask-head, and pressed down with heavy weights. After the cabbage has been allowed to ferment for a month, pour off the cold water which will be formed in this process, and to take its place pour in warm water containing black pepper and common salt. As soon as a sour smell is perceived, the casks must be placed in a cool situation and there kept.

Savoury Pie.—Melt a little butter in a pie-dish, then cut up and put in a few mushrooms. Take two ounces of tapioca, previously steeped for ten minutes in a quarter of a pint of water, put in onion and sage fritters, and three hard-boiled eggs, cut up small, add a little seasoning and one ounce of butter, cover with a paste, and bake.

Savoy Biscuits.—To twelve parts of sugar and eggs add seven parts of flour flavoured with ground lemon-rind, and after baking for a few minutes grate on a little sugar.

Scientific Recreations.—To Produce Fire by the Mixture of Two Cold Liquors.—Take half a pound of dry pure nitre, reduced to powder, put it into a retort that is quite dry, add to it an equal quantity of oil of vitriol highly rectified, and distilling the mixture in a moderate sand heat, it will yield a liquor in the form of a yellowish fume, which, being condensed in a clean dry receiver, is the *spiritus nitri Glauberianus*. Now, if a drachm of distilled oil of cloves, sassafras, turpentine, or caraways, contained in a glass vessel, be added in an equal quantity or half as much more to the above spirit, though both the bodies are perfectly cold before the mixture, a violent flame will instantly arise, and destroy them, leaving only a little resinous matter at the bottom. Great care should be exercised in carrying out this interesting recreative experiment.

Bottles Broken by Air.—Take a bottle that is square, not round or cylindrical; and if it be small the glass must be thin. Put the mouth of this bottle over the hole in the plate of an air-pump and exhaust the air. By this means the bottle will be made to sustain the weight of the external air as long as it is able, but at last it will suddenly burst into very small pieces. The same effect may be produced by the spring of the air in the following manner:—Seal the mouth of a bottle so closely as to make it quite air-tight, and place it in the receiver; then as the air is drawn off from its surface, the spring of the enclosed air will act against the sides of the bottle, and will continually increase as the air in the receiver becomes more rarified, till at last it will burst the bottle into pieces. A similar effect is produced by laying a plate of glass on the top of an open receiver, and exhausting the air; for then the weight of the external air will press upon the glass and break it in pieces. In like manner, if a person lay his hand upon an open receiver, and the air be exhausted, his hand will be fixed to the receiver; for if the aperture of the receiver be four square inches, the weight on his hand will be equal to sixty pounds. This experiment will be attended by some pain to the person's hand.

Water Boiled by Air.—Take water that is made as warm as you can bear your hand in it, but that has not boiled, and putting it under the receiver, exhaust the air. Bubbles of air will soon be seen to rise, at first very small, but presently becoming larger, and will be at last so great, and rise with such rapidity, as to give the water all the appearance of violent boiling. This agitation of the water will continue till the air is again let into the receiver, when it will immediately cease, and the water become quite motionless.

THE FLOATING STONE.—To a piece of cork tie a small stone, that will just sink it, and putting it in a vessel of water, place it under a receiver; then exhausting the air, the bubbles of air which expand from its pores, and adhere to its surface, will render it together with the stone lighter than water, and consequently they will rise to the surface and float.

WITHERED FRUIT, TO RESTORE.—Take a shrivelled apple, and placing it under the receiver, exhaust the air. The apple will immediately be plumped up, and look as fair as when gathered, for the pressure of the external air being taken off, the expansion of that contained within the skin of the apple will swell it to the utmost, so as to sometimes make it burst. This restoration, however, is merely apparent, for the air is no sooner let into the receiver again than the apple returns to its former withered state.

THE MERCURIAL ROD.—Take a piece of stick, cut it even at each end with a penknife, and immerse it in a vessel of mercury. When the air is pumped out of the receiver, it will at the same time come out of the pores of the wood, through the mercury, as will be visible, at each end of the stick. When the air is again let into the receiver, it falls on the surface of the mercury and forces it into the pores of the wood, to possess the place of the air. When the rod is taken out it is found to be much heavier than before, and has changed its colour, being now all over a bluish hue. If this stick be cut transversely, the quicksilver will be seen to glitter in every part of it. In order that the experimentalist may understand the nature of mercury and the care required in its use, he should refer to p. 270.

THE MYSTICAL BELL.—Fix a small bell to the wire that goes through the top of the receiver, and shaking it by that wire, it will be distinctly heard while the air is in the receiver. As the air is exhausted, the ringing becomes gradually weaker, and at last, however much the bell is shaken, the least sound cannot be heard; but when the air begins again to enter the receiver, the sound becomes perfectly audible. This experiment is frequently carried out to demonstrate that air is the medium of sound.

FEATHERS HEAVIER THAN LEAD.—At one end of a fine balance hang a piece of lead, and at the other as many feathers as will keep it *in equilibrio.* Then place the balance under the receiver. As soon as the air begins to be exhausted the equilibrium will begin to be destroyed, and when all the air is exhausted the feathers will descend and the lead mount up. The cause of this phenomenon is plainly deducible from the laws of hydrostatics; for when both bodies are weighed in air, each loses the weight of an equal bulk of air; consequently the feathers will lose a greater weight than the lead; but when the air is taken away, the weight that is restored to the feathers being greater than that restored to the lead, the former will necessarily preponderate.

THE SELF-MOVING WHEEL.—Take a circle of tin about ten inches in diameter, or any other dimension that will go into the receiver, and to its circumference fix a number of tin vanes, each about an inch square. Let this wheel be placed, between two upright pieces, on an axis whose extremities are quite small, so that the wheel may turn in a vertical position with the least force possible. Place the wheel and axis in the receiver and exhaust the air. Let there be a small pipe with a cock; one end of this pipe is to be on the outside of the top of the receiver, and the other end to come directly over the vanes of the wheel. When the air is exhausted from the receiver, open the cock just mentioned. A current of air will rush against the vanes of the wheel, and put it in motion; and the velocity of its motion will increase till the receiver is again replete with air. If the pump be kept continually working after the air is exhausted, the motion of this wheel must be considered as perpetual motion.

THE FOUNTAIN IN VACUO.—Take a glass tube hermetically sealed at either end, by means of a brass cap, screwed on to a stop-cock, and that to the plate of the pump. When all the air is exhausted the cock is turned, and the tube is taken off the plate and immersed in a basin of mercury or water; then the cock being again turned, the fluid, by the pressure of the air, will play up in the tube in form of a fountain, and afford a very pleasing appearance.

THE MAGIC PICTURE. — Take two pieces of glass about three inches long and four wide; they must be quite level, and exactly of the same size. Place them one over the other, and let there be one-twentieth part of an inch between them, which you may effect by pasting papers on their four corners. Join these two glasses together by a luting composed of lime, slaked by exposure to the air, and reduced to very fine powder, mixed with the white of an egg. Cover all the borders of these glasses with parchment or bladder, except a small opening left on one side in order to introduce the following composition:—Dissolve by a slow fire six ounces of fine hog's lard, and put to it half an ounce of white wax, and if you find it necessary to render it more sensible to the heat, add an ounce or more of the clearest linseed oil. This, when liquid, is to be poured between the glasses by the space left in their sides, which you are then to stop close up. Wipe the glasses clean and hold them before the fire, to see that the composition will not run out at any part. Then paste a picture, painted on any thin substance, or a coloured print, with its face to one of the glasses, and fix the whole in a frame. The mixture between the glasses while it is cold will quite conceal the picture, but becoming perfectly transparent by heat, the painting will appear as if there was only a single glass before it. As the composition cools the picture will gradually disappear, and at last be quite invisible.

COMMUNICATIVE MONEY. — Take a crown-piece and bore a hole in the side of it, in which place a large needle strongly touched with a magnet, closing the hole with a small piece of pewter, that it may not be perceived. Now prepare a tube in the manner described further on. When this magnetic tube is brought near the coin containing the magnetised needle it will fix itself in a direction correspondent to the needle in that place. Desire any person to lend you a crown-piece, which you dexterously change for one prepared as above, which give to another person, and leave him at liberty to either put it privately in a snuff-box or not; he is then to place the box on the table, and you are to tell him by means of your glass if the crown is in the box or not. Then, bringing your magnetic tube close to the box, you will perceive by the motion of its needle if the coin be there or not; for, as the needle in the tube will always keep to the north itself, if you do not perceive it has any motion, you may conclude the crown is not in the box. To make the tube, procure one of ivory 2½ inches long, and semi-transparent. One end must open with a screw, and in it an eye-glass is placed, having a focus of two inches. Another glass of any kind is placed at the other end. A magnetised needle is so placed in the tube that it will turn freely on the centre of a small ivory disc fixed on the object-glass with the side next the glass painted black. When the needle in the tube is stationary, you will desire the person to move the box into another position.

ANIMATED FIGURES.—Provide nine, twelve, or any number you please of hollow cylinders about nine inches long and one and a half or two inches in diameter. Let the bottom of each of these cylinders be closed except a small hole, and in each of them place a piston like that of a syringe. At the bottom of each piston let there be a worm spring, and over it the figure of a man, woman, or anything else you please. These figures should be all different, and in different attitudes, and of such a size that they may completely enter the cylinders. Place all the cylinders in a circular frame of wood, and having pushed each piston down to the bottom of the cylinder, and stopped the holes at the bottom, draw it up again to what height you think proper, and there will be then a vacuum under each piston. Then place the frame in a receiver, and exhaust the air. When the weight of the external air begins to be taken off, the force of the spring that is at the bottom of each piston being greater than its friction and the weight of the figure placed over it, they will all gradually rise up and present themselves in their proper attitudes. When the air is again let into the receiver, they will in like manner retire to their separate apartments. If the arms and legs of the figures be inflated with a due quantity of air, when the pressure of that in the receiver is taken off they will be extended, and may be made to assume any attitude required, and when the air is again let into the receiver they will resume their former position.

Artificial Lightning.—Provide a tube that is much larger on one side than the other, and in which there are several holes. Fill the tube with rosin powder, and when it is shaken over the flame of a torch it will produce a sudden coruscation that strongly represents a flash of lightning. You see not the flame itself, but its reflection. A large variety of other *Scientific Amusements* are prepared by the London Stereoscopic Company.

Artificial Thunder.—Take a strong bottle that holds about a quarter of a pint, in which put one ounce of concentrated spirit of vitriol, and adding to that two drachms of the filings of iron, stop the bottle close. After a short time shake the bottle, and taking out the cork put a lighted candle near the mouth of it, which should be a little inclined, and there will instantly arise an inflammation attended with a loud noise. If you are apprehensive of any mischievous effects from the bursting of the bottle, you may surround it with a strong cloth, or you may put it on the ground and light the vapour by a lucifer fixed to the end of a long stick. Another way of imitating thunder is by mixing three parts of saltpetre, two parts of salt of tartar, and two parts of sulphur, and putting the quantity of a small nut in an iron ladle or shovel, place it over a coal fire. The explosion of this mixture will much resemble a moderate clap of thunder; or if you would produce a more violent explosion, put an ounce or two of the mixture in the shovel, but then you must have a chafing-dish, not coals, and placing it out of the house, stand at a considerable distance from it, and not go near it till the matter is completely exploded, or what is better, till the fire is out. Experiments of this nature should in general be conducted with great caution, for the amusement would be dearly bought with a wound in the face or loss of sight.

Electric Kite, how to Make.—Tie together in the form of a cross two canes, or, still better, two rods of deal about three feet long each. To the four corners of the cross-sticks fasten the corners of a large silk handkerchief; a loop must be made by piercing a hole in two parts of the handkerchief, and a string fastened to one of the sticks in the manner of the loop of a boy's kite; indeed a common kite will answer the purpose quite as well as one of silk, except that if it be used in stormy weather the latter will by wet soon become spoiled. The size also is of very little consequence, except that the larger the kite the higher it will fly, and therefore a large kite is more effective. The kite itself being formed, and having a common kite-tail attached to it, or else long strips of calico sewed together, which will be found more convenient, it must be furnished with two or three pointed thin copper wires fastened to the loop, extending upwards a few inches above that part of the kite which flies highest, and projecting from each other as seen in our figure. The string is the next object of importance; that evidently is the best which has a fine wire around. The whole length of string cannot very easily be procured; the best substitute for the wire will be found in soaking a common string in salt water for an hour or two previously to using it. It will thus imbibe sufficient moisture to render it a good conductor even in a very dry atmosphere, where string wetted with water only would become useless. The upper part of the string must be carefully connected with the pointed wire carried above the loop. The lightning, or electric fluid, being thus attracted by the kite and led downwards by the string, it must be retained from passing silently to the earth beneath. For this it will be necessary that the lower end of cord of silk, about three feet long, be kept quite dry, and for convenience of operating a large key is usually tied at that part where the string and silk are united. The kite being raised, the electric fluid will pass down to the key, here being stopped by the silk cord, and will be given off in sparks or flashes, more or less powerful, in accordance with the quantity of lightning which may be in the air. The operator may easily conduct it elsewhere, or charge his conductors or batteries without difficulty. No philosophical instrument is more simple in form and easy to construct than the electric kite, yet no one needs more care in its management. To fly it when a thunder-storm is approaching would be attended with the greatest danger, unless every precaution were taken. In this state of the atmosphere the raising and lowering of the kite requires the utmost circumspection. To let the string wind out from a ball in the hand, making thereby the body a part of the conductor, is too venturesome; the string should pass over and touch an iron railing, or through a ring fastened to a metal rod driven deeply into the ground, whilst the person who holds it is placed upon a dry glass-legged stool, or otherwise insulated, as for example upon a pile of books or papers. When the kite is up a sufficient height the remainder of the string can be fastened to the key, and the operator may remove himself to a distance. It is advisable also that the electric fluid should never be introduced into a dwelling-house, for a thunder-storm is a terrific agent to tamper with, and once invited into our houses may occasion dreadful damage ere it be delayed. Flashes of four or five feet in length have been seen. When upon one occasion a kite was left out on a stormy night, the key appended to it appeared a ball of fire, illuminating all around, and the very kite and string appeared as if enveloped in lambent flames. Fortunately, to operate in weather like that is not necessary, as the calmest and brightest evening of summer, the densest fogs of autumn, and the clearest frosts of winter yield mostly as much fluid as is convenient to use; at either time small sparks will be visible, and may be felt by a knuckle presented to them, when they will be found very different from those usually afforded by the electrical machine. The air will be found *positively* electrified ninety-nine times out of each hundred, yet the sparks as given by the kite-string will be comparatively short, make but little noise, and be felt so much more pungent when passing to the hand, that they rather resemble the vibration or small shock than that known as the electric spark.

Optical Tadpole. — Make with ink, on white paper, a very black spot, about half an inch in diameter, with a tail about an inch in length, so as to resemble a tadpole; look steadfastly for a minute on the centre of this spot, and on moving the eye a little, the figure of the tadpole will be seen on the white part of the paper, and appear more luminous than the other part of the white paper; which can be only explained by supposing that part of the retina on which the tadpole was delineated to have become more sensible to light than the other parts of it which were exposed to the white paper, and not from any idea of mechanical impression or chemical combination of light with the retina.

Scone-pudding—very light and wholesome.—Minced apples and currants, of each six ounces; suet, sultana raisins, and sugar, of each four ounces; bread-crumbs, three ounces; the grated rind of one lemon and the juice. Beat well three fine eggs, and mix thoroughly with the above ingredients, adding a few drops of almond flavouring and two table-spoonfuls of brandy. Boil this pudding for two hours in a well-buttered basin, and serve up with wine sauce. Be sure and grate lump sugar thickly over your pudding before sending it to table. Boiled in a mould it looks better than in a plain basin.

Scotch Broth.—Steep four ounces of pearl barley and two ounces of groats in water, put them into a pan with four quarts of boiling water, and let them boil for two hours. Put in a couple of good carrots and two turnips cut small, and when the vegetables are tender add pot-herbs, and season to taste.

Scrofula.—The principles on which the treatment of scrofula should be based are the following:—First, to improve the quality of the blood (see *Blood*); secondly, to strengthen the solids (see *Food* and *Diet*); thirdly, to give the circulation more vigorous action (see *Exercise*). Medicine, although useful, is a consideration of secondary importance.

Sea-Bathing is greatly preferable to bathing in fresh water. This is universally admitted. It excites the action of the solids, stimulates the vessels of the skin, causes an increased determination of the fluids to the surface of the body, and promotes all the secretions. Even persons of the most delicate habits are less susceptible of cold from being wetted with salt water than with fresh. There is a saline incrustation formed on the skin, in consequence of bathing in the sea, which excites in some measure the action of the cutaneous vessels by the common friction of the apparel, arising from a certain degree of roughness and asperity thereby imparted to the surface of the body. Bathing in the sea, by exposing the body for a time to a medium of lower temperature than it has been accustomed to, combined with the opportunity of breathing pure air, and of enjoying moderate exercise (no small adjunct), to say nothing of indulging in agreeable society and innocent amusement—all these serve to restore to the constitution a portion of that strength which had been previously exhausted by breathing the impure atmosphere and following the enervating modes of life peculiar to great towns. Hence the benefit which soon becomes so palpable from the change. Indeed, in many cases, even after a short course of judiciously regulated sea-bathing, it is difficult to recognise the languid and meagre individual who a few weeks before had repaired to the sea-coast in a state of great debility, where he is seen once more possessing all the advantages of vigorous and florid health. The faculty recommend to invalids that sea-bathing should be resorted to at two periods of the year, and continue for at least five or six weeks at each season, making June part of one and September of the other. By thus allowing an interval between the two courses of bathing, a more salutary change may be effected in the fluids and solids than if it had been persisted in for many months without intermission. Bathing in the height of autumn, when the difference is considerable between the temperature of the air and water, is not reckoned so useful, because this may be called temperate rather than cold bathing. The lower the temperature we can accustom ourselves to bear with impunity, the better we are enabled to withstand the vicissitudes of the season. By exercising a little judgment as to the *time* of bathing, a lower temperature may be obtained even in the warmest weather, that is by taking advantage of the state of the tide; for the temperature of the water will be very different at different times, according to the circumstances of the locality and the period of high water, and the hour of the day. If the shore consists of level sand or shingle, the tide which flows in the afternoon over a large expanse of surface heated by the noonday sun, will be often a good many degrees higher than the morning tide in the same place. Of course the seas round a country like our own are lower than those in more southern parts.

Month.	Time.	Degrees. Atmosphere.	Degrees. Sea.
July 4	Midday.	72	69
,, 12	7 a.m.	63	66
Aug. 3	8 p.m.	65	71
,, 11	1 p.m.	70	71
Sept. 5	8 a.m.	64	65
Oct. 29	11 a.m.	60	55

A reference to the above data shows that the greatest possible advantage is derived from bathing in the month of September, during which the temperature of the air and water so nearly assimilates; the hour should be selected when the sand has been for some time covered by the tide, otherwise at low water. To remove as much as we are able every impediment to salutary vital action, persons of every age, and in almost every complaint, should, before they bathe in cold water, take one or two doses of such aperient medicine as may be proper to their particular state of health; and if the stomach is disordered or the tongue not clean, a gentle emetic may precede the cathartic. It will have the best effect if taken in the morning fasting. In most cases a glass of salt water taken for two or three successive mornings, before bathing is commenced, will answer the purpose extremely well. This precaution is quite necessary not only in guarding against fevers and other disagreeable consequences, but for emptying the first passages of that feculent matter which is always lodged in their convolutions; the constitution is relieved from a load more or less oppressive, and the *vis vitæ* is enabled to produce the reaction regularly, and thereby ensure the benefit expected from bathing. In order that this salutary purpose may be secured by every available means, it is also highly necessary in the case of invalids that during the course of preparation, and before commencing the sea-bathing, a tepid bath should be taken two or three times, heated to about 96°, remaining there from five to twenty minutes, according to circumstances. This will not only purify the surface of the body, but may at the same time, by means of the absorbent system of vessels, remove every deposition of fluid in any cavity or interstice of the body. It is always advisable to adopt this course when practicable. Whether the tepid bath is adopted in the case of hale persons or not, we should never begin to bathe in the sea till two or three days after arriving on the coast, during which time aperients have been taken as already directed. Neither should sea-bathing be taken after great fatigue, as coming from a long journey; nor after the body has been long exposed to great exertion, and increased lassitude, debility, or chilliness; nor if there is any determination of the fluids to the head or lungs. It is an indispensable rule never to bathe in the sea with a full stomach, but either fasting or about four hours after eating. It is hardly necessary to add, that to rush into cold water if at all unwell, or on the day you have taken medicine, is dangerous in the extreme. The robust and healthy may bathe early in the morning, or before breakfast; but persons of a delicate and feeble constitution, or who are in the habit of dining late and indulging in the luxuries of the table, should prefer bathing about two hours before dinner. It is better for such persons to bathe on alternate days than for many days consecutively. Daily bathing is frequently productive of lassitude, accompanied by a manifest wasting of the body. The maxim is pretty generally adopted that not even infirm persons should use a cold-water bath without having previously taken some moderate exercise, and when they bathe being rather warm than cold. This doctrine cannot be too strongly insisted on; and persons should never wait on the edge of a bath or of the sea until they are perfectly cool, for if they plunge into the water in that state a sudden and alarming chilliness may be expected, which would not have been felt had they been moderately warm upon their plunge into the water. As regards the place selected for bathing, it is desirable to choose a bottom of clean sand, wherever it is available; sea-weeds are to be avoided, for they sometimes contain a species of pointed shell, which is apt to inflict dangerous wounds when trodden on. It has long been considered a useful rule to wet the head first, and many think it necessary to plunge head foremost into the water, asserting that if this precaution is neglected there is danger of an accumulation of the blood to the head, with all its direful consequences. This may be reasonably objected to as certainly not the mode indicated by nature, because (until the introduction of bathing-machines) the bather must in most cases have waded into the water until he reached the depth suited to his purpose. A sudden plunge is a violent and unnatural exertion, which ought not to be insisted on with delicate people; and several of the bad effects ascribed to cold bathing, and which have induced many to abandon it who were anxious to persevere in its use may have originated in this practice. Every person who plunges headlong into the water will recollect the partial stupor and unpleasant sensations which are thus produced, affecting such delicate and sensible organs as the eye and the ear when the water enters the mouth or nose, threatening suffocation. Those who feel no bad effect from the practice may persevere in it, but those who experience any inconvenience from it, ought at least to put the matter to the test of experience. To have the greatest benefit from sea-bathing it is proper to remain but a short time in the water—not exceeding two or three minutes. If longer, the body should be kept immersed under the surface the whole time, and in constant motion, in order to promote the circulation of the blood from the centre to the extremities. It is much better to remain completely immersed in deep than to take repeated plunges in shallow water. On coming out, the body should be wiped dry with a rough cloth and the ordinary dress resumed as quickly as possible. It is more necessary to replace the usual vestments quickly than to be extremely anxious that the surface of the skin is perfectly dry, as any wetness from salt-water is not likely to be prejudicial. After bathing, use moderate exercise to promote the return of the heat of the body, taking care that it shall neither be violent nor too long continued. If chilliness occasionally ensues, breakfast soon after bathing in the morning; or in the forenoon some warm soup or broth may be taken; and remember that if immersion, instead of being succeeded by a glow on the surface of the skin, is followed by chilliness, languor, or headache, bathing in the sea should by no means be persisted in. During a course of sea-bathing, and even when the warm sea-bath is used, friction from the flesh-brush or coarse woollen cloth ought not to be omitted, particularly where the glow does not follow the immersion after the desired time. This friction will tend to produce it, and often enables a patient to continue sea-bathing who must otherwise have given it up. Bathing-machines, although not indispensable, are nevertheless extremely useful and convenient to bathers, because they enable them to dress and undress under cover; bathers are moreover less exposed to cold, and can bathe at any time of the tide and any depth desired. At the same time these have their inconveniences when they are without awnings, or soaked with rain, or replete with moist exhalations. It is seldom, too, that there are sufficient numbers of these vehicles in a proper state to accommodate all who desire to use them. The practice also of crowding great numbers in so small a box as a bathing-machine is objectionable. The air soon gets contaminated and occasions languor and faintness. Bathing-dresses are useful, especially to the delicate; they should be made of a very open texture, so as to admit the water freely in every direction. By using them the temperature of the body is prevented from being so much reduced as to render bathing in cold water hazardous. To strong and healthy men they are not necessary; but invalids of both sexes should certainly adopt them. At any rate, after undressing as quickly as possible, the body should be immediately wrapped in a dry flannel dressing gown, which should not be laid aside until the very moment of going into the water. By this means the shock of immersion is avoided, and that salutary glow which should always succeed bathing may generally be ensured. It is right to go into the water with a slight degree of quickened circulation and increased warmth of the body, which may generally be produced by a sharp walk to the beach; but it must not be supposed that those who are heated by previous fatigue, late hours, or intemperance should bathe in cold water; in such cases it would be hazardous, and certainly should not be attempted. It has been stated "that sea-bathing derives its efficacy more from the coldness than the saltness of the water, and fresh water is colder than salt water," consequently it ought to have the preference. To demonstrate which of the two is most conducive in restoring health would be a matter of much difficulty, because it is impossible to determine how far the influence of the sea air extends, and if the experiment was made at the sea-side where shall we find two cases exactly similar, or the same person in precisely similar circumstances at different periods? Independent of the evident good effects of sea air upon those who do not bathe, our opinion is strongly in favour of salt water, not only from the salts and other matters contained in it, but because there is probably a very different impression made upon the nerves and extreme vessels on the surface of the body than what can be occasioned by fresh water in a state of rest. It may also be presumed that the specific gravity of salt water exceeding that of fresh water, may considerably augment its action. This opinion also acquires support from the fact that sea water does not occasion rheums and colds when partially applied. Those who have acquired the art of swimming find it healthy and agreeable. After using that exercise we sleep comfortably the whole night, even during the most ardent heat of summer. Perhaps, the pores being cleansed, the insensible perspiration increases, and occasions the coolness we experience. Those who can swim should never fail to practise when they remain in the water, for besides the uninterrupted immersion of the body, the muscular exertion tends greatly to keep up the balance of temperature which is lost by placing the body in a medium so much colder than itself. It should be a constant rule, however, even with the most expert swimmer, never to bathe in the sea in deep water without having a boat in attendance, or a companion who can swim. Swimming is certainly a weakening exercise, and many who have remained too long in the water have become so enfeebled as to be scarcely able to stand when they came on shore; and if this weakness or a more fatal cramp came in deep water when no aid was at hand, the consequences might be dangerous in the extreme. The lightest water is at least 830 times heavier than the air. The human body therefore cannot sustain for any length of time a great pressure of water; hence the most experienced negro divers dare not venture beyond a certain depth in the sea, well knowing that it would be impossible for them to rise against the additional weight of water incumbent upon their bodies. The action of cold water on the body when frequently applied may be compared to labour, or any other debilitating cause, and in the first instance somewhat similar to the rigour that is the leading symptom of fever, producing a spasm upon the extreme vessels. If there happens to be a sufficient degree of strength in the system to counteract the shock of the cold water and produce reaction, a general warm glow will ensue. This reaction rouses the principles of life, overcomes the spasm on the extreme vessels, and increases the energy of the constitution—of that principle which in all matter, animate or inanimate, is continually labouring for its preservation. When the warm glow immediately or in a very short time succeeds the immersion, when the spirits are light and the mind cheerful, the bathing will have a salutary effect. But after coming out of the water, if you continue cold, chilly, shivering, pale, more or less languid, the body evidently shrunk, and this after several trials, you should desist, nor again attempt bathing until the constitution, by proper remedies, is in a state to bear the action of the water, and produce the succeeding warmth so essentially necessary. If the effect of cold water applied to the surface of the body is similar in some degree to the first attack of fever, producing a similar reaction of the heart and internal parts, it will be evident how necessary it is to use this powerful agent with caution, and not without having previously ascertained whether it is adapted to the constitution, strength, and any disease that may then exist.

Sea-bathing, or salt-water bathing, is useful wherever cold bathing of any kind is indicated, as in all cases of debility unaccompanied with inflammatory symptoms. How far it is preferable to the common cold bath is doubtful, except in cases of cutaneous eruptions, and old ulcers, where the stimulating quality of the salt as an external application is generally attended with good effects. In some delicate and irritable habits, too, bathing in the sea will be succeeded by that universal glow that is the certain test of the utility of the bath, when common cold bathing would be succeeded by chilliness and coldness of the extremities. Warm salt bathing may be more advantageous in paralytic cases than common warm bathing.

Sea-sickness.—It has been stated that a girdle worn round the body above the bowels—that is, over the epigastrum—will prevent sea-sickness. It is said to operate by keeping the intestines from pressing upward against the diaphragm, when the ship descends from the top of a wave. The upward motion of the vessel does not cause the disquieting and painful sensation of sea-sickness, but affords an instantaneous relief. This is said to have been known to the monks of Palestine, who kept it secret, but were well paid by selling to pilgrims embarking at Damietta for Europe bits of paper which had touched the holy sepulchre, with directions to have them bound in this way. This trick procured a brisk sale for these papers. Symptoms resembling those of sea-sickness are often experienced by persons of delicate nerves, in riding in a carriage on a rough road, by swinging, falling and by what is most remarkable dreaming of falling from a considerable distance. It has been observed that ladies wearing long corsets tightly laced, however injurious they may be otherwise to the health, are sometimes preserved by them from sea-sickness. An instance is given of a seaman who escaped this malady for many years, by wearing a belt on account of some injury he had received in his sides.

Seaside, Visits to the.—Sea-bathing and sea-air are excellent things, as everybody knows; the first should, however, be indulged in judiciously, and with some knowledge of its general and special effects (see preceding pages). Sea-air is more equable in its temperature, being in summer generally cooler and in winter warmer, than the inland atmosphere. It contains free muriatic acid and saline particles, which act favourably upon the respiratory organs and the blood; and moreover being more dense, the amount of oxygen inspired is proportionately increased.

Sea-air contains an increased quantity of ozone (see *Ozone*), the beneficial effects of which are too well known to be here dwelt upon.

Seasoning.—(See *Diet.*)

Sea-water owes its saline taste to common salt (muriate of soda) which it contains in abundance, and its bitter taste to muriate of magnesia, of which it contains a considerable portion. Both these salts are purgative, and the sea-water differs very little, if at all, in its medicinal virtues from the saline springs, the purgative quality of which is generally derived from Epsom or Glauber salts. The internal use of Epsom salts or sea-waters is recommended in glandular or scrofulous swellings; in dyspepsia, attended with nausea and a foul tongue; in hypochondriasis, attended with costiveness; and in most cases of habitual costiveness, particularly where the more drastic purges have been so freely administered.

Sea-weeds, Drying.—The first object to be attended to in preserving marine plants is to have them washed perfectly clean before spreading. There should not be left upon them a particle of sand or foreign body, unless in some rare instances a parasitic species may be thought worthy of keeping, on account of its rarity, or because it may add an additional beauty to the chief specimen. It is a good practice to wash them before leaving the shore, either in the sea or in a rocky pool, or, as is sometimes more convenient in some localities, in a rivulet discharging itself into the ocean, though, as will be afterwards explained, the last practice proves very destructive to the beauty of some species. The foreign bodies to be got rid of are fragments of decayed sea-weeds, gravel, and sometimes portions of the softened surface of sandstone or argillaceous rock on which the specimens may have grown, together with the smaller testacea and the corollina of females, &c. After the greatest pains taken in cleaning the specimens on the shore, there will generally be found much to do before they can be properly committed to paper, since foreign substances will continue attached to them with much pertinacity, even after we may have been satisfied that they are perfectly clean. It is therefore necessary to prepare each specimen by examining it in fresh or sea water, in a white dish or plate, so that everything foreign may be detected and removed. The next thing to be attended to is the quality of the paper on which the specimens are to be spread; and here a great error is generally committed, in using a thin and inferior kind, by which, if the specimen be worth preserving, it has not proper justice done to it. Much of the beauty, indeed, of many species depends on the goodness of the paper, exactly as a print or drawing will appear better or worse as it is executed on paper of a good or an inferior kind. Some species, too, will be found to contract so much in drying as to pucker the edges of the paper if it be not sufficiently thick, and this has a very unsightly appearance. The sort which we have from experience been led to prefer is good music-paper. It closely resembles that used for drawing, and the sheet divides into four leaves of a most convenient size. Whatever pains may be taken to clean the recent specimens, we shall often find when spreading them that some foreign particles continue attached, and for the removal of these a pair of dissecting forceps and a camel-hair pencil of middle size will be found very convenient and useful; these, indeed, are almost indispensable, and will be found useful on more occasions than can be here specified. A silver probe, with a blunt and a sharp end, is the most convenient instrument for spreading out and separating branches from each other, but anything with a rigid point—such as a large needle or the handle of the camel-hair pencil sharpened—will answer. A large white dinner-dish serves perfectly well for spreading the specimens in, and all that is further necessary is a quantity of drying papers and some sheets of blotting-paper, with three or four flat pieces of deal board. Nothing answers better for drying than old newspapers, each divided into eight parts, but it is necessary to have a large supply of these. The beautiful common *Plocamium coccineum* is one of the most easily preserved species, and may be taken as an example of the mode of proceeding with most of the others. The following are the methods to be adopted:—1. The specimen is to be thoroughly well cleaned. 2. A dinner-dish to be filled about two-thirds with clean fresh water. 3. The paper on which the specimen is to be spread to be immersed in the water in the dish. 4. The specimen to be then placed on the paper and spread out by means of the probe and camel-hair pencil. 5. The paper with the specimen on it to be then slowly withdrawn from the dish, sliding it over its edge. 6. The paper with the specimen adhering to it to be held up by one corner for a minute or two, to drain off the water. 7. To be then laid on a paper or cloth upon a table, and the superfluous water still remaining to be removed by repeated pressure of blotting-paper upon the specimen, beginning this operation at the edges and gradually increasing towards the centre till the whole can be pressed upon without danger of any part adhering to the blotting-paper, which probably would be the case were the latter applied at once to the whole specimen. 8. The specimen then to be laid on a couple of drying-papers placed on a carpet or on a table, two more papers to be laid over it, and then the piece of board, on which latter a few books are to be put, to give the necessary pressure. 9. These papers are to be changed every half hour or oftener, till the specimen is sufficiently dry. (A number of specimens, with drying-papers interposed, may be pressed at once under the same board.) Though the above method is in general the best, yet there are various species, and among these the *Plocamium coccineum* itself, which dry perfectly well by simple exposure to the open air, without pressure being had recourse to at all; and some can only be preserved in the latter way, being so glutinous that they will adhere as strongly to the drying-paper laid over them as to that on which they are spread; pressure, however, is necessary after they have dried, for the purpose of flattening them. An indispensable requisite for the drying of marine or fresh-water algæ is a portion of old rag, neither of a quality too fine or too coarse. When the specimen has been spread as directed, upon the paper on which it is to remain, a piece of rag sufficient to cover it should be laid over, and then it may be interleaved under the boards for pressure. The rag prevents the necessity of so much care in taking up the moisture, does not adhere to the specimens, but, when dry, leaves them, while most of the plants themselves stick firmly to the sheets on which they have been spread.

Sea-weed, Dyeing.—In arranging sea-weeds for ornamental purposes, they are often dyed a variety of bright colours. For this purpose Judson's dyes are very effective.

Seidlitz-water.—Dissolve two drachms of sulphate of magnesia, eighteen grains of muriate of magnesia, in twenty and a half ounces of soda-water. If it is required very strong, put in a double quantity of the muriate.

Seltzer-water.—Dissolve four grains of sub-carbonate of soda, two grains of sub-carbonate of magnesia, and twenty grains of common salt in twenty and a half ounces of soda-water. Subject it to pressure with the usual apparatus for twenty-four hours. Drain off, and bottle for use. (See page 275.)

Shells.—The matter of the shell is secreted by the corium or skin of the insect, its form is regulated by that of the animal. It is coeval with its existence. The solid matter consists of common lime with a small portion of animal matter resembling coagulated albumen. The mouth of the shell is extended by the application of fresh layers of the shelly matter to the margin, and its thickness is increased by a coating on the inner surface. Shell is hardened by carbonate of lime, bone by phosphate of lime.

Shell Collecting.—The chief implements required in collecting are a ladle or spoon made of tin or thin iron, five inches long by three and a half wide, with a rim about an inch high; if it is made with a hollow handle it can be attached to a walking-stick; the centre should be perforated for the escape of the water. This implement is suitable for fishing up small river shells, or for sifting fine sand on the seashore. One or two strong knives will be required to detach the shells from the rocks or limpets, &c., a hammer and chisel for procuring such as perforate; and small boxes or bags for holding the different specimens. A small-mesh landing-net will be required in searching for the larger specimens, such as the bivalves, and it may be contrived that it will fit on to the stick used also for the ladle. The lowest ebb of the tide is the best for searching for marine shells. The rocks, corals, and stones which are then left exposed should be carefully examined for chiton, limpets, ear-shells, and other adhesive tribes which are fixed upon the surface, or shelter themselves in the crevices. They are detached by suddenly passing a knife between them and the substance they are upon. Mussels, and other gregarious bivalves furnished with a byssus, likewise occur in such situations. Wherever the rock, mud, or sand is pierced with round holes, the collector may be tolerably sure of finding bivalves. They are obtained either by breaking the rock with a hammer, or digging deep into the sand or mud with a spade. The little puddles of salt water left by the tide are the habitations of many univalve shells; and others will be found beneath loose stones and sea-weeds. If any shells appear to have been recently cast up on the beach, and are not broken, they may be collected; but such as have lain some time exposed to the sun are scarcely worth that trouble. After a gale of wind or violent storm, the shore should be immediately visited, as fine shells are frequently to be met with; if the line of coast is extensive a few boys should be engaged to assist in the search. This must be done quickly, for it not unfrequently happens that the next flow of the tide takes away every shell. Small islands and coral reefs, not exposed to violent surfs, are generally very rich in shells, particularly in different species of *spondylus*, tree-oysters (*Dendostreæ*), clams (*Tridacnæ*), winged mussels (*Margarite*), and other adhesive or lyssiferous bivalves. A *trawl* or dragging-net, upon a productive coast, will generally bring up a variety of living shell-fish, as well as of other marine animals. Whenever dead or broken shells are drawn up with the sounding-line, or observed upon the beach, they afford an almost certain indication of the coast being productive. The trawl should be tried in every direction, both in deep and shallow water; and when once the shelly ground has been discovered, the collector may calculate upon procuring a variety of species peculiar to such waters. Shell-fish of a carnivorous nature may be caught in lobster-pots, which they frequent for the purpose of feeding upon the offal used as baits. In the Mauritian islands it is a common practice to fish for olive and harp shells with a line and hook baited with flesh; this method, no doubt, might be employed with great advantage on other productive shores. The fish markets in Catholic countries should be regularly visited, particularly during the season of Lent, when shell-fish constitute an important article of food to the inhabitants. In the market of Naples are often seen fine specimens of *Carduum spinosum* and *aculeatum*, *Pedunculus pilosus*, *Pecten Jacobea* and *varia*, *Murex brandanus*, and many other species of a smaller size, thus exposed for sale merely for the sake of the fish. Trawling in the bay would produce, without doubt, a still greater number. At Taranto, according to Swinbourne and Ulysses, the variety and abundance of shell-fish are prodigious: the latter author enumerates 185 species, found by himself at Taranto and Naples. Shells, also, are procured by divers or pearl-fishers in various parts of India. The sea in the sheltered bays and coves of tropical climates is at times so clear and transparent, that objects are distinguished at the depth of fifteen or twenty feet. The collector should avail himself of this, by using a small hand-net fastened to a pole, by which the bottom may be scraped. The most productive coasts for shells are those of the Continent and islands of the Indian Ocean, from whence near one-fourth of the exotic species usually seen in cabinets are brought. It may be taken as a general rule that the shores of islands abound with more shells than those of continents. Ceylon, Amboyna, Sumatra, and Java have long been celebrated for their shells; but those from Borneo and New Guinea are very little known. The island of Timor may be called the paradise of the conchologists, for it has frequently been averred that no part of the world can be compared with it in the variety and profusion of its marine productions. The coasts of Australia are considered productive, yet not particularly so. From the Pacific Islands many beautiful and rare species have been obtained; and numerous others, in all probability, remain to be discovered. It is singular that while the eastern coasts of South America are particularly barren, the western shores are found to be plentifully inhabited by testaceous animals, more especially those of the cyclobranchian tribe, or chiton, numerous species of which, of late years, have been received from Chili. In Britain, the west of England affords nearly two-thirds of all the marine species yet discovered. The coasts of Exmouth, Sandwich, and Weymouth are particularly productive, so likewise are those of Tenby, Barmouth, Hastings, &c. In Ireland, Bantry Bay, and the celebrated silver strand of Portmarnock, in Dublin Bay, have been explored with great success; while in Scotland a considerable number of interesting shells have been discovered in the Firth of Forth.

FLUVIATILE SHELLS may be sought for in fresh-water lakes, ponds, rivers, streams and ditches filled by brooks. The greatest number of the univalves occur at or near the surface, under the leaves of aquatic plants, among decayed vegetables, &c. The bivalves, on the other hand, as also the *ampullariæ*, *melaniæ*, *paludinæ*, among the univalves, are only to be found at the bottom, either among the pebbles, or partly imbedded in the sand or mud. The first are easily captured by hand, or by the spoon already described; but the different species of *cyclos*, *unio*, *anodon*, &c., from fixing themselves within the mud (very often two or three inches beneath the surface), can only be extracted by a strong semicircular landing-net, somewhat resembling a drag in miniature, the curved portion being that to which the handle is attached, while the straight side is in front. This side, which comes in contact with the bottom, might be furnished with three or four iron prongs, like a rake, which would detach the shells from the mud; while the net, being drawn forward, would receive them. Many of the European fluviatile bivalves are minute, and can only be secured by a net with very small meshes. There are scarcely any situations in this country where fresh water shells may be found. The exotic species should particularly engage the attention of the collector. The great rivers and lakes of North America abound with a surprising number of these bivalves, many of which grow to a very large size and astonishing thickness. Although we are now well acquainted with those of North America, few, comparatively, have yet been brought from the tropical regions of that continent, still fewer from Asia, and scarcely any from Africa. As no cause has been assigned for such a singular disparity, we may presume it is occasioned by the fresh waters of those regions not having been sufficiently examined.

LAND SHELLS occur in all countries, and are found in various situations; as humid spots covered by herbage, rank grass, &c., beneath the bark or within the hollows of old trees, crevices of rocks, walls, bones, &c. Early in the morning, during a damp sunless day, or after showers of rain, land mollusks may be found crawling on the leaves of plants, the stems of trees, &c. The animals will sometimes live in a torpid state for one or two years after they have been removed from their native country; it is therefore highly desirable that this experiment should be tried with a few of each species; packing them in moss or loose vegetable earth, but in such a way that they may not be shaken during the voyage. The animals of all shells may be killed with warm water, in which they should remain two or three hours. The water must not boil, otherwise the colours, in many cases, will be changed or injured. Previous to removing the animal, the shells should be simply cleaned with water and a hard brush. Spirit of salt, or other acids, on no account should be used; they are, indeed, employed to remove scurf, or any extraneous bodies that sometimes hide the beauty of the specimens; but their application requires much skill, and will prove destructive in the hands of inexperienced persons. When the shells, therefore, have been cleaned with a brush, the dead animals can be removed with a stout pin, or the point of a knife; the latter will be necessary for cutting the two muscles generally found in bivalves, and by which the valves are closed. The animals of these shells are never dead until these muscles are relaxed, and the valves begin to gape during this operation. Great care must be taken not to injure the teeth; and it is desirable that the ligaments should be preserved entire. The operculum, or lid, which closes the mouth of univalves should be carefully detached, wrapped in paper, and replaced within the aperture. The shells may be left to drain upon a towel and board placed in the shade. In tropical climates, the assistance of ants may be called in with advantage. In packing shells, the smaller and more delicate kinds will be best secured from injury in chip boxes; to these should be affixed labels, stating the place they were found in, and any other circumstances. Those armed with long and tender spines had better be packed in cotton or tow, until their points are completely covered; the rest may be wrapped in cotton wool, paper, or other soft substance, and closely packed, taking care to put the largest and heaviest at the bottom, and filling up the interstices with the smaller species. Many of these latter also may be packed with greater security within the larger ones; thus the risk of injury will be diminished, and much space spared.

Shell Cement.— It may be useful to shell collectors to know of a cement suitable for sticking the shells to cardboard boxes, &c. Make some very thick gum-water, and stir in finely-powdered whiting until it becomes stiff; when dry it adheres so firmly that it can only be removed with a knife. It is an excellent thing also for mending plaster and China ornaments. To insure success it must be used rather thickly. A very large variety of showy and pretty household ornaments may be made with the smaller kinds of shells and this cement.

Shells, Method of Polishing.—The art of polishing shells has but lately reached its present state of perfection; and as the admiration of sea shells has become so general, it may be desirable to give some instructions in the means of adding to their natural beauty. A shell which has a smooth surface and a natural dull polish, need only be rubbed with a piece of chamois leather on which is tripoli, or fine rottenstone, and it will become of a bright and fine polish. A shell that is rough, foul, or crusty, or covered with a tartareous coat, must be left a whole day steeping in hot water; when it has imbibed a quantity of this, it is to be rubbed with rough emery on a stick, or with the blade of a knife, to get the coat off. After this, it is to be dipped in diluted aquafortis, spirit of salt, or any other acid, and after remaining in it a few minutes be again plunged in water. After this it is to be well cleaned with soap and a linen cloth, and when by these several means it is made perfectly clean, the polishing is to be finished with fine emery and a hair brush. If, when dry, the shell has not so good a polish as may be desired, it may be rubbed over with a solution of gum arabic, which must not be so thick as to give a sensible coat, only heightening the colours. If the shell has an epidermis which prevents the polishing of it, it should be dipped several times in diluted aquafortis and, after remaining in it for a few minutes, taken out and plunged into common water. The progress the aquafortis makes is to be carefully observed each time the shell is taken out. The point of the shell, and any other tender parts, are to be covered with wax, also any worm-holes, and a long piece of wax must be provided, and one end of it made entirely to cover the mould of the shell, the other will serve as a handle. When the repeated dippings into the aquafortis show that the coat is sufficiently eaten away, then the shell is to be carefully wrought with fine emery and a brush, and when highly polished coated with gum-water or with the white of an egg. When it is only a pellicle that hides the colours, the shell must be steeped in hot water, and after that the skin worked off by degrees with an old file. When a shell is covered with a thick fatty epidermis, aquafortis will do no service, as it will not touch the skin: then a rough brush and coarse emery are to be used; if that does not succeed, seal-skin, or as the workmen term it, *fish-skin*, and *pumice-stone* are to be employed. These are the methods to be used with shells that require but a moderate quantity of the surface to be taken off; but as many require to be uncovered deeper, this is called entirely scaling a shell. This is done by means of a horizontal wheel, impregnated with rough emery; it is a work, however, of difficulty. Very often shells are cut down too far by it and wholly spoiled; to avoid this, a coarse vein must often be left standing, and taken down afterwards with a file, when the cutting down at the wheel would have spoiled the adjacent parts. After the shell is thus cut down to a proper degree, it is to be polished with fine emery, tripoli, or rotten-stone. When a shell is full of tubercles or protuberances it is then impossible to use the wheel, and industry and patience are the only means of effecting a polish. A camel's hair pencil must be dipped in aquafortis, and with this the intermediate parts of the shell must be wetted, leaving the protuberances dry. This is to be often repeated, and after a few moments the shell is always to be plunged into water to stop the corrosion of the acid, which would otherwise cut too deep. When this has sufficiently cleansed the shell, it is to be polished with the finest emery or tripoli by means of a small stick, or the common polishing stone used by goldsmiths may be used. There will probably remain several places which could not be reached by any instrument, so that the shell must necessarily be rubbed over with gum-water or the white of an egg afterwards, to bring out the colours and give a gloss; in some cases it is even necessary to give a coat of varnish. Shells are subject to many imperfections, some of which are natural and others accidental. Besides those arising from age and sickness in the fish, morbid cavities or protuberances occur where they ought not. When the shell is valuable, these faults may be hid; the cavities may be filled with mastic or isinglass, dissolved in spirits of wine; these must be coloured to a tinge of the shell, or water-colours must finish them up to the resemblance of the rest, and then the whole shell being rubbed over with gum-water or the white of an egg, scarce any eye can perceive the artifice. The same substance may also be used to repair the battered edge of a shell, if the pieces chipped off be not too large. When the excrescences of a shell are faulty, they are to be taken down with a fine file. If the lip of a shell be so battered that it will not admit of repairing by any cement, it must be filed down, or ground on a wheel till it becomes even.

Shell Gold, how to Make it.—This is very often useful to touch up a damaged gilt frame with, or put a gold line round a mounted sketch or photograph, &c. Grind leaf-gold with new honey on a clean piece of marble until it is extremely soft and smooth to the touch; then put it in a glass of clean water, stir, allow it to deposit, and decant the water from it; repeat till the gold is very clear and fine. Then pour into it about a pennyworth of aquafortis, and let it remain for about two days. The gold may then be taken out and mixed with one or two drops of very thin gum-water. A little oxgall washed over the shell before the gold is applied improves its appearance, and a trace of soap in the water last used makes it lie smoother.

Shower-Baths.—Those who begin to use the shower-bath as a permanent practice should adopt it in the summer. In winter the shock is much greater, and the patient being probably unaccustomed to exposure to cold, might find the effect too strong, especially upon sickly temperaments, which require great caution in the medical treatment applied to them. If, however, the case were pressing, the temperature of the water might first be raised by adding hot water, and then gradually diminished.

Silks, how to Select.—Of old a good silk could be known by its stiffness and weight; now, however, the lightest silks are often rendered so heavy and stiff by receiving treatment with gum and dye that these tests are valueless. Such silks are brittle and rotten, and the best test for them is to gather the fabric into folds across its width, and observe the angles produced. If the folds are pointed and sharp-edged, like those of paper, instead of rounded and soft, the silk is one of the bad kind, and should be rejected. Good silk has a peculiar gloss which cannot be successfully imitated, although it is imitated. To ascertain when a white silk has been mixed with cotton, suspend a piece of it in a wide-mouthed bottle containing chloride of lime, which must not be allowed to come in contact with the silk. If it contain cotton, the threads of it will remain white, while those of the silk will become yellow under the influence of the chlorine gas evolved from the lime.

Silk, to Colour Photographs on.—Take a print on paper from the same negative as that from which the photograph on silk was printed. Rub the back of it with fine lac in powder, and apply this reddened surface upon a smooth piece of parchment. Go over the photograph with a pencil, tracing out upon the parchment the space to be filled with any one colour. For each different colour use a fresh piece of parchment. Cut out the part representing the colour from each piece, and then place every piece one after another on that part of the silk where the space cut out corresponds with the space to be coloured. You may then proceed to the colouring. The oil used in this kind of painting is composed as follows:—Grind into very fine powder or obtain thus ground twenty grains of sal-ammoniac and twenty grains of sal-prunella. Throw the powder into one pound of the linseed-oil used by artists, and boil it for three hours, of course carefully.

Preserving Silk. — Silk articles should not be kept folded in white paper, as the chloride used in bleaching the paper will probably impair the colour of the silk. Brown or blue paper is better; the yellowish, smooth India paper is best of all. Silk intended for a dress should not be kept long in the house before it is made up, as lying in the folds will impair its durability by causing it to cut or split, especially if the silk has been thickened by gum. A white satin dress should be pinned up in blue paper with coarse brown paper outside, sewed together at the edges. The best way of keeping ribbons is to roll them round a block made for the purpose, and then wrap them in soft paper.

IRONING SILK.—Silk cannot be so ironed as to press out all creases without first sprinkling it with water and rolling it up in a cloth, and letting it remain thus for an hour or two. If the iron is in the least too hot it will injure the colour; it should first be tried on a piece of the old silk. Bright-coloured silks or ribbons, such as pinks, blues, yellows, greens, &c., always change colour on application of an iron. Blacks, browns, olives, greys, &c., generally look very well after ironing. Silks should always be ironed on the wrong side.

Skeletons of Birds.—Perfect skeletons of little birds and animals can be obtained by placing them singly in a small wooden box, just large enough to receive the animal, fixed in the position desired; perforate the box with numerous holes, and place it in an ant-hill; in a short time the ants will have the bones perfectly polished, leaving the joints and sinews untouched, as they only feed on the flesh.

Skipping-rope.—The skipping-rope, a toy frequently discarded by the young girl when prematurely entering womanhood, but which ought to be looked upon as a necessary article in every boudoir or private room occupied by a woman of civilised life and civilised habits, is one of the best, if not the very best, kinds of gymnastic exercise known. It exercises almost every muscle of the body, and there are few women who do not neglect to take sufficient exercise.

Skull, the.—In infancy the brain is in several parts, unprotected by bone, in order that it may have space in which to grow. In childhood the bones of the skull are separate, so that the effect of a fall or blow—to which young children are so subject—is to cause the bones to overlap, and when the pressure is removed to spring back into their places. As the child becomes a youth these bones unite, and an inner and outer skull is formed, with a network of bone between. As age comes on all these bones unite and become solid. This is why a fall on the head is more dangerous for the old than it is for the young, and is least dangerous for the child.

Sleep.*—No arguments are requisite to prove the necessity of sleep; nor will it answer any practical or useful purpose to enumerate or attempt to reconcile the various and fanciful speculations relative to the causes of sleep; experience tells us, in a language not to be misunderstood, that "the chief nourisher of life's feast," "tired Nature's sweet restorer, balmy sleep," cannot safely be dispensed with for any considerable length of time. When its accustomed visits are not paid, or, when paid, are not attended to, the whole frame is thrown into disorder; the appetite ceases, the strength fails, the spirits become dejected, and the whole body is reduced to a state of exhaustion and misery, in fact, a prostration and dissolution of all the animal and vital powers seem likely to ensue. And, it may be added, that nothing gives the countenance the early appearance of age more than the want of healthy and refreshing sleep. But while too great exertion or prolonged action enervates both body and mind, exhausts and unhinges all the organs, and lays the train for a host of destructive evils, excess of sleep, or prolonged inaction, is equally to be guarded against; it deadens and enervates the body, and occasions a concentration of the vital powers on the brain or the stomach. On the due equalisation, therefore, of sleep and activity the preservation of health and strength depends; and regularity in the

* This useful information is extracted from "The Oracle of Health."

hours of rising and retiring to rest mainly contribute to this preservation. The common abuses on those points necessarily induce numerous indispositions, and often serious diseases. The causes or circumstances which principally contribute to sleep are—good air, labour or exercise, wholesome diet, and regular habits and hours. The more artificial means, and consequently the last to be resorted to, are medicine, sedatives or soporifics, the application of cold or heat, &c. When sleep does not follow as a natural consequence of the active employment or exercise of the day, it may always be inferred that some derangement in the machinery of the constitution has taken place. Our first duty, therefore, is to endeavour to correct this derangement; but as this desirable purpose is not to be accomplished by a sudden effort, our next care is to conciliate the benign influence of "all-healing sleep;" for when the pulse is almost paralysed by anxiety, half an hour's repose will cheer the circulation, restore tranquillity to the perturbed spirit, and dissipate those clouds of *ennui* which sometimes threaten to eclipse the brightest minds and the best of hearts. Various practices have been recommended for promoting sleep. Walking up and down the parlour or bedroom before retiring is one of the specifics; *after supper walk a mile* is an excellent rule, and may be practised in the house as well as the open air. Washing the mouth and rubbing the gums and teeth with a brush before going to bed, is a wholesome practice, and has a tendency to promote sleep. Friction, or rubbing the body, arms, legs, soles of the feet, &c., with the hard flesh brush, or a coarse towel, besides promoting the insensible perspiration, is one of the most effectual sedatives to repose. When the natural rest is much disturbed, or it is difficult to be obtained, the legs and feet may be immersed in a narrow tub filled with water as high as the knees, gradually increasing the heat of the water until a mild and gentle perspiration is felt over the frame. Then let the legs and feet be thoroughly dried, and a pair of worsted stockings drawn on, but not to their full extent. This remedy, however, should be but occasionally adopted, on account of its debilitating effects. Agreeable and lively conversation, and listening to music, reading, &c., are often good preparations for repose. Gently titillating the soles of the feet will frequently procure sleep. Again, when the soles of the feet are cold, no disposition to sleep can be induced, on account of their affinity with the brain, until their natural warmth is restored. The best means of procuring the required warmth is to rub the feet with a hard brush or a coarse towel for some minutes before going to bed, which will be found a more effectual method of preventing the sense of coldness and conciliating sleep, than the immediate application of bottles filled with warm water, or anything else actually hot, as recommended by Lord Bacon, in his natural history, and generally adopted in domestic practice. It is scarcely necessary to add, that in order to enjoy sound and refreshing sleep, every object that may excite unpleasant ideas or violent emotions in the mind, should, for some time before going to bed, be most sedulously avoided. "If none of these practices will procure sleep, then try the effect of conning over some task that in childhood was apt to create it, or of the counting from one to five hundred, or a thousand, or reciting any long passage from any ancient or modern author. By these means the attention is diverted from uneasy thoughts, and you are overtaken by sleep in the midst of your efforts." Many other methods may be also adopted to induce sleep. For instance, reading aloud in a slow, monotonous manner, and the gentle noise produced by vessels full of water, so arranged that it may fall drop by drop into a sonorous vessel. A continued sound indeed, if uniform and moderate, is well suited to absorb the attention without fatiguing it; the vibrations of a pendulum, or the sound of soft gentle music, or a long uninteresting recital, are often productive of similar results. But it is frequently in vain that every means are resorted to to induce the balmy influence of repose —it evades, like a fleeting vision, the feverish body, or the busy mind :—

> " And in the calmest and the stillest night,
> With all appliances and means to boot,
> Denies."

In this case if you find yourself restless from feverish heat, a parched state of body, or any other cause, or should you be awakened by any accident, and cannot easily get to sleep again, then put into practice Dr. Franklin's rules, viz., get out of bed, beat up and turn the pillow, shake the bed-clothes well and repeatedly, with at least twenty shakes, then throw the bed open, and leave it to cool; and, in the meantime, take some turns about the room, till the skin has dispersed its perspirable matter, and become sufficiently cool; then return to your bed, and you may soon fall asleep, and your sleep will be sweet and pleasant. If the room be cold, or the season of the year be winter time, both stockings and a dressing-gown should be put on while you are out of bed. But if you are too indolent to get out of bed lift your bed-clothes with one arm and leg, so as to draw in a good deal of fresh air, and by letting it fall, force it out again. This method of pumping the bed, repeated about twenty minutes, will so clear the bed-clothes of perspirable matter which they have imbibed, as to enable you to procure easy and healthy sleep again. These suggestions from a doctor who was scarcely at a loss for any useful contrivance (though, in this instance, he is indebted for the hint to Huller's "Medicina Gymnastica"), have been put into practice, and found to be very beneficial. There are other various artificial means of procuring sleep, such as opiates, soporifics, but they should be cautiously and sparingly given, as they cannot be employed for any length of time without constitutional inconvenience, and even danger of apoplexy and the different kinds of paralysis. Air, exercise, wholesome diet, and regular habits will best insure sleep in its natural form, for, as the bard of Avon says:—

> " ——— Weariness
> Can snore upon the straw, when resty sloth
> Finds the down pillow hard."

Sleep is repelled and interrupted by a variety of circumstances, as noise, light, sleeping in a new apartment, having slept during the day, or just before going to bed, repelled perspiration, from too great a weight of bed-clothes, mental disquietude, over-exertion, the nightmare, deficiency of muscular action, drinking tea, coffee, or any thin or weak liquor immediately before going to bed, &c. But the more common causes of disturbed and restless sleep, frightful dreams, &c., and which are often erroneously ascribed to the vapours and other unfounded causes, arise either from the defective state or the derangement of the functions of the digestive organs, or are occasioned by the use of heavy suppers, malt and other fermented liquors, just before retiring to rest; in which last-mentioned case no rest can be obtained until the first stage of digestion has been performed, and the stomach relieved from its crudities. "In a great proportion of the sudden deaths which are continually happening," says the learned author of "The Manual for Invalids, "two-thirds at least are found dead in their bed in the morning. In those cases the victim is prevented from relating a detail of his sufferings or his opinion of their cause; but a large proportion of cases of gout, asthma, hæmorrhoids, apoplexy, and many other diseases, may be fairly attributed to late and heavy suppers, for they happen so often among that class of persons who give themselves this indulgence." This remark is deserving of serious attention by the lovers of good cheer at unseasonable hours. Though digestion is favoured by a state of repose, and increased energy is given to the circulation by the concoction of the food being allowed to proceed uninterruptedly, yet the habit or custom of indulging in diurnal sleep or taking a nap, as it is called, after dinner, should be avoided by every one in good health, and not aged, or who is of a plethoric habit of body; for when a person is in a recumbent posture, and the stomach is distended with food or aliments, it is apt to press on the great blood-vessels, by which too much blood is thrown on the brain, and thus plethoric headache or apoplexy is sometimes occasioned." When habit, however, has rendered the custom of napping after dinner almost natural, or where nature, from extraordinary fatigue or want of rest during the preceding night, requires some refreshment, an afternoon nap may be indulged in, provided that it is taken in a sitting posture with the body inclining towards the back of the chair, and a little turned to the left side, with the feet raised by means of a stool about four or five inches from the ground. Care also should be taken that all those parts of the clothes, which are likely to prevent the circulation of the blood, be removed, and the body should be well covered, by putting on a great-coat, or some external covering, in order to defend it against catching cold, and prevent it from becoming chilled, and the circulation checked. The same indulgence, provided it is not carried to excess, and is not likely to break or interrupt their rest during the night, may also be taken by the infirm, the delicate, the sickly, the careworn, or those whose bodies are enfeebled or enervated by the relaxing influence of the weather. Persons advanced in years may advantageously sleep a little after dinner, that the heat of their bodies, which is weak and feeble, being internally concentrated, may enable the digestion to perform the better. It has been said that "the most complete and healthy sleep that can be taken in the day, is in summer-time out in a field." It must, however, be recollected, that though the sensation of slumbering on the grass or hay is exceedingly pleasurable, yet it, as well as falling asleep on a garden bench, and the like, may be attended with injurious consequences. Neither should we ever suffer ourselves to "take a foretaste of repose, a relishing snatch of slumber," before we go to bed, lest it should diminish the chance of getting sleep for a considerable part of the night. (See also page 364.)

Snake-bites.—As many as 8,000 persons die annually in British India and Burmah from the effects of snake-bites. The inspector of police to the Bengal Government has reported that of 939 cases in which ammonia was freely administered, 702 victims recovered, and in the cured instances the remedy was not administered till three and a half hours after the attack, on the average. In the fatal cases, the corresponding duration of time was four and a half hours.

Snuff.—In our article on tobacco some hints will be found on taking snuft; but, in addition to the evils already enumerated, there are others arising from the chance of obtaining adulterated snuff. (See *Adulterations.*)

Soap.—Soap is what the chemist calls a salt, formed by adding soda or a quantity of potash to stearine or oleine. The addition of soda makes the hard, that of potash makes the soft, soap. Of these two soaps one is soluble, the other insoluble; of the latter diachylon plaster is an example, for although it is made of lead and oil the chemical action is the same as that occasioned by the addition of soda to oleine. The addition of lime to soap renders it insoluble, as may be seen by using soluble soap with hard water, or water containing lime. With hard water soft soap is used. Curd soap, which is generally made from palm oil, is one of the best kinds of washing soap. Mottled soap, brown soap, and other kinds are made of coarser materials —fats and resin, which contains an acid, combining with soda. Scented soaps are made by the introduction of scent.

Glycerine soap by the addition of a quantity of glycerine after the soap has been made. Soft soaps are not so pleasant to use for cleaning the skin, but, potash being a more vigorous detergent than soda, they act with greater efficacy in getting up a strong lather. Soap acts by removing the grease from the skin, and with it the dirt it has accumulated. Too frequent washing with soap has the effect of rendering the skin rough, and more liable to catch the dirt, as it acts upon the little epidermal scales (see *Rough Hands*). This is more especially the result of using soaps which are highly alkaline, such as brown soap. The harder the soap the better for those who wish to have nice clean white hands, although it requires patience in use. The brown Windsor soap now sold is said no longer to resemble the purified soap, coloured with caramel, which made the title famous, but brown and imperfectly defecated bone-grease, which retains its dark colour, and of which the bad odour is concealed by perfume. A gentleman, writing, says the *British Medical Journal*, under the initials "W. W.," gives the following account of its effects:—"I have, while using such shaving-soap, thrice suffered from eczema of the face. On the first occasion I derived no benefit from treatment by the two most celebrated dermal surgeons in London; and at last the disease went away of itself, after giving up shaving for a time. I had by me a quantity of this brown soap, and, through inadvertence, took to using it again, for a time without effect; but when dry and hot weather came, with it came a recurrence of the skin disease, which also again, after some months of discomfort, went away. Curious to make sure whether or not the soap was the real cause, I a third time employed the soap deliberately to see if the eczema were due to it. I was in excellent health, and in about three weeks I found the disease re-established, so that I think the soap must be viewed as the culprit." Bars of soap should be cut into pieces when purchased, and kept in the air two or three weeks, then put on a shelf, with a space between each piece, and allowed to grow hard. This plan will save a full third in the consumption. The best time for purchasing soap is in the cold weather, when its manufacture is usually conducted.

Toilet Soap. — The soft fancy soaps are divided into two sections, namely, the pearl soap, which differs from the other both in the mode of preparation and in physical properties. Good potash soap, coloured and scented in various ways, forms the basis of the soft soaps of the perfumer. Pearl soft soap or almond cream is prepared in the following way:—Weigh twenty pounds of hog's lard and ten pounds of pure potash; put the lard into a glazed china or earthenware vessel, gently heated upon a sand bath, stirring it constantly with a wooden spatula, and when it is half melted and has a milky appearance pour into it one-half of the lye (the potash, it is supposed, has been already dissolved in water and passed through quicklime), still stirring and keeping up the temperature as equally as possible; after an hour or so we shall perceive some fat floating on the surface like a film of oil, and at the same time the soapy granulation falling to the bottom; we must then add a second portion of the lye, whereon the granulations disappear, and the paste is formed. It must, however, be boiled quite three hours or more, when it will become a stiff paste; after cooling gradually, it is to be pounded strongly in a marble mortar, along with the essence of bitter almonds, when it will be fit for use.

Hard Toilet Soap.—The soaps prepared for the perfumer are separated into different species, according to the fat which forms their bases. Thus there is a soap of tallow, of hog's lard, of oil of olives, of almonds, and palm oil. The mixture of these various kinds, differently scented, forms the numberless varieties sold under so many names.

WINDSOR SOAP is made by mixing nine parts good ox tallow and one of olive oil, scented with the oil of carraway, oil of lavender, and oil of rosemary in the following proportions :—

Hard curd soap, as above	...	100 ounces.
Oil of carraway	... ...	1 ,,
,, of lavender	... ...	¼ ,,
,, of rosemary	... ...	¼ ,,

SOAP À LA ROSE contains the following ingredients :—

Olive oil soap ...	... ...	30 pounds.
Good tallow soap	... ...	20 ,,
Finely-ground vermilion	...	1½ ounce.
Essence of rose	... ...	3 ounces.
,, of cloves	... ...	1 ,,
,, of cinnamon ...	...	1 ,,
,, of bergamot ...	...	2¼ ,,

The hard soaps are to be kept at the heat of boiling water for about an hour with five pounds of water in an untinned copper pan, the vermilion is then added, and when taken off the fire the essences mixed well with it by stirring them together. This is a very perfect soap, possessing a delicious fragrance, a beautiful roseate hue, and the softest detergent properties, which keeping cannot impair.

SOAP AU BOUQUET.—

Good tallow soap	... ...	30 pounds.
Essence of bergamot...	...	4 ounces.
Oil of cloves, sassafras, and thyme, each ...	... ...	1 ,,
Brown ochre (colour)...	...	7 ,,

CINNAMON SOAP.—

Good tallow soap	... ...	30 pounds.
Palm oil soap...	... ...	20 ,,
Essence of cinnamon	...	7 ounces.
,, of sassafras	...	1¼ ,,
,, of bergamot	...	1¼ ,,
Yellow ochre (colour)	...	1 pound.

ORANGE FLOWER SOAP.—Tallow and palm oil soap as before, to which add—

Essence of orange-flowers ...		7½ ounces.
Ambergris ...	... ...	7½ ,,
Colour { Chrome yellow ...		8 ,,
{ Red lead ...	...	2 ,,

MUSK SOAP. — Tallow and palm oil soap as before, to which add—

Powder of cloves, roses, gilly-flowers, each	... ...	4 ounces.
Essence of bergamot and of musk...	... ...	3¼ ,,
Brown ochre (colour)	...	4 ,,

BITTER ALMOND SOAP is made by compounding fifty pounds of the best curd soap with ten ounces of the essence of bitter almonds.

TRANSPARENT SOAP. — Equal parts of tallow soap made perfectly dry and spirits of wine are to be put into a copper still, which is plunged into a water bath ; the heat applied to affect the solution should be as slight as possible, to avoid evaporating too much of the alcohol; the solution being effected, it must be suffered to settle, and after a few hours' repose the supernatant liquid is drawn off into tin frames of the form desired for the cakes of soap. These do not acquire their transparency till after a few weeks' exposure to a dry atmosphere ; they are coloured by a strong alcoholic solution of archil for the rose tint, and of turmeric for the deep yellow. Transparent soaps, however pleasing to the eye, are always of indifferent quality ; they are never so detergent as ordinary soaps, and they eventually acquire a disagreeable smell.

CASTILE SOAP is made of the coarser kinds of olive oil and soda, the colour being given as described under marbled soap.

COCOA NUT OIL SOAP is similar in its general properties to ordinary palm soap, but has others of a remarkable kind, besides its dissolving with extreme rapidity. It will wash linen with sea-water, hence it is often called marine soap, and is much bought for ships' use.

Soap-suds.—Few persons know how valuable soap-suds prove when used as a manure. Applied to the roots of vines, fruit trees, &c., it imparts a vigour and rapidity of growth which is surpriring. No one who is lucky enough to have a garden ought to have the soap-suds wasted.

Soda, or the fossil alkali, is sometimes found in a native state, as in the lakes of Natron, in Egypt, which are dry in the summer season, the water leaving, after evaporation, a bed of soda, or, as it is there called, natron, of two feet in thickness, which is dug out with iron crows for sale. Such as is not obtained from this source is procured from the ashes of sea-weeds, and certain plants that grow on the seashore. These vegetables are thrown together in heaps and burnt; the ashes are then collected, and treated in the same way as wood-ashes for obtaining the vegetable alkali. When it is obtained from the sea-weeds, as sea-wrack, or tang, which are different species of fucus, the salt is called kelp. When obtained from a plant called barilla, which grows in great perfection on the Spanish coast, the salt is also called barilla. There are several other vegetables which afford the mineral alkali, as *Salsola kali* (prickly salt-wort), the genus *Chenopodium*, and also the *Atriplices*. By softening the water used for washing soda saves a considerable amount of soap. In using it, the better plan is to melt the soda in a large jug, and add it to the water in the tubs and boiler from time to time to preserve its strength. For coarse washing soft soap is far more economical than that sold in the bar, half the quantity being sufficient. (See *Washing*, page 389.) As will be seen in various sections of this little book, soda plays important parts in the manufacturing arts and in domestic matters. A weak solution of soda is excellent for cleaning wine-bottles and casks. It is useful for cleaning copper cooking vessels, and for utensils of tin and iron. Dairy utensils, when they become foul in summer, can be most effectually cleaned with soda. The crystals of soda play their parts in medicine, and a weak solution of soda is an excellent gargle for cleansing the mouth and throat in certain cases of disease. (See *Soap* and page 390.)

Soils.—The chief part that soils play in the growth of plants is to support the vegetable at its root with sufficient firmness, and to supply it with a proper quantity of water; besides which it should contain charcoal, or coaly matter, and certain salts in small proportions. From this it appears that a good soil should be sufficiently porous to allow the roots to strike freely, and to suffer the superfluous water to drain off, but at the same time close and compact enough to hold the roots firmly, and prevent the water draining off too fast. This is only to be obtained by a mixture of lime, clay, and silex or sand in due proportion; for these earths retain the water in very different proportions, and form soils of various degrees of compactness, according to their proportions. The soils most frequently met with are clay, chalk, sand, or gravel, clayey loam, chalky loam, sandy loam, gravelly loam, ferruginous loam, and boggy or heathy soil, or, as it is often called, mountain soil.

CLAY is of very different colours, white, grey, brownish red, brownish black, yellow, or bluish. It feels smooth and somewhat unctuous; if moist, it adheres to the fingers and is ductile. If thrown into water, it gradually diffuses itself through it, and then slowly subsides. Usually it does not effervesce with acids unless a strong heat be applied. If heated it hardens, contracts in all its dimensions, and, when burnt, becomes perfectly hard, as in bricks. It consists of alumina (pure clay) and sand, with a small proportion of calx of iron, which gives it its colour. The proportion of pure clay varies from 20 to 75 per cent., and is separable from the sand by boiling in strong sulphuric acid.

CHALK, if tolerably pure, is of a white colour, moderate consistence, and dusty surface; stains the fingers, adheres slightly to the tongue, and does not harden, but burns to lime when heated, losing at the same time four-tenths of its weight. It effervesces with acids, and is dissolved entirely therein.

SAND is small loose grains of great hardness, not cohering when wet. It is generally silicious, and therefore insoluble in acids.

GRAVEL differs from sand chiefly in the size of its particles; but calcareous stones, when small and rounded, are often comprehended under the same term.

LOAM denotes any soil moderately cohesive, that is, less so than clay, but more so than loose chalk, and consists of clay and sand with sometimes chalk.

CLAYEY LOAM is that in which clay predominates, and is by farmers generally called strong, stiff, cold, or heavy loam, according to its character.

CHALKY LOAM is a mixture of clay, sand, and chalk, the latter being in greater proportion than it is ever found in clayey loam.

SANDY LOAM, in which sand, partly coarse and partly fine, forms from eighty to ninety per cent., is less coherent than either.

GRAVELLY LOAM differs from the last in containing coarser sand and pebbles. This, with the two last soils, are termed by the farmers light and hungry soil.

FERRUGINOUS LOAM, or tile, is of a dark brown or reddish colour, much harder and heavier than the other loams. It consists of clay and the calces of iron more or less intimately mixed.

BOGGY SOIL consists chiefly of ligneous particles, being the roots of decayed vegetables mixed with argillaceous earth and sand, and a coaly substance derived from decayed vegetables. (See also *Magnesia.*)

Of the various soils above described, some are much better adapted to support vegetation than others. Some are too stiff and too little retentive. Whatever will meliorate the soil in these particulars is called a manure; and different soils, of course, require different manures. Those substances, too, that improve the soil by supplying coaly matter and certain salts, as dung and composts, are termed manures; but all soils require this kind of manure when exhausted of their nutritious principles. Paring and burning the land improves the soil, by reducing to ashes the old roots, and thus affording the same nutriment to fresh vegetables as is supplied by dung or other compost. Burnt gypsum and quicklime answer the same, by aiding the putrefaction of the old grass and dead vegetables. The first object must be to ascertain in what particular any soil is deficient, and the next to discover a manure that abounds in the particular earth required. To ascertain precisely the composition of a soil requires a great deal of chemical knowledge; but for common purposes a sufficient degree of accuracy will be obtained by attending to the discriminating qualities of the different soils that has been given in describing them. The chief substances employed as manures are chalks, lime, clay, sand, marl, and gypsum. The particular earth in which they are distinguished may be learned by attending to that description. The situation of the land will make some difference in the proportions of the different earths requisite to form a fertile soil. On a declivity, for instance, the soil requires more clay than on a plain. In a very rainy country, again, a lighter and more sandy soil is necessary than where there is less rain. In the rainy climate of Turin, the most fertile soil has from 77 to 80 per cent. of silicious earth, and from 9 to 14 of calcareous; whereas in the neighbourhood of Paris, where there is much less rain, the silex bears only the proportion of from 46 to 50 per cent. in the most fertile parts. The following observations will serve as general rules for the adaptation of manures to the soils:—Clayey soils require calcareous earth for a manure, in a form that is best fitted for opening the texture of the soil, and making it less retentive of moisture. For this purpose nothing answers so well as marls, and of these a gravelly marl—or, as it is called by some, a limestone gravel, which is a marl mixed with lumps of limestone—is the best; calcareous marl is next in goodness; next the silicious; and, lastly, the argillaceous. Where these manures cannot be had, a mixture of coarse sand with lime or chalk; and if these are not to be procured, coal ashes, chips of wood, burnt clay, coarse brick-dust, gravel, or even pebbles, will prove useful. Clayey loams may be defective either in calcareous ingredient or the sandy, or in both. If in the first, the proper manure is chalk; if in the second, sand; and if in both, silicious marl, limestone gravel, or marl lime and sand. There is a limestone found in Yorkshire and some other counties called by the farmers hot lime, which if used in the same quantities with common lime is very injurious to vegetation. It has been lately examined, and found to contain a large proportion of magnesia. This magnesian limestone is easily distinguished from that which is partly calcareous by being much more slowly dissolved in acids, even the softest kind being much longer in dissolving than marble. A chalky soil wants both clay and sand, or gravel, therefore the best manure for it is a clayey or sandy loam; but when the chalk is so hard and so difficultly reducible to powder as to keep the soil sufficiently open of itself, then clay is the best manure. Chalky loam, or light limestone soils, which do not differ from them essentially, require clay or argillaceous marl. The best manure for sandy soils is calcareous marl; the next best is argillaceous marl; and next to these clay mixed with lime, or calcareous or argillaceous loams. Lime or chalk are less proper, as they do not give sufficient coherence to the soil; but when mixed with earth or dung they are very well. Sandy loams are most benefited by calcareous or argillaceous marls, or by chalk for a first and clay for a second dressing. Boggy soils after draining generally require burning; and as they are mostly clayey, they should have limestone gravel, or lime mixed with coarse sand; but if, as sometimes happens, they are sandy, lime or calcareous marl may be required. The above are to be considered only as general rules; and as the soils partake more or less of the nature of those described, the manures must be selected that correspond more or less with those recommended.

Soldering Zinc.—Zinc may be easily soldered by the following method:—Procure a small soldering-iron, or, as it is more properly called, a copper-bit; a piece of sal-ammoniac, a small quantity of muriatic acid, and a piece of soft solder. Having laid the pieces of zinc together as they are to be joined, draw the muriatic acid along on the zinc, with a piece of wood or a small brush, to the width of a quarter or half an inch. Now, having heated the copper-bit so that it will melt the solder easily (it should not be made too hot, or it will burn a hole in the zinc), place the point upon the sal-ammoniac, and apply the solder, some of which will adhere to the copper. Now take the solder and drop a small portion upon the proposed joint; draw it along in a fluid state; and it will be found that, when cold, the two parts are firmly united. The superfluous acid should be wiped off the joint with a piece of rag.

Soles en Matelote Normande.—Skin and cut off the fins of a very fresh sole, take out the bone, and put in its place the following mixture:—Chop separately, very fine, about a dozen mushrooms, several leaves of parsley, an done shallot; put these ingredients into a stewpan, with two ounces of fresh butter, a little salt, pepper, and some powdered spices. Stir them on the fire five or six minutes, till the herbs are done; then break two eggs, and put the yolks to the herbs; put them on the fire about half a minute, and then lay them in a plate to cool. When quite cold, put some of the mixture inside the soles in place of the bone, as before mentioned. Next lay the soles in a dish or saucepan, moisten with a glass or two of white wine (one glass for each sole), powder the fish with a little salt and pepper, and cover them with buttered white paper to prevent the soles getting brown. Put them in the oven for a quarter of an hour, or longer according to the size of the soles. Observe, when this matelote is too much done, it is good for nothing; the strictest attention is therefore requisite to have it in perfection.

Sorrel Sauce.—Take two quarts of sorrel leaves, pick and wash them clean; put these into a stewpan with one ounce of butter, cover close, and put it over a slow fire for a quarter of an hour; then rub through a coarse hair sieve, season with pepper, salt, mustard, and a small lump of sugar. Squeeze in the juice of a lemon, and make the whole thoroughly hot. This will be found very nice with roast veal.

Soup a la Julienne.—Shred some carrots and turnips rather fine, divide two or three heads of celery, two or three onions, and a bunch of leeks into pieces an inch long; put about two ounces of butter into a stewpan; and lay the vegetables on the top; fry the whole over a slow fire, stirring gently all the while. When a nice brown, moisten the vegetables with veal or chicken broth; season to taste, adding a lump of sugar to take away the bitterness of the vegetables; let the soup simmer over a slow fire or on a trivet till the vegetables are done. A little gravy added during the boiling is an improvement. A few mushrooms may be added if liked.

Soup, Superlative.—This is the name given to a soup strongly recommended by Dr. Kitchener:—"Take about nine pounds of the leg-of-mutton piece of beef, cut it into pieces of three or four ounces each; put four ounces of beef dripping, and a couple of large onions chopped very fine, into a large deep stewpan, which must hold at least two gallons, and let them fry about five minutes. Then put in your meat, and add by degrees three-quarters of a pound of flour, and stir it well together about five minutes; pour in about six quarts of boiling water, and keep stirring it till it boils. Take all the scum carefully off, and put in two tea-spoonfuls of ground black pepper, and two of ground allspice, with salt to your taste. Let these simmer together for three hours and a half. Take the meat out, and when it is cold cut it into pieces about an inch by half an inch each. The above will make eight quarts, and will furnish a substantial meal for sixteen people."

Soups.—Great richness may often be given to soups by the addition of fried cucumbers.

Souse Pudding.—Take the weight of two eggs in flour and ditto in sugar, beat them together until the froth comes, adding the flour when they are quite ready to put into the oven. Bake in cups, and strew sugar over them.

Spanish Sauce.—This is made of slices of ham and veal seasoned with mushrooms, green onions, and parsley "sweated" down and strained. When it is done enough remove it to a second stewpan, which is to be placed in a kettle of boiling water. Season it with pepper and salt, and skim it without removing the parsley. It must not be too thick.

Spa-water.—Dissolve two grains of sub-carbonate of soda, four grains of sub-carbonate of magnesia, one grain of sub-carbonate of iron, and one grain of common salt, in twenty and a half ounces of soda-water, and proceed as for seltzer-water. (See also *Mineral Waters.*)

Specific Gravity.—To take the specific gravity of a solid body heavier than water, hang it to the bottom of a scale-pan by as fine a thread of unspun silk as will safely carry it; now weigh it accurately, while hanging in the air, and afterwards place in a tumbler of water, and see how much it weighs when completely immersed in water. Then divide the weight in air by the difference between the air and water weighing, and the result will be the specific gravity.

Specific Heat.—Different bodies are susceptible to the effects of heat in different degrees; a greater supply of heat being required to raise the temperature to a given degree in one than in another. Thus to raise water from a temperature of 50° to that of 60° will require a fire of given intensity to act upon it thirty times as long as would suffice to raise the same weight of mercury to the same temperature. Therefore the quantities of heat necessary to produce the same degree of warmth in bodies of equal weight are called the *specific heats* of such bodies. The specific heat of a body changes with its density, increase in the latter diminishing the former. Hence we find certain metals, when undergoing the process of hammering, to increase their density, grow hot, but they cannot afterwards be strongly heated by the same means unless the metals are previously introduced into a fire. If air be squeezed into a small compass it becomes so hot that it can be made to ignite tinder, and hence, also, the discharge of an air-gun in the dark is said to be accompanied by a flash of light. On the other hand, the reader may remember, from our remarks on the atmosphere (see page 31), that as air expands it grows colder.

Spectacles.—Near-sighted persons are those in whose eyes the cornea or white is unusually convex, to counteract the visual effect of which double *concave* glasses (glasses hollowed on either side) are worn. As the cornea flattens with age, time remedies the defect of near sight more or less. Far-sighted people, on the contrary, are those in whose eyes the cornea is too flat, so that near objects are not seen so distinctly as those which are farther off. To remedy this double *convex* glasses (glasses curving outward on either side) are worn. Hawks' eyes have the power of flattening the cornea at will by the action of a muscle, so that they discern very near and very distant objects equally well.

Spermaceti is used for candles, and hundreds of thousands of tons of it are imported for that purpose every year. With yolk of egg it forms a very pleasant mixture for coughs and colds.

Spices and Condiments.—The term *spices* is applied to certain vegetable products which are highly aromatic or pungent, or both aromatic and pungent. For their uses as articles of food see *Diet* and *Cooking*. Foreign spices should be used with food in moderation, especially black pepper, all spice, nutmeg, and cloves. It is generally safer to exclude them from the diet of the sick.

Spinach Cream.—Beat the yolks of eight eggs with a wooden spoon or a whisk, sweeten them a good deal, and put to them a stick of cinnamon, a pint of rich cream, and three-quarters of a pint of new milk; stir them up, and add a quarter of a pint of spinach juice. Set it over a gentle heat, and stir it one way constantly till it becomes as thick as hasty-pudding. Put into a custard-dish some Naples biscuits or preserved orange in long slices, and pour the mixture over them. It is to be eaten cold.

Spinach in Consommé.—Boil the spinach in the usual manner, then roll it up into balls, and stew it briskly in veal broth well seasoned, adding sufficient nutmeg in powder to cover a sixpence, and a tea-spoonful of chilli vinegar. Spinach dressed in this manner is an enjoyable accompaniment to veal or boiled mutton. With roast meat it is best served plain.

Spinach Omelet.—Take a quarter of a pound of spinach, the same quantity of beets, half an ounce of parsley, and half an ounce of mixed leeks and lemon-thyme. Chop the herbs together, and season with pepper, salt, and nutmeg. Then add a large table-spoonful of flour, four table-spoonfuls of milk, four eggs well beaten, and two ounces of butter melted. Melt the whole well together, and bake in a quick oven for twenty minutes.

Spirit of Lemon-peel.—Essential oil of lemons, one drachm; rectified spirit of wine, two ounces. A few drops of this will give the flavour of fresh lemon-peel to anything for which it may be required. From one to two table-spoonfuls of this will be sufficient to convert a tumbler of water into lemonade.

Splinters, and Dust in the Lungs.—A splinter or thorn in the flesh produces local inflammation, and in some cases foreign substances of this nature make their way into the system. Spikes of corn, and more especially those of wild barley taken incautiously in the mouth, may reach the lungs, and give rise to more or less serious affections of these organs, in some cases even endangering life. The breathing of air impregnated with the following kinds of dust may give rise to alarming symptoms of inflammation of the chest—dust of mills and granaries when swept into the air, or that of barns in which corn is being threshed; dust falling from trees during the operation of pruning them, or from trees invested with the processionary and some other hairy species of caterpillars (see *Insects*); the dust swept from worm-eaten wood; the down from certain plants, &c. It is of course impossible always to guard against such accidents as these, but knowing their nature is one of the steps towards avoiding them. (See *Lungs.*)

Sponges.—To keep these soft and white, wash them in warm water with a little tartaric acid in it, and then rinse them in cold water. Take care not to put in too much tartaric acid, the effect of which would be to corrode the sponge.

Sprat Powder.—Remove the heads and intestines from the sprats, put them in vinegar, add a little suet and allspice, bake for two hours, and rub them through a hair sieve. The sprats are made into paste with dried flour, rolled out thin, then dried and reduced to a fine powder.

Spring Soup.—Boil a shin of beef to rags for ten hours with only enough water to souse it; at the same time put in four or five carrots and half a dozen onions and celery; then strain it well. This should be done the day before you make your soup; then add three handfuls of young peas, two bunches of celery cut small, six onions, a small cauliflower, some young spinach, and a dozen carrots likewise small. Salt to your taste.

Spruce Beer Powders.—For a glassful, one drachm of loaf sugar, eight grains of essence of spruce, one scruple of bi-carbonate of soda, and one grain of essence of lemon; dissolve this in a glass one-third full of water; put half a drachm of tartaric acid in the same quantity in another glass, mix the two together, and drink while it is effervescing. The first of these mixtures may be packed in blue papers, and the latter in white.

Staining.—In addition to the processes we have given for staining wood, that of dyeing with Judson's simple dyes may be mentioned. (See *Dyeing.*)

Stains.—Mixture for Removing Ink-Stains.—Take an ounce of sal-ammoniac (or hartshorn) and an ounce of salt of tartar, mix them well, put them into a pint of soft water, and bottle it for use, keeping very tightly corked. Pour a little of this mixture into a saucer, and wash in it those parts which have been stained with ink, mildew, fruit, or red wine. When the stains have by this process been removed, wash the article in the usual manner. Another stain-mixture useful for removing ink-spots, is to dissolve half an ounce of oxalic acid in a pint of soft water, then bottle and cork it for use, shaking it well. To use it, stretch the ink-stain over a bowl of hot water, and rub it with a sponge dipped in the oxalic solution. Then wash and dry it.

Stains.—To Extract Lamp-oil from a Floor.—Take some fuller's earth; scrape it into a powder with a knife. Pour some warm water on the boards which are greased, and then lay on the fuller's earth, mixing it into a paste, and plastering it over with a flat piece of stick. Let it remain on for a short time, then remove it, and repeat the operation. Two days after repeat the process, and persist until the oil is entirely removed. Then let the place be scrubbed in the usual way.

To Remove Medicine Stains from Silver Spoons.—These stains (even muriate of iron) may be removed by rubbing the spoon with a rag dipped in sulphuric acid, afterwards washing it in soap-suds, and then cleaning it with a little whitening in the usual way. Sulphuric acid must, of course, always be used very carefully (see pp. 3 and 365).

To Remove Fruit or Wine Stains from Table-linen, &c.—A wine-stain may sometimes be removed by rubbing a little common salt over the place, or a little salts of lemon (to be obtained at any chemist's); apply it to the spot with the finger, after stretching the part over a pewter pot, and holding it down on it with the left hand. Another way is to tie up a little cream of tartar in the stained part (so as to form a bag); and then put the linen into a lather of soap and cold water, and let it boil for an hour. Then put it in lukewarm water, washing and rinsing it well, after which it may be hung out to dry. Port-wine stains may frequently be removed from silk or linen by putting over the place a little sherry wine. Fruit-stains may be removed from silk by wetting them with hartshorn diluted with a little water. By repeating the process several times, the stain will disappear. If the hartshorn will not remove the stains from black silk, nothing better can be done than to apply a little ink laid on with a camel's-hair brush.

Tried Methods for Removing Grease and Stains from Woollen Goods.—Cover the spots with fuller's-earth made into a paste with a little water, repeating the operation until the grease comes out; or you may remove the spots by applying a little turpentine put on with a sponge. To the stains you may apply hartshorn with a little water.

Shawls.—After washing a woollen shawl, take care to pull and stretch the fringe well while drying. After ironing, the appearance of the shawl will be improved by folding it smoothly, and pressing it for a few days between a bed and mattress or sacking. It may not be out of place here to advise our readers in buying a plaid or tartan shawl to avoid choosing one with white in it; for even the smallest portion of white (for instance, two or three threads in the pattern) will, by immediately showing the dust, soon give the shawl a dirty, dingy appearance.

Stair Carpets, to Preserve the Edges of.—The edges of stair carpets wear out before other parts, on account of the extra friction to which they are subject. To prevent this, strips of brown paper should be pasted over the edge of every stair, before the carpet is laid down. The friction of the carpet against the boards beneath will thus be considerably lessened, and the carpet will last twice as long as it otherwise would. The strips should be within an inch or two as long as the carpet is wide, and about four or five inches broad.

Stale Cake.—If you have a sweet cake that is a little stale, shut it up closely in a box, and put it before a fire about an hour before it is required for tea, turn it round occasionally, and do not place it so near the fire as to scorch the wood. If the cake is large, cut it into slices.

Starch.—As the price of starch varies, it may be worth while to hint that in a warm, dry closet it will keep good for some years.

Star-gazy-pie, a Favourite Cornish Dish.—Take of herrings, mackerel, or almost any fish in its season, of sufficient quantity to fill a moderately-sized pie-dish—say half-a dozen or eight fish, if of mackerel or herrings. Scale and clean them carefully, and bone them as if for baked or soused mackerel, removing the backbone and every vestige of bone possible, of course taking care not to leave the silver thread. Then wash them well in cold salt and water. Dry on a clean cloth, and spread them open on your board; then season them well with cayenne and salt, and a good sprinkling of finely-chopped parsley; place on each fish a piece of butter the size of a walnut, and roll each up neatly and carefully. Shake over the bottom of your pie-dish a thick layer of finely-grated bread-crumbs, and then proceed to arrange your fish in the dish. Strew over them more bread-crumbs, then another layer of fish, and above your second layer of fish more bread-crumbs. Have ready a few slices of very fat bacon cut thin, or the fat from a ready-dressed ham, with which cover your fish. Add a couple of table-spoonfuls of good Tarragon vinegar, then beat up six or eight eggs according to the size of your dish or number of fish; let them be beaten to a good froth and poured over all. Cover with a tolerably good crust, and bake in a well-heated oven. Three or four of the heads of the fish should be arranged, mouth uppermost, in the centre of the lid of the crust, as pigeon's legs are in a pigeon-pie, and when finished baking a small sprig of green parsley in the mouth of each fish by way of garnishing. The name of star-gazy is given because the fish are supposed to be gazing upwards towards the sky, or stars, for this is usually a supper dish. Some people prefer, when it is possible to be procured, a little cream added to the eggs; in that case the Tarragon vinegar had better be omitted. No oyster patties can surpass this dish, if rightly made.

Steel, to Engrave on.—Cover the steel with bees'-wax in every part, and on this write with a clean quill pen, so as to lay bare the metal. Cover the article entirely with a strong solution of sulphate of iron, in which it must remain about ten minutes. The deeper you wish the letters, the longer must be the action of the sulphate.

Steel, to Make it Blue.—Dissolve four ounces of hyposulphite of soda in a pint and a half of water, put the steel into this, and gradually heat it to the boiling-point. This can also be done by suspending the article over burning charcoal.

Stencilling. — Lay the drawing you wish to copy over a sheet of paper, and with a needle prick all the outline over with holes through both the papers; then take the clean paper you wish to have the design transferred to, and dust over with the powder of charcoal from a small muslin bag. The dust will penetrate through the holes, and leave a correct copy of the original upon the paper. This pricked paper will do again for any number of copies.

Stewed Chop or Cutlet.—M. Soyer recommends that the chop or cutlet should be put into a stewpan or small saucepan with a pint of water and a little sugar and salt. It should be allowed to stew as gently as possible for an hour and a half to two hours. The scum and fat should then be removed by skimming, and the chop and broth both sent to table. The broth should be reduced to half a pint.

Stewed Steak and Spanish Onions.—Take two moderate-sized Spanish onions, remove the outer coats, and roast or bake them with one ounce of butter cut in bits to each, turning them from time to time; try them with a fork, and when soft, and of a nice brown, take them up and set them aside to keep warm. Then dredge as much steak as you require with flour, and lay it in a deep earthen pan, if you have an oven, or in a stewpan if you cook it over the fire, and add the butter the onions were roasted in. Let it remain baking or stewing for ten minutes, when it will be nicely browned. Now add a tea-cupful of walnut or mushroom câtchup, and a pint of boiling water (this would be the quantity for two pounds of steak), or better, stock broth, if you have it, but the water will do well enough; twelve berries of allspice, and a little cayenne pepper. Set it in your oven to bake slowly, or tie a paper over and send it to the baker. It will take from half an hour to an hour, according to the thickness of the meat and the briskness of the oven. It should be done very slowly, but not too slackly. When done, lay the meat in a hot deep dish, pour all the gravy over it, and take off the outer rind of the onions, divide them, and lay several portions nicely over the meat.

Stinging Nettles.—In the event of your being stung by incautiously touching these plants, rub the parts affected with bruised dock-leaves, which are generally to be found in the immediate vicinity of the nettle.

Stockings.—We give here some plain directions for knitting a stocking, which we are sure will give satisfaction. The writer says, "In the first place, be careful in choosing your yarn. Take it between the fingers at a short length, and give it a strong pull; if good it will not break, and when bad it divides like tinder. The best colour we find is the common light greyish-brown, which is sold at the fancy shops at from 4s. 6d. to 5s. per pound. It takes about half a pound for one pair, four knitting pins, No. 14, measured by Chambers's bell gauge, which may be purchased at Helbronner's, Regent Street, for 1s. Cast on 112 stitches on one needle, divide them on to three, knit 27 rounds ribbed, that is, two plain and two purl alternately. 28th round knit 17, purl two, knit two, until only seventeen stitches are left on the needles, which knit plain; 29th, 30th, and 31st the same as 28th; 32nd, knit 17, knit two, purl two alternately, knit 17, last plain; 33rd, 34th, and 35th the same, this you will find forms a honeycomb; continue these eight rows, until you have 35 patterns, then commence the intakes for the calf of the leg; intakes are made by taking two together, knitting two stitches, take two together at the beginning of the row, and the last four stitches knit two together, knit two, continuing the pattern for the front of the leg.

3 intakes	with	4 rounds	between each.
4	do.	5	do.
4	do.	6	do.
3	do.	7	do.
3	do.	8	do.

This makes 34 altogether, 17 on each side of the seam, and reduces the stocking to 78 knit, 72 rounds, all honeycomb for ankle. Divide the stitches, placing 19 on each side of the seam for heel, and 39 divided of two pins for front of foot; knit 35 rows plain, and purl rows alternately for heel when finished, knit 20, take two together, turn back, purl two, purl two together, turn back, knit three, knit two together, turn, purl four, purl two together, continue thus knitting or purling one more stitch every row until only 19 stitches are left on the needles; having finished the heel proceed to pick up 24 stitches at the side edge of the 35 rows, beginning at the left side with the needle on which the heel-stitches are, knitting them as you take them up. With the fourth needle work off all the stitches on the two front needles, of course following the honeycomb pattern; now pick up 24 stitches on the right side of the heel, and with the same needle work off nine stitches from the first heel needle, which divides the heel. The stocking is now ready for working the gusset; knit round again to the right-hand side of the back of the foot, knit the first two stitches, slip the third, knit the fourth, and pull the slipped stitch over. On the left-hand needle knit all but four, which slip one, knit one, pull the slipped stitch over, knit two. Knit one plain round between the intakes, continue these two rounds until you have only 19 on each heel needle, when knit 67 rounds honeycomb for front of foot, and plain for underneath. When you come to the toe, begin the intakes at the right hand of the needle in front of the foot, knit two, take two together, knit plain to within four, knit two together, knit two. Do the same at the back, proceed with an intake round and plain round, until you have only 16 on the front of the foot and eight on each under pin, when place the needles together and cast off the back and front rows together. We made several pair of these stockings last winter, and our gentlemen friends much preferred them to the plain ribbed ones."

Stone-Coal is so called because of its stone-like hardness. It is a general name for the best varieties of Welsh coal used for malting purposes.

Stoppers.—Glass Stoppers, to Loosen.—When there is difficulty in removing a glass stopper, pour round it a little oil close to the mouth of the bottle. Then lay it near the fire, with the mouth towards the heat, and when it gets quite warm wrap a thick cloth round the end of a stick, and strike (but not too hard), first on one side of the stopper, then on the other. This will soon loosen it. Or you may set the bottle in a vessel of warm water previous to striking at the stopper.

Strawberry Acid, to Make.—Put twelve pounds of strawberries into a pan, and pour over them two quarts of spring water, previously acidulated with five ounces of tartaric acid; let them remain for twenty-four hours, then strain them, taking care not to bruise the fruit. To each pint of clear liquor add one pound and a half of lump sugar finely powdered, stir it frequently, and when quite dissolved bottle the syrup. Raspberry acid is made in the same way.

Straw Matting.—This is apt to turn yellow, but it may be kept white by adding salt to the water used for wiping it clean.

Subdividing Drops.—A drop may be subdivided very conveniently by adding ten, fifty, or one hundred drops of water, and then taking a certain number of drops of this dilute solution. In this way homœopathic doses of medicines are given (see p. 228).

Sublingual Soup.—Wash clean in salt and water the root of a tongue, put it into a stewpan with some whole carrots, turnips, onions, and a stick of celery, and as much water as may be proportionate with the scrag of mutton or coarser kind of meat made use of. Place it in an oven, and let it remain all night; strain, and when cold remove the fat from the surface. The stock is now ready. Return to it the kernels of the tongue and the soft edible parts, together with the carrots after they are sliced. As the other vegetables will have contracted a bad colour by stewing, discard them and add some fresh, cut into dice, and which have been boiled in water only. Add a few spoonfuls of rice and pepper, and salt to taste. To this economical dish is sometimes added a knuckle of veal.

Suckling Infants, &c.—By allowing an infant to suck within a few hours after birth, the breasts are prevented from becoming full and hard, and are drawn into shape. If the infant is not applied to the breast until after the third day, the breasts will have enlarged, the nipple sunk, and only to be drawn out with difficulty. Another advantage of applying the infant to the breast as early as possible, is that the first milk of the mother acts as a very gentle aperient on the child, and thus prevents the necessity of giving it any medicine immediately after birth. In the case of a young mother with a first child, the nipples sometimes happen to be so small and short as to hinder the flow of milk and prevent the infant from drawing them out. This may be remedied by frequently fomenting the breasts with a sponge or piece of flannel wrung out of warm water, as hot as the patient can bear it with comfort. During suckling it is advisable to give the child its nourishment from each breast alternately, otherwise the breast not used is very liable to become inflamed. In cases where the mother is unable for the first few days to furnish sufficient milk, other food must be given in addition. The best is either asses' milk diluted with an equal part of hot water, and allowed to cool to the temperature of 96° to 98°, which is that of the mother's milk, or one part of good cow's milk mixed with three of hot water, sweetened slightly with loaf sugar, and suffered to cool to the required temperature. A feeding-bottle is better than a spoon or pap-boat, because the child takes it slowly, and does not take too much at once. After a few spoonfuls of the milk properly diluted has been given to it, by little and little, it should be allowed to rest for at least half an hour. The infant should be raised while receiving the nourishment, because that position is not only more comfortable for the child, but also lessens the risk of the food going the wrong way, and exciting cough. As long as the mother can supply her infant with sufficient milk, other nourishment should be relinquished. While the infant is very young it should be put to the breast whenever it appears to require it, but as soon as it grows older it should be fed only at regular hours: the practice of observing regularity in the hours of applying the infant to the breast being attended with advantage to the child by promoting digestion. The infant's digestion being weak for the first week or ten days, owing to its stomach being unaccustomed to food, it can take but little milk at a time, but requires it very frequently. But at the end of that period, the child's digestion being stronger and more accustomed to nourishment, the breast should be given about every four hours during the night and day. Sufficient time will thus be given for one meal to be digested before another is taken. By following this plan, indigestion and flatulence, and the continual fretfulness and crying which accompany them, will be avoided. The mother will also escape the anxiety and annoyance caused by the wakefulness of the child; since, during the first month, the infant, when in health, sleeps immediately after taking the breast. In their mistaken kindness young and inexperienced mothers are very apt to suckle the infant at all hours during the night. It is advisable for mothers not to give the child the breast during the night, since, whilst nursing, the mother ought to have at least seven hours' uninterrupted sleep. The infant should therefore be given the breast immediately before going to bed, and again on first awakening in the morning; the mother again sleeping, if she wishes, after she has attended to the child. If this is persevered in, the infant will soon become so accustomed to sleep during the night as to give but little trouble. This rule should be attended to by every mother, as much for the sake of her offspring as her own; since everything that improves the health of the mother increases that of her child, by increasing not only the quantity but the amount of nourishment contained in the milk on which it lives. This is more especially the case in regard to females who live in cities, and who, on that account, possess less health and strength of constitution than the inhabitants of the country, who are accustomed to live a life of less excitement, and to breathe a purer atmosphere than the inhabitants of towns. For the first two months, especially in feeble children, the young infant requires to be kept as warm as possible, since the child does not then possess the power of sufficiently generating its own heat. It should also be allowed to sleep during the intervals of taking the breast, and should never be awakened for the purpose of giving it nourishment. The infant should be laid on its side—the right being the best—and never on its back, and its body should be laid as straight as possible. When the infant is about two months old, it may be put to sleep by itself in a cradle. If the weather is warm, the infant should not be covered with too large a quantity of bed-clothes, but sufficient to keep it at a proper temperature. If attention is not paid to this point, the child will be weakened by too profuse a perspiration being excited, and there is also danger of its catching cold when it is taken up to give it the breast. The infant should be laid on a soft bed or mattress, and both the bed and bed-linen should be well aired every day, and, if the weather will allow it, placed in the sun for a short time. The bed should not be placed close to the window, nor where too strong a light may fall on the child's eyes, as this would render them liable to become inflamed, more especially if the infant is predisposed to that complaint. The room should be always kept as fresh and well ventilated as possible, but great care should also be taken that the child be not placed in a draught, by which it may take cold. In addition to this every care should be taken to keep the child as dry as possible. These precautions should be especially observed in the case of infants born in large towns, as they are placed in circumstances less favourable to health; they are usually less robust than those brought up in the purer atmosphere of the country, and therefore require greater care in management.

Sugar is the most generally diffused of all the principles of vegetable life, but it is most abundant in the sugar-cane. America and the West Indian islands supply the greater part of the world with sugar. Formerly many substances were classified as sugar merely because they were sweet, although it has since been ascertained that they really have quite a different character. Sugars are chemically composed of carbon and water; they are soluble in water and in alcohol: under the influence of heat they originate products having the odour of calomel (see page 78), and they are destroyed under certain conditions under the fermentive influence by which they produce alcohol. They are easily oxidised, and when treated with nitric acid they tend to form oxalic and carbonic acid. Sugars are not precipitated by acetate or subacetate of lead. Sugar is classified under two heads—the first including cane sugar, grape sugar, and the uncrystallisable sugar of fruit; the second sugar of milk.

Sugar of Milk, or lactine, gives milk its sweetness, and in turning acid makes it sour.

Sugar of Lead, which is lead dissolved in vinegar and crystallised, is sometimes fraudulently added to bad wines to clarify them, and often to take off a slight acidity. It is likewise added to brandy to deprive it of colour. To detect lead in water, the most delicate test is water impregnated with sulphuretted hydrogen gas (as the Harrogate water. To the suspected water add half its bulk of sulphurated water, and if lead is present it will give a dark brown or blackish tinge. To detect lead in wines, add a few drops of the following liquors to a glass of wine, and the lead if present will be precipitated a blackish colour:—Take of calcined oyster-shells and crude sulphur equal parts; keep them in a white heat for fifteen minutes; when cold add an equal quantity of cream of tartar, and boil it in water for an hour in a glass vessel. When the powder has subsided, decant the clear liquor into phials holding an ounce each, and add twenty drops of muriatic acid (spirit of salt) to each phial; let the phials be kept well corked. Copper, if present, will be precipitated by this liquor as well as lead.

Sugar Vinegar.—Add to a gallon of water seven pounds of the coarsest and cheapest moist sugar, and let it boil for about half an hour, previously well stirring it. Put it intc some vessel, and when milk-warm have a thick toast well covered with stiff yeast put into it. Let it stand two days, with frequent stirring, and then put it into a cask. Paste a piece of paper over the bung-hole, and place the cask in the sun during one or two summers. It can then be bottled off. For all purposes this strong vinegar will be found excellent.

Sulphur a Security against Measles.—The following account of the effects of sulphur in affording security against the infection of measles was published in 1829 by the Medical Society of Tours:—"In a family of four children two took the flowers of sulphur night and morning, and were entirely preserved from the contagious influence of the disease, although they continued to live in the same atmosphere and were allowed to communicate freely with the other children who had the disease. Two of five adults who lived in the same house contracted measles; one had had the disease before! They employed no precautionary means. In another family one child had measles; three other children were not separated from the patient; they took, night and morning, sulphur mixed in sugar, and escaped the disease. The dose of the sulphur should be from two to six or eight grains, according to the age. In another case, an infant took the sulphur as soon as the disease had clearly manifested itself in his brother. In eight days, however, the measles appeared, but the malady ran so favourable a course that it was probable the preservative effects of the remedy had some influence. Four other children were treated in a similar manner; they were designedly exposed to the contagion, but entirely escaped." Sulphur, being an aperient and sudorific, given at the time of sickening and continued during the progress of measles, is very likely to render the disease mild, and to protect the lungs against the serious mischief which, in scrofulous subjects, frequently takes place during measles and hooping-cough, and to prevent secondary fever.

Sulphur, or Brimstone, is an inflammable substance found alone or combined with other bodies in a variety of situations. In volcanic countries it is found almost pure, having been volatised and thrown out by the volcanoes. In such situations the earth and stones in which it abounds are distilled, and the result of this distillation is brought to market as crude sulphur. By fusion and casting in moulds, it forms roll brimstone, and by subliming or volatilising it with gentle heat or close chambers, we obtain the flowers of brimstone. Sulphur is also found in coal-mines, and in the ores of different metals. In this state it bears the name of pyrites, and the copper and iron pyrites are piled in the form of pyramids, the sides of which are earthed up. By the addition of a small quantity of fuel, the pile is lighted, and made to burn slowly, during which the sulphur is volatilised, and, escaping to the top, is there condensed, and then melted in cavities destined to receive it. When sulphur is burnt, it combines with oxygen, and forms sulphuric acid, or oil of vitriol. In the manufacturing of this acid, about one-eighth of saltpetre is added to the sulphur, to assist the combustion by affording oxygen. The operation is performed in chambers lined with lead, and the acid vapours are condensed against the sides, or absorbed by water, with which the floor of the chamber is covered. When this water is sufficiently impregnated it is concentrated in leaden boilers, and rectified in glass retorts, to render it white and pure.

Sulphuretted Hydrogen Gas.—This gas gives the peculiar smell and taste to Harrogate water. It is like that of rotten eggs, or the scouring of gun-barrels. Notwithstanding its very disagreeable flavour to most people Harrogate water is often drunk without disgust, the palate being by habit soon reconciled to it. It tarnishes silver and blackens white paint. Characters written on paper, with a solution of sugar of lead in water, are made visible, and rendered almost black by holding the paper over fresh Harrogate water, and still more readily by immersing it in the water. This has been had recourse to for secret writing, for the characters are quite invisible before the application of the water. Many curious tales are circulated of ladies who have used white paint being disfigured by bathing in these waters. The paint being a calx of lead (white-lead), is immediately blackened by the application of the water. (See *Atmosphere.*)

Sulphuric Acid is much used by the dyers, and in a less oxygenated or acidified state, when it is called sulphurous acid. It is used to bleach or whiten silk. When a match is lighted, or a rose held over the vapours, its colour soon fades, and the rose becomes white. This is effected by the sulphurous acid vapours that are formed, and proves its bleaching qualities. Sulphur, united to the alkaline salts, forms the different hepars or livers of sulphur. Acids decompose these, and at the same time disengage a very offensive gas, sulphuretted hydrogen, which is inflammable air, holding sulphur in solution.

Sunstroke, or *Coup de Soleil*, is held by some to be a species of apoplexy, and by others to bear a greater resemblance to concussion. The phenomena of sunstroke are to be mainly accounted for by the action of a super-heated blood on the nerve-centres and large internal organs. Intense heat applied to the surface of the body may bring about a condition allied to that of concussion of the brain, and death may very rapidly ensue from paralysis of the heart's action. Sometimes a man exposed to the direct rays of the sun is struck down by a veritable *ictus solis;* and sometimes the high temperature of the atmosphere under cover, or at midnight, especially if the air be fouled by defective ventilation, will induce all the phenomena of sunstroke. As every one knows, the body-temperature of healthy men is nearly identical in different climates. This equality is maintained in hot latitudes by the increased functional activity of the eliminating organs, especially that of the skin, carrying off the superfluous heat. But in cases of sunstroke the increased temperature and dryness of the skin forms one of the most striking features of that disease. The *Lancet* informs us that "the great safeguard against sunstroke is the healthy play of all the functions of the body. Whatever checks elimination, whatever induces nerve-weariness, or embarrasses the normal working of the organic system, powerfully predisposes to heat-apoplexy. Temperance in all things, sobriety, and that cleanliness which is allied to godliness are, after all, the main things to be observed by residents in hot climates. When a person is seized with symptoms of heat-apoplexy, the chief aim should be to abstract heat from the body. For this purpose douches of cold water and the freest exposure of the surface to a current of air are the readiest methods of treatment. We have heard of some military surgeons who always before encamping in India looked for a well or puddle of water, into which they place a soldier seized with heat-apoplexy. From the known effects of quinine in reducing temperature the hypodermic use of this agent is indicated, and it has been employed with apparent advantage in India." Referring to the intense heat felt in America at the time the above was written, the same authority adds:—"The climate of New York during the summer appears to be both much hotter and drier than that of this country; and the energetic habits of the more restless, excitable American race tend to induce a feeling of nervous exhaustion, which they seek to counteract by having repeated recourse to a variety of those stimulating drinks which have acquired a nomenclature of their own." Bleeding is sometimes adopted in a case of sunstroke, but this is certainly not to be recommended.

Supper Dishes, Economical.—Take a lamb's head, scrape, and wash it thoroughly clean, put it into a saucepan, after removing the brains, with a quart of water, and salt to taste; let it boil gently for an hour and a half, keeping it well skimmed. When done, place it open with the outside upwards on a dish, brush it over with a well-beaten egg, and strew on some bread-crumbs mixed with a little pepper and salt, and put it before the fire to brown; boil the brains with a small onion in a little of the liquor in which the head was boiled. When done enough, chop them fine with two or three sprigs of parsley and a little lemon-peel, put it back into the saucepan in which the head was boiled, and add a squeeze of lemon and a lump of butter sufficient to make two table-spoonfuls of flour into a paste, and mixed with a little gravy smoothly to thicken it, pepper and salt to taste, let it boil up. Have ready a dish of spinach with the water thoroughly squeezed from it, put the head on it and pour the sauce over. This is a very savoury dish. We add another economical supper dish:—Take of whatever cold meat you may have in the house a few thick slices; cut it up into small dice as for mince veal, or if preferred mince it still more finely, place in a stewpan a large table-spoonful of good cold beef dripping. Other dripping would do, but that from beef is always the nicest. When your dripping is thoroughly melted add one table-spoonful of chilli or Tarragon vinegar, a table-spoonful of good mustard, a tea-spoonful of moist sugar up-heaped, and a tea-cupful of flour and water smoothly mixed. Stir over the fire until all your ingredients are thoroughly mixed and thickened by the flour and water. Now add your meat, closely covering down and leaving it to simmer gently by the side of the fire, taking especial care it does not either burn or scorch. Then, having by this time some potatoes finished boiling, proceed to mash them together with some milk, in which a piece of butter has been melted; be sure to beat your potatoes well up, that they may be very light and free from all lumps, and especially taking care to keep them hot. When ready, turn them out on a well-heated dish, making a wall of your potatoes all round the edge, and pour into the centre of them your meat, being now hot and almost boiling, and the flavour all right, which should be rather strong of the chilli vinegar, and not, of course, forgetting some salt. Just previous to pouring your meat out of the pan, have two eggs well beaten up, yolks and whites together, and stir in carefully amongst the meat, not allowing it on any account to boil after the eggs are added, but at once pour all into the middle of your wall of potatoes. This is a way of using up cold meat, that when once tasted almost every one likes. Rice, as boiled for curry, may be used if preferred to the potatoes.

Swan, Roasted.—We extract the following from a work on Domestic Economy, published in 1842:—"The task of preparing the feast of which the *rara avis* in question formed the principal attraction, was very properly delegated to the host of the Belle Sauvage, on Ludgate Hill, of whose ability as an able purveyor we have had repeated proofs, and we can conscientiously recommend this long-established hotel to those whose object it is to enjoy good wine and viands, to blend economy with comfort, whether as visitors to the metropolis or as occasional diners at taverns. We had full confidence, therefore, that justice would be done in the preparation of the rare and magnificent dish. We confess our doubts as to the success of its appearance at table, conceiving that, like the peacock, which is sometimes served up at feasts, it would prove more ornamental than enjoyable, and yield in flavour to other dishes of less pretension when its merits came to be tested. In this we were mistaken; when the cover was removed, the odour was quite stimulating; never did we taste more tender or delicious meat, and it is a matter of surprise to us that at great festivals this truly royal dish should be so rarely introduced, particularly on occasions where no cost is spared to provide articles of luxury. Occasionally at the Universities, and also (once a year, we believe) by a club which holds its meetings at the Clarendon, a swan makes part of the bill of fare; but we are not aware it is included in the Lord Mayor's feast, although that dignitary is Conservator of the Thames, and in such capacity the owner of the numerous swans reared and maintained upon that river. The bird in question was about the size of the largest Norfolk turkey, and weighed probably from twenty-five to thirty pounds; it was cooked much after the manner of a goose, with gravy somewhat similar, but stuffed with several pounds of rump steaks cut into small squares instead of the ordinary goose stuffing. No rankness or toughness was apparent; on the contrary, the flesh, although dark, was uncommonly short and tender, and no better proof could be shown of the manner in which it was appreciated than the fact that upwards of a dozen guests every one made his dinner of swan, rejecting the other delicacies which the acknowledged skill of Mr. Price's cook had provided. Slices from the breast (which was an ample one) sufficed for the whole party, and every guest admitted his gratification at the taste and quality of the bird, and the admirable manner in which it was cooked and served up. It is indeed a dish, for magnificence of appearance and excellence of flavour, well worthy of the epicure's attention. We believe there is no recipe, even in the oldest cookery-book, for roasting swan; but it is remarkable that on the 1st of December last in Mr. Yarrell's beautiful book all particulars respecting this bird are aptly detailed; and we annex the following extract, merely observing that the swan, or rather cygnet, that we dined off had been fed at Norwich, in the manner he described, and was said to have consumed a peck of corn per day during the two months that it was fattening." For the following account Mr. Yarrel acknowledges himself indebted to the Bishop of Norwich, the president of the Linnæan Society:—"The Town Clerk of Norwich sends a note from the Town Hall to the public swan-herd, the corporation, and others who have swans and swan rights. On the 2nd Monday in August they are collected in a small stream or pond, the numbers actually varying from 50 to 70, and many of them belonging to private individuals; they begin to feed immediately, being provided with as much barley as they can eat, and are usually ready for killing early in November. They vary in weight, some reaching 28 lbs. They are all cygnets. If kept beyond November they begin to fall off, losing both flesh and fat, and the meat becomes darker in colour and stronger in flavour. A printed copy of the following lines is usually sent with each bird—

To Roast a Swan.

Take three pounds of beef, beat fine in a mortar,
Put it into the swan—that is, when you've caught her;
Some pepper, salt, mace, some nutmeg, an onion,
Will heighten the flavour in gourmand's opinion;
Then tie it up tight with a small piece of tape,
That the gravy nor other things may not escape.
A meal paste, rather stiff, should be laid on the breast,
And some whited brown paper should cover the rest;
Fifteen minutes at least ere the swan you take down,
Pull the paste off the bird, and the breasting get brown.

The Gravy.

To a gravy of beef, good and strong, I opine
You'll be right if you add half a glass of port wine;
Pour this through the swan, yes, quite through the belly,
Then serve up the whole with some hot currant jelly.

N.B. The swan must not be skinned. "In former times," observes Mr. Yarrell, "the swan was served up at every great feast, and I have occasionally seen a cygnet exposed for sale in the poulterer's shops in London, but not very lately." Again we send forth from La Belle Sauvage Yard, where birds of another feather are now to be found, directions for cooking a swan. There is a degree of appropriateness in the above recipe appearing here, in a volume which dates from the very Belle Sauvage Yard in which the writer enjoyed so famous a dish.

Sweats, Wasting.—A disorder often attended with serious consequences which is characterised by excessive periodical perspirations. The cause of these is worthy of consideration. No one who has read our articles on "Blood," &c., can deny that the mass of blood is necessary to produce life and to nourish the body; that this mass is not homogeneal is evident, because it contains many different parts, some of which are watery, others oily, others again saline, and the like; and if we examine it mechanically, we perceive that it divides into oily, cheesy, and aqueous parts. Now all these parts are mixed up loosely together in one mass, but in the course of the circulation it is evident that these parts appear in the different secretory ducts; for oil is separated by the gall-bladder, a muriatic saline is in the urine—that is, the volatile salts are joined to the acids, which appear in the same manner as in the distillation of sal-ammoniac, when the acid joins to the lime, as to the fixed salt of any kind, and leaves the volatile salt free to mount up, and so of all the rest. This union of parts and separation of the parts joined, as it is done by Nature itself, is natural; and thus the glands of the skin afford a certain secretion, which by us is called "perspiration." Whatever flows from these besides is reputed preternatural, and has some cause within us or without us that produces a secretion of watery liquors which we call *sweat*. This liquor is not, however, always mere water, but blood; as bloody sweats have sometimes been observed. Without referring further to those extraordinary secretions, authenticated by well-established facts, let us confine ourselves to the excess of sweats only, which appear to the eye to be nothing but water that flows forth, but upon tasting it we always find it saline and bitter, and it smells fœtid; and in most things it agrees with urine in its nature, as appears by the following fact, that persons on whom diuretics fail to act, or affect but partially, perspire on the least occasion, whilst a sweat frequently acts like a diuretic upon others. These sweats are distinguished variously, for they are either copious, or saline, or bitter, or watery, or cold, or hot, or fœtid; or they are critical or symptomatical, according to the advantage received or damage done by them. Let us therefore look into the causes of this disorder, that we may better learn how to manage it. The following causes undoubtedly seem to promote it—namely, warm and at the same time moist air, excessive exercise, great vexation of mind, warm liquors drunk plentifully or cold liquors after heats, warm clothing, and warm remedies. As for other causes, fevers are the most common. At the end of every sweat fits ensue, and contribute to take them off; and very often the sweats in them are prejudicial, more especially when they are particular; but in fevers of any kind sweats are often symptomatical and dangerous. But it frequently happens that slow local remedies and an acrimonious blood are causes of sweats, which may thus be accounted for. In general perspirations ensue whenever the blood is so lax as to adhere but slightly, so that the serum, which is saline, flows readily through the pores. The warmth of the air has this effect, inasmuch as it surrounds our bodies, it is breathed into the lungs, and is even swallowed down with our saliva; the fire it contains rarefies our blood, moves it quickly forward, and, dividing its parts, causes a separation through the pores; for the pores being very minute, and only accustomed to separate invisible streams, the blood must be divided very minutely before it can be separated through them. It is plain that there is fire in the air; the sun, according to Newton, is a ball of fire, and it dispenses its fiery rays everywhere. We shall now state why motion gives rise to sweats: is is because by it the blood is pressed forward through the vessels, the particles of the juices are rarefied, and then, as we may say, they run over their banks. As to the passions of the mind, it is certain, although inexplicable as to the mode, that when the mind is under any agitation the fluids are detached plentifully into the nerves and muscles, as well as into the other vessels, and we find an evident acceleration of the pulse; so that the blood is divided, rarefied, and pushes out its thinner parts to the pores. Liquors of a warm nature, or taken very warm, irritate, or afford matter for sweats, water itself, especially warm, dissolves the salts, and then they, being dissolved, stimulate strongly at all the emunctories, and more especially at the pores, and sweats ensue. As for cold liquor when it is taken immediately after exercise, it has two effects: either it congeals the juices and thickens the blood, or the heat of the stomach is so great as to warm it immediately, without receiving any prejudice, and then it has the same effect as if taken warm, and causes perspiration in the same manner. Warm clothing, especially flannel worn next the skin, keeps the pores open, and increases the flush of humours within; by opening the orifices and relaxing them they grow wider, and the humours escape faster. It is so evident that flannel opens the pores exceedingly, that when consumptive people wear it next their skin they grow excessively weak by the excess of perspiration. Thus much of the evident causes of sweats: let us now examine the preternatural causes, amongst which may be mentioned fevers of all kinds. There seems to be an assemblage of all kinds of salts in the blood of feverish people, as, at all events, the salt seems to be somewhat acrimonious, and therefore is the heart stimulated more frequently in them, and the consequence of that stimulation brings a more perfect circulation; and in dissevering the parts of the blood, in a rarefication of it, the thin parts fly off at such passages as are made for them, and consequently sweats are familiar in fevers. Volatile oily salts also occasion sweats, and are given in malignant cases for this end, because these disorders terminating in this manner by nature, it is an encouragement to administer them for the like effect. By these salts the acids are corrected, the gross consistence of the blood is taken off, the parts of the blood are rendered less cohesive, and secretions are regularly performed. (See *Consumption.*)

SWEATS, THE REASON OF.—The reason of sweats being sometimes particular, at other times universal, is to be sought for in the blood's constitution; for if it be well disposed, and the pores sufficiently lax, then sweats ensue. As for cold liquors being drunk after exercise, it is evident, if some sweat after them, it is because the fibres are then put into stronger vibrations, when they are not injured; for as cold liquors contract the fibres, if this concentration be sufficient it puts all the fibres very soon in contractile and oscillatory trembling, from which swifter circulation ensues, and alternation of the fluids, and a more frequent arrival at the orifices of the glands, and consequently a secretion proportionable. But where this occurs once it happens ten times that persons suffer great injury from drinking cold water after strong exercise, because the fibres are greatly contracted, and the circulatory juices are embarrassed, and inflame the parts; hence arise pleurisies, quinsies, and other disorders.

FŒTID SWEATS.—It appears that these sweats proceed from salts greatly exalted, which dissolve the blood into minute and thin parts; hence it is no wonder that such blood should escape and fly off. In such sweats the patient should be removed to the cool air, kept at rest and easy in his mind, be thinly clad, and avoid liquors of every kind. Such patients should only warm themselves by degrees; they should rub and dry with towels; their diet should be glutinous, with cooling salads.

Swimming.—THE PRINCIPLES OF FLUID SUPPORT.—Before entering upon a description of the art of swimming, and giving some few other particulars connected therewith, it will be in accordance with the plan adopted all through these pages if we enter upon a short description of the scientific principles involved in fluid support. We want our readers to have all the facts, in order that the hints we base upon them may have their full force. First it must be understood that the human body, with the chest full of air, is lighter than water. If this truth were generally and familiarly known it would lead to the saving of more lives, in cases of shipwreck and in other accidents, than all the mechanical life-preservers which man's ingenuity will ever contrive. The human body, with the chest full of air, naturally floats with a bulk of about half the head above the water—having then no more tendency to sink than a log of fir. That a person in water, therefore, may live and breathe, it is only necessary to keep the face uppermost. The reasons that in ordinary accidents so many people are drowned who might easily be saved are chiefly the following:—1st. They believe that the body is heavier than water, and therefore that continued exertion is necessary to keep it from sinking; and hence, instead of lying quietly on the back, with the face uppermost, and with the face only out of the water, they generally assume the position of a swimmer, in which the face is downwards and the whole head has to be kept out of water to allow of breathing. Now, as a man cannot retain this position but by continued exertion, he is soon exhausted, even if a swimmer, and if he is not, the unskilful attempt will scarcely secure for him even a few respirations. The body, raised for a moment by exertion above the natural level, sinks as far below it when the exertion ceases, and the plunge, by appearing the commencement of a permanent sinking, terrifies the unpractised individual, and renders him an easier victim to his fate. To convince a person learning to swim of the natural buoyancy of his body, it is a good plan to throw an egg into water about five feet deep, and then to desire him to bring it up again. He discovers that instead of his body sinking towards the egg, he has to force his way downwards, and is lifted again by the water as soon as he ceases his effort. 2nd. They fear that water entering by the ears may drown, as if it entered by the nose or mouth; and they make a wasteful exertion of strength to prevent it, the truth being, however, that it can only fill the outer ear as far as the membrane of the drum, where its presence is of no consequence. Every diver and swimmer has his ears thus filled with water, and cares not. 3rd. Persons unaccustomed to the water and in danger of being drowned generally attempt in their struggles to keep their hands above the surface, from feeling as if their hands were in prison and useless while below; but this act is most hurtful, because any part of the body held out of the water, in addition to the face, which must be out, requires an effort to support it, which the individual is supposed at the time ill able to afford. 4th. They do not reflect, that when a log of wood is floating upright, with a small portion above the surface, in rough water, as at sea, every wave in passing must cover it completely for a little time, but will again leave its top projecting in the interval. The practised swimmer chooses this interval for breathing. 5th. They do not think of the importance of keeping the lungs as full of air as possible, which has nearly the same effect as tying a bladder of air to the neck, and, without other effort, will cause nearly the whole head to remain above the water. If the chest be once emptied, while, from the face being under water, the person cannot inhale again, the body remains specifically heavier than water, and will sink. When a man dives far the pressure of deep water compresses or diminishes the bulk of air in his chest, so that, without losing any of that air, he yet becomes really heavier than water, and would not again rise but for the exertion of swimming. A man having to swim far may occasionally rest on his back for a while, and resume his labours when he is somewhat refreshed. So little is required to keep a swimmer's head above water that many individuals, altogether unacquainted with what regards swimming or floating, have been saved after shipwreck by catching hold of a few floating chips or broken pieces of wood. An oar will suffice as a support to half-a-dozen people, provided no one of the number attempts by it to keep more than his head out of water. But often, in cases where it might be thus serviceable, from each person wishing to have as much of the security as possible, the number benefited is much less than might be. Swimming is much easier to quadrupeds than to man, because the ordinary motion of their legs in walking and running is that which best supports them in swimming. Man is at first the most helpless of creatures in water. A horse while swimming can carry his rider with half the body out of water. Dogs commonly swim well on the first trial. Swans, geese, and water-fowls in general, owing to the great thickness of feathers on the under part of their bodies, and the great volume of their lungs, and the hollowness of their bones, are so bulky and light that they float upon the water like stately ships, moving themselves about by their webbed feet as oars. A water-fowl floating on plumage half as bulky as its body, has about half that body above the surface of the water, and similarly a man, reclining on a floating mattress, has nearly as much of his body above the level of the water as the mattress has of its body under it. His position, therefore, depends on the thickness of the mattress. A man walking on deep water may tread upon sharp flints or broken glass with impunity, because his weight is nearly supported by the water. But many men have been drowned in attempting to wade across the fords of rivers, from forgetting that the body is so supported by the water, and does not press on the bottom sufficiently to give a sure footing against a very trifling current. A man, therefore, carrying a weight on his head, or in his hands held over his head, as a soldier bearing his arms or knapsack, may safely pass a river where, without a load, he would be carried down the stream. There is a mode in China of catching wild ducks which requires that the catcher be well loaded or ballasted. Light grain being first strewed upon the surface of the water to tempt ducks, a man hides himself in the midst of it, under what appears a gourd or basket drifting with the stream, and when the flock approaches and surrounds him he quickly obtains a rich booty by snatching the creatures down one by one, adroitly making them disappear as if they were diving, and then securing them below. Each bird becomes as a piece of cork attached to his body. Fishes can change their specific gravity by diminishing or increasing the size of a little air-bag contained in their body. It is because this bag is situated towards the under side of the body that a dead fish floats with the belly uppermost. Animal substances, in undergoing the process of putrefaction, give out much aëriform matter. Hence the bodies of persons drowned and remaining in the water generally swell after a time and rise to the surface, again to sink when the still-increasing quantity of air shall burst the containing parts. A floating body sinks to the same depth whether the mass of fluid supporting it be great or small, as is seen when a porcelain basin is placed first in a pond and then in a second basin, only so much larger than itself that a spoonful or two of water suffices to fill up the interval between them. One ounce of water in the latter way may float a thing weighing a pound or more, exhibiting another instance of the hydrostatic paradox. And if the largest ship of war were received into a dock, or case, so exactly fitting it that there were only half an inch of interval between it and the wall or side of the containing space, it would float as completely when the few hogsheads of water required to fill this little interval up to its usual water-mark were poured in as if it were on the high sea. In some canal locks the boats just fit the space in which they have to rise and fall, and thus the expanse of water at the lock is diminished. The preceding examples of floating are all illustrations also of the truth that the pressure of a fluid on any immersed body is exactly proportioned to the depth and extent of the surface pressed upon. The lateral pressures just balance one another, and the upward pressure has to be balanced by the weight of the body.

Swiss Omelet.—Melt two ounces of butter, and add to it the same quantity of grated cheese, with a quarter of an ounce of parsley and an equal quantity of sweet leeks. Add six eggs well beaten, and fry it very lightly in a little butter. To be served hot.

Tea.—ITS NATURE AND QUALITIES.—Tea, obtained from a genus of plants called *Thea*, may be described as consisting of its woody fibre, a bitter astringent called tannin, theine, the peculiar principle of tea, and a fragrant oil, to which it owes its flavour. In its natural condition it is an aromatic, slightly astringent, and somewhat narcotic plant; on which account the Chinese refrain from its use till it has been divested of this property by keeping it at least twelve months. If, however, good tea be drunk in moderate quantities, with sufficient milk and sugar, it invigorates the system, and produces a temporary exhilaration; but when taken too copiously it is apt to occasion weakness, tremor, palsies, and various other symptoms arising from narcotic plants, while it continues to aggravate hysterical and hypochondriacal complaints. Tea has also been supposed to possess considerable diuretic and sudorific virtues, which, however, depend more on the *quantity* of warm water employed as a vehicle, than the quality of the tea itself. Lastly, as infusions of these leaves are the safest refreshment after undergoing great bodily and mental exertion, they afford an agreeable beverage to those who are exposed to cold weather; at the same time tending to support and promote perspiration, which is otherwise liable to be impeded. Tea is to be chosen of the briskest smell, and as whole as possible, and the greatest care is to be taken that it has not been exposed to the air to dry and evaporate. Tea is made in China, and throughout the greatest part of the East, after the same manner as in Europe, viz., by infusing the leaves in boiling water, and drinking the infusion hot. Indeed among us it is usual to temper its bitterness with sugar, but the Orientals use it without the addition of either sugar or milk; however, the Japanese are said to prepare their liquor in a somewhat different way, viz., by pulverising the leaves, stirring the powder in hot water, and drinking it as we do coffee. Medical writers have at all times been very divided in their opinions of the consequences of drinking tea. Of late the newspapers have given us the opinions of some authorities against the use of tea, and their reasons for holding their extreme opinions. We append some opinions, not less strong, from authorities not less worthy of attention, but on the other side of this interesting question. At the Academy of Sciences, Paris, M. Peligot read a paper on the "Chemical Combinations of Tea," and stated that it contained essential principles of nutrition, far exceeding in importance its stimulating properties, and showed that tea is in every respect one of the most desirable articles in general use. It tempers the spirits and harmonises the mind; dispels lassitude and relieves fatigue; awakens thought and prevents drowsiness; lightens or refreshes the body, and clears the perceptive faculties." The author of "Chemistry of Common Life" says, "By the consumption of a certain quantity of tea, the health and strength of the body is maintained in an equal degree upon a smaller supply of ordinary food. Tea, therefore, saves food—stands to a certain extent in the place of food—while at the same time it soothes the body and enlivens the mind. In the lives of most persons a period arrives when the stomach no longer digests enough of the ordinary elements of food to make up for the natural daily waste of the bodily substance. At this period, tea comes in to arrest the waste, and enable the less energetic powers of digestion still to supply as much as is needed to repair the wear and tear of the solid tissues; no wonder, therefore, that tea should be a favourite, on the one hand, with the poor, whose supplies of substantial food are scanty; and on the other, with the aged and infirm, especially of the feebler sex, whose powers of digestion have begun to fail." A writer in the *Lancet* says—"That tea has an influence over the tissues of the body is now among the things admitted in physiology. This influence is of a conservative nature, and its value to the poor can scarcely be overrated. To them tea is virtually tissue, and makes a supply of food that would otherwise be inadequate to maintain the waste of the body sufficient for that purpose. Doubtless an unlimited supply of food capable of replacing any amount of effete tissue would be preferable to a substance which simply goes to prevent tissue from becoming effete; but this is impracticable—the unlimited supply of nitrogenous food being a thing that as yet neither Providence nor politicians have given to us. This preservative power of tea over the tissues has not hitherto been explained. Perhaps it may not be altogether unconnected with another influence of tea which we proceed to notice—namely, an influence over the temper, or rather the mood, or, speaking physically after our fashion, over the nerves. Nothing affects the wear of tissue more than mood; and tea has a strange influence over mood—a strange power of changing the look of things, and changing it for the better: so that we can believe, and hope, and do, under the influence of tea, what we should otherwise give up in discouragement or despair—feelings under the influence of which tissues wear rapidly. In the language of the poor, who in London, we are told, spend an eighth of their income in buying tea, it produces a feeling of comfort. Neither the philosopher nor the philanthropist will despise this property of tea, this power of conferring comfort or removing *ennui*, of promoting those happier feelings of our nature under which we can do most and bear most."

TEA. — THE VARIETIES OF. — A very well-known authority—viz., Des Guignes — gives the following characters of the different kinds of tea as he observed them in China, using the common English orthography, with their usual price at Canton, as sold at the time he wrote. The following are called generally *black teas*:—

BOHEA TEA (from Bo-he, the name of a place) is of a black cast, and yields a deep yellow infusion; sells in China for twelve to fifteen taels, 6s. 8d. each, per pic, about 130 lbs., or from 7½d. to 9¼d. per pound. This keeps well and makes a dark infusion.

CONGOU TEA (from *cong fou*, great care). The infusion is lighter than that of bohea, rather green, and seldom of an agreeable smell; sells for twenty-five to twenty-seven taels, or from 15½d. to 16½d. per pound. It used to be in much higher repute than it now is.

SOUCHONG TEA (from *se ow chong*, a very little sort). The infusion is a fine green, smells agreeably; the leaves ought to have no spots on them; sells for forty to fifty taels, or from 2s. 6½d. to 2s. 6¾d. Some kinds of souchong are scented with flowers.

PEKOE TEA (from *pe kow*, white leaf-bud). The infusion is light and rather green, has a violet scent, and a very fine perfume in the mouth; sells for thirty-four to sixty taels, or from 1s. 9d. to 3s. 1d. This is regarded as the finest of all black teas.

FLOWERY PEKOE is made from the very young buds clothed with down. Pekoe does not keep well.

IMPERIAL TEA—*mao tcha* of the Chinese—has a green cast; the infusion is also green; the leaves large, and of a fine green; has a slight smell of soap. To these may be added:—

CAMPOI TEA, which is intermediate between congou and souchong.

PADRE, or POU CHONG TEA, a very fine souchong, imported in papers for presents.

CAPER TEA, made into balls with gum, and scented, imported only in small boxes.

The *green teas* of Des Guignes are—

SONGLO TEA (from the place where it is grown); it has a leaden cast, the infusion is green; the leaves are longer and more pointed than the black teas: sells for twenty-four to twenty-six taels, or from 1s. 3d. to 1s. 6d. The inferior sorts have yellow leaves, and a smell of sprats.

TWANKAY is a common coarse green tea, corresponding to the bohea among he black teas.

HYSON TEA (from *he tchune*, first crop) is of a leaden cast; the infusion is a fine green; the leaves are gathered in spring, and should be handsome, without spots, and open quite flat; it has a strong taste, and a slight smell of roasted chestnuts; sells for fifty to sixty taels, or from 2s. 6d. to 3s. 1d.

TCHU TCHA, of which he gives no characters, but it sells for sixty-five to seventy taels, or from 3s. 4d. to 3s. 7d. per pound.

Besides, there are imported into

England the following green teas, namely :—

Hyson Skin or Bloom tea, being the large loose leaves of the hyson; a faint delicate smell; infusion a pale green.

Superior Hyson Skin, intermediate between hyson and hyson skin.

Gunpowder tea (so called from its granulated appearance), a superior hyson, in small round grains, of a blooming greenish hue.

For delicacy no teas are comparable with those called "Mandarin teas," which never leave China, being bought up by the mardarins. These will, however, bear neither transport nor keeping. In Canton counterfeit teas are made of refuse, such as moistened tea-leaves from the pots, beat up with gum and rice-water in a mortar, coloured with Prussian blue and gypsum, and so ingeniously curled, granulated, and twisted as to resemble the most costly varieties. There is an inferior kind of leaf used extensively in South America as a substitute for tea. It is called Paraguay tea, or *maté*. Though inferior to the Chinese tea and its offshoots, it contains the same essential principle.

Making Tea.—First put a little boiling water into the tea-pot, pour it out, first rinsing it round, put into it a teaspoonful of tea for the pot, as the saying is, and one for each person, and pour over it just sufficient boiling water to cover the tea. After it has stood a few minutes and the leaves are fully expanded, fill up the pot, and be sure the water boils. The purer and softer the water, the better is it for making tea. When the water is particularly hard a little carbonate of soda will improve it. More than half the weight of tea-leaves is in the woody fibre, which is insoluble in water and does not convey the slightest nutriment. This is in larger proportion in black than in green teas. The tannin is that element which, as most people know, aids in converting animal skins into leather. Of this green tea contains as much as 17 per cent. In tea which has stood long "to draw," or tea which has been foolishly boiled to extract its full strength, the astringent properties of the tannin are most largely extracted. Theine is, as we have stated, the peculiar principle of tea—a substance very easily converted to the formation of bile—and to this and the volatile oil above mentioned, the refreshing, nourishing, and stimulating qualities of tea are alone due. To obtain these without the astringent quality, the tea ought to be taken while newly made. Five minutes will suffice for extracting these, but the tannin is not extracted until the tea has stood long in a hot place, or has been boiled. Tannin, we may add, is not positively injurious unless it is taken in large quantities, or there is a tendency to constipation; but it is not of the slightest use, and is certainly best dispensed with in our tea.

Tears.—Under the outer edge of the bone upon which the eyebrow is placed there exists a very small gland. Every time the eye is closed this is pressed upon, and a tear being thus squeezed out, it washes away every particle of dust from the eye and carries it away through the nose by means of two minute openings, one in the top and the other in the lower eyelid. The moisture flowing into the nose prevents the currents of air passing up the nostrils from drying up the inside of the nose and so rendering it insensible and horny, by which its power of smell would be destroyed. When the tears come too fast to escape into the nose they run over and flow down the cheeks. The hint afforded here is that which you take when reading some pathetic passage in a clever novel—you blow your nose to bring the tears more quickly down into the nostril, and so prevent their overflow and consequent appearance outside the nose. Sometimes the minute openings through which the tears pass suffer a temporary stoppage, and the lids grow swollen and inflamed in consequence. The remedy is a good sniff at some strong smelling salts.

Terrines.—Take two pheasants or

four partridges, pluck, clean, and bone them; keep the livers to use with the forcemeat. Cut some pieces of fat bacon, of the length and thickness of your little finger, season them with salt, pepper, and powdered spices; then lard the fleshy parts of the birds equally, and season them in the same manner as the bacon. Put into the inside of the birds some of the forcemeat described below, and some truffles at intervals; then close the birds, so as to give them their natural form, and proceed as follows:—To preserve them from breaking, put them first in a saucepan of cold water and bran, boil gently, and let them cool in the same water. Then take an oval preserving pan (one with a cover is to be preferred), put some slices of fat bacon all round the pan, lay the birds with their breasts downwards, fill all the cavities with forcemeat, and with it some truffles a short distance from each other, and season again. Do not quite fill the pan. Then make some common paste with a little flour, butter, salt, and water, and cover the pan with it; put it in the oven for two hours, and, when done, take it out, fill the basin with lukewarm lard, and put it to cool. When quite cold, put on the lid, then make some paste with flour and water, and paste some paper all round, and put it into a cool, dry place. It may be used at any time within a year, as it will keep good for that length of time. Make the forcemeat with two pounds of calves' liver, one pound of streaky bacon, and half a pound of ham. Cut them into pieces two inches square, put them into a stewpan with a quarter of a pound of fresh butter, and the livers of the birds. Fry slightly, season with salt, pepper, one or two shallots, and some parsley chopped fine. When the whole has been frying on the stove for twenty minutes, put it in a dish till cold, then pound the whole in a mortar, and when fine use as above directed to fill the birds and the pan.

Test-papers, Chemical.—Take half a pound of litmus in small cubes, boil in an iron vessel with one quart of water for some minutes, and then pour through a fine piece of linen to separate the undissolved portion. This solution is spread over paper by means of a camel-hair brush, and the blue paper thus obtained hung over a cord to dry. To make the red paper, a small quantity of vinegar is added to the foregoing blue liquid until it becomes of a reddish colour. It is best to cover the paper on both sides, and to cut it into narrow short slips, which should be kept in closed bottles so as to guard against the action of acid or alkaline vapours. In using test-papers observe the following precautions:—They should be protected from the action of the air, or they soon become purple from the action of carbonic acid, which, as we have explained, is always present in the atmosphere in small quantities. By immersion in water containing about one drop of liquor potassæ in four ounces, the blue colour is restored. Test-papers prepared with porous paper show the red colour better than those made with glazed or strongly-sized paper. If the quantity of acid present is, however, small, it is not sufficient in any case simply to dip the paper in the liquid; a small strip should be thrown in and allowed to remain for ten minutes or a quarter of an hour. If the paper, on immersion, assumes a wine-red or purple tint in place of a decided red, it is probably caused by carbonic acid gas. In that case the blue colour returns when the paper is washed and held to the fire. Blue litmus paper may be changed to the red paper used for alkalies by soaking in water acidified with sulphuric acid, one drop to half a pint.

Thaumatrope—an Amusing Toy.—In a round box are contained several cards, each suspended by a piece of bobbin at either side. There is part of a figure or object represented on one side of the card, and the remainder on the other. For example, we have the head of a watchman on the obverse of one, and the empty watch-box on the reverse; by twisting the bobbins, and consequently spinning the card, the head and body fit together, and we see a complete guardian of the night. There is on the obverse of one card a thing like a well-worn bundle of birch, but by twisting the bobbins we produce a shower of fresh leaves, and these leaves falling upon the bundle, produce the striking likeness of a tree. The optical principle on which this machine is constructed is the duration of an impression on the retina of the eye, after the object producing it has been withdrawn, and which is said to last about a second.

Thirst.—Thirst, one of the most distressing symptoms of fevers and inflammatory complaints, is seated in the mouth and fauces. It is a feeling even more exacting than hunger, particularly in hot climates, or when any of the watery secretions are increased. Hot spices, saline substances, and common salt increase it, as do all causes augmenting the different secretions. When thirst is not appeased a general irritation follows; the sensation of dryness in the mouth and fauces increases, and is accompanied by a burning sensation and an accelerated pulse. Simple thirst is a natural feeling, immoderate thirst indicates disease. The most grateful palliatives of intense thirst are the vegetable acids, particularly the acescent fruits. A decoction of sorrel-leaves, slightly inspissated with gum arabic, and sweetened to the taste, has been recommended for allaying excessive thirst. A *few* drops of brandy will, it is often said, assuage thirst more readily than large draughts of any other liquid; too much would tend rather to create thirst.

Tin.—To Remove the Taste of Resin from New Tin.—Take a hot live coal from the fire, or a piece of burning charcoal. Put either of these into the vessel, and shake it slightly. Repeat this, if necessary, with a fresh coal each time, then wash out the vessel with hot water. Or boil in the vessel some potash melted in water. Afterwards wash out the vessel, and boil plain water in it.

Tobacco. — The *Doctor* quotes from an Italian medical paper some remarks by Professor P. Mantegazza on tobacco. He first speaks of the researches of Erlenmayer, who gives the following symptomatology of poisoning by nicotine: "Conjunctivitis, diplopia, and amaurosis are not unfrequent when tobacco is greatly made use of. The skin takes a yellowish hue, and furuncular eruptions are not rare. Stomatitis, glossitis, and black deposits on the tongue and teeth are noticed. Gastrodinia, mesenteric neuralgia, dyspepsia, and feeble appetite are common, serous diarrhœa, and in severe cases paralysis of the rectum. Pharyngeal catarrh, bronchitis, hæmoptysis, asthma, and catarrh are caused by smoking. The circulatory system presents palpitation of a special nature, with a certain anxiety. The nervous system, in general, suffers a good deal from the chronic use of tobacco. Hyperæsthesia and neuralgia are common, while the nerves of general sensation are affected by various hallucinations. There may occur neuralgia of the various branches of the fifth pair, or of the ischiatic, or along the vertebral column. Anæsthesia is greatly pronounced over the whole skin, especially the legs. There is muscular weakness, greater or less, especially in the lower extremities, and sometimes so grave that the patient cannot stand on his feet, and when seated must lean against a solid body. The horizontal position is the least grave. There also may be tremors in the limbs, uncertain gait, convulsive movements. Vertigo is an important symptom, which is conjoined with a sensation as if the eyes were continually rolling. The intellectual and moral functions are perturbed with a well-marked nervous irritability, with anxiety, with the terror provoked by frightful visions, with dulness of thought, melancholy, and timidity. In some cases there occurs true delirium accompanied by trembling, as in chronic alcoholism; in other cases there is profound melancholy, alternating with great exaltation, and with precordial anguish; and lastly, it may give rise to mania. Men have discovered in smoking a new pleasure, but also a new sorrow." Dr. Robertson says of tobacco: "Whether smoked, chewed, or used as snuff, its action on the system is but little different. It is essentially a narcotic, and as such it is detrimental to the power and healthiness of the nervous system—as such it stimulates at the expense of subsequent depression and eventual loss of tone; it interferes with the functions of assimilation and expenditure, and as such is injurious to the health of the system." Dr. Prout, in his book on diseases of the stomach, says: "Tobacco is confessedly one of the most violent poisons in nature. . . It not only disorders the assimilating functions in general, but particularly, as I believe, the assimilation of the saccharine principle. . . . The severe and peculiar dyspeptic symptoms sometimes produced by inveterate snuff-taking are well known; and I have more than once seen such cases terminate fatally with malignant disease of the stomach and liver. Great smokers also, especially those who smoke short pipes and cigars, are said to be liable to cancerous affections of the lips." (See *Indigestion.*) Many will perhaps be surprised, and some who agree with the above authorities will be pleased to hear, that the consumption of tobacco in England is very small compared with that of most other countries. Smoking is most excessive in those parts of Germany called the Zollverein, where the consumption of tobacco is said to be 156 oz. per annum for every head of the whole population. The proportions in other countries run as follow:—In Belgium, 144 oz. per head per annum; Holland, 131; Denmark, 128; United States of America, 119; Austria, 108; Norway, 101; France, 89; Spain, 77; Sweden, 69; and Great Britain only 65. Therefore the consumption of tobacco in this country is less than in any other European nation, with the exception of Sardinia, 55; Tuscany, 40; Russia, 40; and the Papal States, where smoking least of all prevails, which figures, as compared with the others, at only 32. Thus the English smoke twice as much as the Romans; the Danes twice as much as the English; and the Germans of the Zollverien about one-fourth more than the Danes.

Tobacco-Paper.—This, which may be procured from the seedsman, is used for fumigating plants, as it is much more economical than tobacco itself, and quite as efficacious.

Toothache, Cure for the.—Four drops of essence of thyme, four drops of essence of cloves, four drops of a weak solution of carbonate of ammonia. A little cotton wool, holding one drop of oil of cloves, is said to be a good remedy for toothache. A piece of camphor in the mouth will lessen the pain. A piece of tobacco in the tooth is said to give relief, but we fear the only sure cure is extraction.

Tooth Brushes.—It is said that a dog's front teeth are so white because he uses them in scraping meat from bones, whereas we use only our back teeth in the process of mastication, and consequently the front teeth decay for want of use, and become discoloured for want of the cleansing mechanical action which the dog's front teeth get in the process of bone-picking. The bone, in short, is the dog's tooth-brush. Tooth-brushes are consequently of importance to us, because they remove impurities from the teeth and keep up the healthful action of the gums. Sound, white teeth and healthy gums cannot be expected by those who never pick bones and never use a tooth-brush. Tartar while soft is removed from the teeth by the brush, but it soon hardens, and can then only be removed by scraping.

Tortoiseshell Boxes.—Horn and tortoiseshell boxes are thus formed by these substances being placed in brass moulds and subjected to the action of strong screw presses, which are placed in boilers; and when heated, the screws being turned, compel these softened substances to unite firmly together and to receive the form given to them by the moulds. A glue which may assist in their union can also be made of the raspings of tortoiseshell, by exposing them, in close vessels with a little water, to the action of heat under pressure.

To Stain Wood Black.—Boil some chips of logwood in water for about a quarter of an hour; then wash the piece of wood with it three or four times, allowing it to dry after each washing; lastly, wash the wood by means of a common painting brush with vinegar prepared as follows:—Put one ounce of steel or iron filings into two ounces of vinegar; keep the phial near the fire, so as to be gently heated for about two hours; then decant the vinegar, and keep it for the purpose.

Touch-paper. — Unsized paper, or blotting-paper, dipped in a solution of saltpetre; or paper smeared and blackened with damp gunpowder.

Touch-wood is an inferior kind of tinder.

Tracing Paper, to Make.—Mix equal parts of oil of turpentine and drying oil, and with a rag rub it evenly over some fine tissue paper, or any other very thin paper. Hang it by to dry for a day or two, and it will be fit for use. Lay this over the drawing you wish to copy, and you will see every line distinctly through, so that you can go over them with a black-lead pencil. If you wish to trace it in ink, mix a little ox-gall with the ink to make the paper take it, which it would not otherwise do, on account of the oil.

Tripe, Roasted. — Cut your tripe in two square pieces, somewhat long, have a forcemeat made of crumbs of bread, pepper, salt, nutmeg, sweet herbs, lemon-peel, and the yolks of eggs mixed all together; spread it on the fat side of the tripe, and lay the other fat side next it; then roll it as light as you can, and tie it with a packthread; roast it, and baste it with butter; when roasted lay it in your dish, and for sauce melt some butter, and add what drops from the tripe. Boil these together, and garnish with raspings.

Turnip Peel washed clean and put into a net is sometimes used to impart its flavour to soup.

Turnips, Taste of in Butter.—To avoid this you should feed your cows with turnips immediately after they are milked, and on no account give them any a short time before milking. Immediately after being milked in the morning give them as many turnips as they can eat. During the day feed them on hay, and after milking them at night give them the same quantity of turnips. The butter made from milk from the cows fed as described has been much admired for its flavour and colour.

Turtle.—The turtle is very delicate and nourishing as food, but it is often rendered indigestible by the modes in which it is prepared.

Umbrellas, to Make Pliable Varnish for.—Take any quantity of caoutchouc, as ten or twelve ounces, cut it into small bits with a pair of scissors, and put a strong iron ladle (such as that in which painters, plumbers, or glaziers melt their lead) over a common coal or other fire; which must be gentle, glowing, and without smoke. When the ladle is hot, put a single bit into it: if black smoke issues, it will presently flame and disappear, or it will evaporate without flame; the ladle is then too hot. When the ladle is less hot, put in a second bit, which will produce a white smoke; this white smoke will continue during the operation, and evaporate the caoutchouc; therefore no time is to be lost, but little bits are to be put in, a few at a time, till the whole are melted; it should be continually and gently stirred with an iron or brass spoon. The instant the smoke changes from white to black, take off the ladle, or the whole will break out into a violent flame, or be spoiled, or lost. Care must be taken that no water be added, a few drops only of which would, on account of its expansibility, make it boil over furiously and with great noise; at this period of the process two pounds or one quart of the best drying oil is to be put into the melted caoutchouc, and stirred till hot, and the whole poured into a glazed vessel through a coarse gauze, or wire sieve. When settled and clear, which will be in a few minutes, it is fit for use either hot or cold. The silk should be always stretched horizontally by pins or tenter-hooks on frames (the greater they are in length the better), and the varnish poured on *cold in hot weather*, and *hot in cold weather*. It is perhaps best always to lay it on when cold. The art of laying it on properly consists in making no intestine motion in the varnish, which would create minute bubbles, therefore brushes of every kind are improper, as each bubble breaks in drying, and forms a small hole, through which the air will transpire.

Unwritten Wills.—Soldiers in time of war, and sailors at sea, are permitted by law to make their wills verbally in the presence of witnesses, except where sailors are concerned, and the property bequeathed is pay or prize-money, in which case the will must be expressed in writing, in order that it may pass through the Admiralty Office.

Varnish for Gilded Articles.—One of the best of these varnishes is that known as Watkins. It consists of gum-lac, ingrain, 125 parts; gamboge, 125; dragon's-blood, 125; arnatto, 125; saffron, 32. Each resin must be dissolved in 1,000 parts by measure of alcohol of 90 per cent.; two separate tinctures must be made with the dragon's-blood and arnatto, in 1,000 parts of such alcohol; and a proper proportion of each should be added to the varnish, according to the shade of golden colour wanted.

Varnishes.—As a rule, all varnishes should be kept in a dry place (there may be a few exceptions), otherwise they are liable to become *tacky*. It should also be observed that they should be applied in a dry place. Much, indeed, depends upon the state of the weather when they are employed —more than is easily credited—and the work should be kept in a warm place until thoroughly dry. All varnishes in which spirits of wine is the menstruum should be used in a warm place. Foremost among varnishes is that so well known as French polish:—Take of gum sandarach fourteen ounces and two drachms; gum mastic, in drops, seven ounces and one drachm; shellac (the yellower the better), fourteen ounces and two drachms; alcohol, of 0·8295 sp. gr., three quarts and one pint. Pound the resinous gums, and effect their solution by continued agitation, without the aid of heat. If the woods are porous, seven ounces and one drachm of Venice turpentine. If also an equal weight of ground glass with the gums be added, the solution will be more quickly made, and otherwise benefited by it. Before using, the wood should be made to imbibe a little linseed oil, the excess of which should be removed by an old flannel. The varnish should be applied by saturating a piece of old, soft, coarse linen cloth, folded into a sort of cushion, rubbing the wood softly at first, turning the linen from time to time until nearly dry. The linen should be saturated afresh, and the rubbing continued until the pores of the wood are completely filled. Two or three coats are generally sufficient. Do not rub hard. If the varnish becomes *tacky*, apply a very little drop of olive oil uniformly over the surface of the cushion. The finishing process consists in pouring a little pure alcohol upon a clean piece of linen, which is lightly rubbed over the varnished wood, and as the linen and varnish dry, the wood is rubbed more briskly, until it takes a beautiful polish like a looking-glass. The above may be relied upon as the original and genuine French polish, it being from the "Dictionnaire Technologique," a French work famous for its practical character and great accuracy.

SEEDLAC VARNISH.—Wash three ounces of seedlac in several waters, dry it, and powder it coarsely. Dissolve it in one pint of rectified spirits of wine, shaking as often as convenient, until it appears dissolved; pour off the clear, and strain the remainder.

Shellac Varnish.—Take two and a half ounces of shellac, break it into a coarse powder, put it into one pint of spirits of wine, keep it in a warm place a few days, shaking frequently until dissolved; strain.

Copal Varnish. — Dissolve the copal, broken in pieces, in linseed oil, by digestion, the heat being almost sufficient to boil the oil. The oil should be made drying by the addition of quicklime. This makes a beautiful transparent varnish. It should be diluted with oil of turpentine; a very small quantity of copal, in proportion to the oil, will be found sufficient.

Gum Sandarach Varnish.—A colourless varnish may be obtained by dissolving four ounces of gum sandarach and one ounce of Venice turpentine in sixteen ounces of alcohol by a gentle heat; it is not very hard, however.

Mastic Varnish.—Mastic should be dissolved in oil of turpentine, in close glass vessels, by means of a gentle heat. This varnish is extensively used in painting transparencies, &c.

Bookbinders' Varnish. — Five ounces of shellac are to be dissolved in one quart of rectified spirits of wine; add ten ounces of burnt and recently-heated animal charcoal, boil a few minutes, subtract a little of the liquid, and see if it is colourless; if not, add a little more charcoal. When colourless, strain through silk, and afterwards filter through blotting-paper; if wanted perfectly pure, strain when cold.

Caoutchouc Varnish. — Digest two parts of caoutchouc, cut in shreds or small pieces, in sixty-four parts of rectified oil of turpentine; strain through linen cloth.

Sealing-wax Varnish. — This capital varnish is made by dissolving black or red sealing-wax in spirits of wine. It is used for preserving such things as magnets, and for electrical and optical instruments. It also forms an excellent cement.

Varnish for Shoes.—Put half a pound of gum shellac broken up into small pieces in a quart bottle or jug, cover it with alcohol, cork it tightly, and put it on a shelf in a warm place; shake it well several times a day, then add a piece of camphor as large as a hen's egg, shake it again and add one ounce of lamp-black. If the alcohol is good it will be dissolved in three days; then shake and use. If it gets too thick add more alcohol, pour out two or three teaspoonfuls in a saucer, and apply it with a small paint-brush. If the materials are all good, it will dry in about five minutes, and will be removed only by wearing it off, giving a gloss almost equal to patent leather. The advantage of this preparation over others is, it does not strike into the leather and make it hard, but remains upon the surface, and yet excludes the water almost perfectly. This same preparation is also suitable for harness, and does not soil when touched as lamp-black preparations do.

Varnish, to Polish.—This is effected with pumice-stone and Tripoli earth. The pumice-stone must be reduced to an impalpable powder, and put upon a piece of serge moistened with water; with this rub lightly and equally the varnished substance. The tripoli must also be reduced to a very fine powder, and put upon a clean woollen cloth, moistened with olive oil, with which the polishing is to be performed. The varnish is then to be wiped off with soft linen, and when quite dry, clean with starch or Spanish white, and rubbed with the palm of the hand.

Veal.—The calf, after it is slaughtered and dressed, is called veal; but, unlike the ox in its dressing, the butchers seldom take off the skin until the day it is to be placed in the shop for sale. It is retained on the carcase for the purpose of keeping the flesh moist, bright, and clean. The age of the calf not being less than four nor more than six weeks, produces the best veal if properly fed and in good condition. At a less age the flesh is not fit for food, as it is flaccid, gelatinous, and watery. When calves are wholly fed from the cow and range between the age of four to six weeks, they produce what may be called *milk veal*, being the most white, tender, and delicate, and considered the choicest eating of all other veal. After six weeks the calf requires more food than the cow can produce. The milk of another cow, or a little meal, grass, or hay is also given. This change of food with advance of its age of course materially alters the character of the flesh, both in quality and colour, which becomes darker, while the fat is more yellow and the meat less juicy. When turned out and wholly fed on grass (grass calves), the flesh is rendered poor, dry, tasteless, and usually dark-coloured. Good veal should be finely grained, tender, and juicy, the fat firm and of a whitish colour. When veal is very white it indicates that the calf has been bled before slaughtering, a process which may add to its appearance, but which deprives the meat of its juiciness as well as its flavour. The hind quarter of veal is the choicest, and always commands the best price. It is usually divided into two parts, which are commonly called the leg and loin of veal. The loin of veal is the choice part for roasting, either whole or divided. It also makes fine veal chops, either for broiling, stewing, frying, &c. When the loin is too large it is divided into two small joints. The thin end is called "kidney-end," and the other the thick or "chump-end."

VEAL AS FOOD is tender and nourishing, not easy of digestion, and therefore unsuited to weak stomachs. It is not of a heating nature as beef is, and may therefore be given to weak febrile patients, especially if accompanied with some acid. Veal is usually recommended to those who have a tendency to hemorrhage. Persons disposed to phlegm and complaints of the abdomen ought to abstain from eating veal. Veal-broth is commonly recommended in cases of pectoral and inflammatory diseases. The lungs, liver, and tongues of calves are sometimes recommended for sick persons and convalescents, being light eating and of a soft, mild nature. The fat of veal, being particularly light and showing the least tendency towards putrescence, has often caused it to be given to persons of a scorbutic taint. When boiled, veal is but slightly nourishing. Boiling the fat of veal renders the fibres soft, destroys the jelly, and renders it indigestible.

LEG OF VEAL, which is sometimes used whole for roasting, or from it is cut the "fillet of veal," "veal cutlets" for fricandeau, forcemeats, collops, &c. The fillet of veal is boned generally by the butcher, and is in most cases used for roasting, stewing, &c.

THE KNUCKLE OF VEAL, being a part of the leg of veal after the fillet or cutlets are taken from it, makes a good light soup, stew, or boil, &c.

THE FORE QUARTERS OF VEAL comprise the shoulder, the neck, and the breast. It is a good joint for being stuffed to roast, and will answer for that purpose without burning. A small family can make two dishes from it by having the blade taken from the thin end for roasting, stewing, &c. The "knuckle," or hock end, left with the flesh on with the blade-bone, will make good soup or stew at a small cost.

THE NECK AND BREAST OF VEAL.—The former is used for stewing, fricassée, veal pie, and the best or rib end is prepared by the French and Germans for "rib chops" or veal *cotelettes*. The latter is used for roasting, stewing, ragoût, and it is sometimes boned so as to roll, or a large hole is made in it for stuffing, &c.

CALVES' SWEETBREADS.—These, no doubt, are the greatest delicacies of the meat kind. There are but two in the calf, one from the neck or throat, the other from or near the heart, called the "heart sweetbread." Their colour should be clear, and a shade darker than the fat of the same animal.

CALVES' HEADS.—These are usually

found with hair, scalded, and shaved cleanly off, and when fresh have a bright, full look, while the skin seems firmly fastened to the head. There should also be a prominent rise or appearance of the young horn to denote that the animal was old enough. If the head should be small and no signs of horns, it shows that the animal was too young to be wholesome food. Never purchase either calves' head or feet if they have a yellowish look or a slippery or slimy appearance. The brain will smell badly, more particularly when the head is cracked or split. The head makes the mock turtle soup or a plain boil, &c. The head is found skinned when it is not so valuable, or only fit for a plain soup, &c.

Calves' Feet.—Very small feet are not always good, in consequence of the risk that they are from too young a calf. Their uses are excellent for jelly, or they are sometimes cooked in with the head.

Calves' Tongues are sometimes taken out and used separately for stewing, or salted, boiled, or pickled.

Calves' Brains.—With some preparation, very nice delicate sauces and other dishes are made from calves' brains. They are taken out when the head is cracked open.

Calves' Haslet.—This comprises the heart, lights, and liver (sometimes also the melt), connected together; but when separated they appear with the name of calves' liver, calves' heart, and calves' lights. This liver is the best of all the animal livers. Both the heart and liver are used for frying, boiling, roasting, &c., but when for a hash the lights can be used.

Calves' Kidneys. — These are usually found in the loins of veal, but are sometimes taken out and sold separately. They are the best of all kidneys.

Calves' Melt.—This small, dark piece attached to the lights makes a very good dish if dressed in the following way:—Soak it for three or four hours in a little salt and water, also a little vinegar. Pepper it well, and boil it.

Veal and Maccaroni Pudding.—Having chosen the pudding-basin you mean to use, procure as much veal, without bone, as will fill it about three quarters full. It is not necessary to choose the prime parts for this; if you can have the kidney, or part of it, use it. Cut these into dice half or three-quarters of an inch square; season them slightly with pepper and salt. Break sufficient macaroni into inch lengths to fill the rest of the vacant space; steep it half an hour in tepid water, then mix it up with the veal. Line your pudding-basin with crust, put in the meat and maccaroni, interspersing with it a little lemon-peel and two or three blades of mace. Add the juice of half a lemon and a small wineglass of water, for gravy. Put on the top crust, tie it in a well-floured cloth, and boil exactly as with beef-pudding, except that it will not take quite so long to cook; nevertheless, it should be well boiled. A few oysters, mushrooms, and bits of sweetbread, when occasion offers, are a great improvement. Chicken or rabbit also may be associated in the same way with the veal.—*Cassell's Household Guide.*

Veal Olives.—Cut half-a-dozen slices or cutlets from a fillet of veal (of course an uncooked one), let them be quite an inch thick, and as long and as broad as you can. Rub them over with an egg that has been well beaten. Cut some slices of fat ham or bacon as thin as possible and as nearly the size of your veal as you can, and then lay it upon your veal with more egg brushed over that; have ready a little forcemeat such as you would use for veal, consisting of sweet herbs, suet, bread-crumbs, egg, cayenne, salt, &c. Now roll up very tightly, as you would a rolled preserve pudding, only without a cloth. Bind it with a clean broad tape, then brush an egg over it, and powder thickly with bread-crumbs. Roast by a brisk fire for three-quarters of an hour, or according to the quantity of veal in your olive. Have a good gravy to serve up with, and garnish your dish with slices or lemon and sprigs of parsley alternately. Rumpsteaks may be done in the same manner, with oysters instead of the forcemeats. The veal olives are exceedingly good boiled. Indeed, many persons who have tasted both ways of cooking them prefer the boiled, and they make a pretty-looking dish for dinner where a boil is required.

Vegetable Marrows, to Cook.—Peel, and cut them in halves lengthwise; if the seeds are tender do not take them out. Butter the two insides, sprinkle with mace, white pepper, and salt. Stew with a teacupful of milk in a pan, or the oven.

Vegetable Parchment.—By dipping unsized paper, or paper from which the size has been removed, into sulphuric acid for a few minutes, and afterwards well and thoroughly rinsing it in clean water, it is converted into a parchment-like material of great strength. The acid must not be too strong, or the paper will be spoiled.

Vegetable Poisons do not admit of such remedies as are used for mineral poisons, there being no means of rendering them inert by decomposition. Their speedy evacuation should therefore be attempted without delay by the most powerful emetics. The sooner the emetic is administered the greater is the probability of success, for such is the narcotic property of vegetable poisons that in a short time they will so far destroy the sensibility of the stomach, and produce such a degree of spasm as to render vomiting impracticable; their evacuation cannot then be effected, and their continuance is inevitably fatal. If an emetic cannot be readily procured, attempts should be made to excite vomiting by forcing a quantity of warm water into the stomach, and afterwards by irritating the fauces, by introducing a feather or finger into the mouth until the contents of the stomach are forcibly ejected. The patient should likewise be made to drink plentifully of warm water, or a strong infusion of coffee, the latter of which some experienced practitioners assert to be the most efficacious remedy that can be employed for the restoration of sensibility of the stomach and the removal of the spasms induced by vegetable poisons. If the poison be an over-dose of opium, the patient should be prevented from going to sleep by shaking him and applying some pungent smelling salts to the nostrils, while the above means are employed for its evacuation from the stomach. Some medical men recommend bleeding in such cases; but this is much to be doubted. No advantage can be derived from such a practice, but as tending to diminish the powers of life it would probably accelerate the poisonous effects.

Vegetables, to Make them Tender.—When peas, French beans, and similar productions do not boil easily, it has usually been imputed to the coldness of the season, or to the rains. This popular notion is erroneous. The difficulty of boiling them soft arises from a superabundant quantity of gypsum imbibed during their growth. To correct this, throw a small quantity of sub-carbonate of soda into the pot along with the vegetables, the carbonic acid of which will seize upon the lime in the gypsum, and free the legumes from its influence.

Farinaceous Vegetables containing sugar and oil in large proportions are held to be as food more than sufficient for the purposes of nutrition, and in proof of this it has been pointed out how many of the peasantry in various countries preserve health and strength on a diet from which meat is altogether excluded.

Vegetable Tooth-Brushes.—Cut some marine marsh-mallow roots into lengths of six inches, and about the thickness of a lady's finger; dry them in the shade gradually to prevent their shrivelling. Procure two ounces of pulverised dragon's-blood, also half an ounce of conserve of roses, and four ounces of highly-rectified spirit; set them on a gentle fire in a flat-bottomed glazed pan, and stir until the dragon's-blood is dissolved; throw in two or three dozen of the sticks, turning them over and stirring them about, so that all parts may absorb the dye alike; continue this until the whole of the stuff is absorbed, and the bottom of the pan quite dry, and keep shaking it over the fire until the sticks are dry also. Both ends of the sticks may be gently bruised with a hammer previously to immersion, for about half an inch from the top, so as to open the fibres to form a brush. They are used by dipping one of the ends into the powder or opiate, and then rubbing it against the teeth, which are cleaned and whitened admirably by this process. Cane or some common wood is sometimes used instead of the marsh-mallow root, but the brushes are of a very inferior quality. A small country shopkeeper, who discovered this hint, used to manufacture and sell these tooth-brushes, thereby adding greatly to the profits of an otherwise very poor little business. Thus this *hint* originated a *fact*, which in its turn may be a very good *hint* for some other poor body.

Velvet Cream.—This is made by dissolving an ounce of isinglass in half a pint of white wine, adding lump sugar to taste, having previously rubbed some of the lumps on the rind of a lemon. Put it on the fire, and stir until the isinglass and sugar are thoroughly dissolved. Strain, and when the wine is cold add a pint of cream; place it in moulds to congeal.

Velvets, to Clean.—The following has been recommended as a very simple mode of cleaning velvets:—Procure a small square of pipeclay (such as the soldiers use to clean their uniform with), and scrape a little off upon the velvet; then take a brush, made of the same material as the carpet-whisk, and lightly brush it off. This raises the pile, and restores the bloom.

Velvet, to Restore.—Rip the velvet to pieces, damp each piece separately and hold it tightly in both hands, stretch it round a warm stove-pipe, the wrong side of the velvet against the iron. This will remove the creases, and give the surface of the material a fresh and new appearance. Velvet cannot be ironed on a table, as when spread out on a hard substance the iron will not go smoothly over the pile.

ANOTHER WAY.—Cover the velvet with a damp cloth, heat an iron, and hold it *under* the velvet—passing it to and fro beneath. For this proeess, the velvet must be stretched over a vacant space between two tables, and well secured to each, by weights or something that will keep it fast. The vapour arising from the heated iron and the wet cloth will raise the pile of the velvet, while at the same time another person brushes it up with a velvet-brush.

Venous Blood.—The dark blood, formed from the food, circulating in the veins and devoid of nourishing properties. (See also *Blood* and *Arterial Blood.*) Venous blood consists of chyle, composed of organic particles, which having already formed an actual part of the solid structures of the body, are on their way to the lungs to receive a higher elaboration, and of blood which having completed its circuit through the system is on its way to the lungs for depuration and renovation.

Ventilation.—Few tasks are more difficult than that of giving a small room, such as may be found in middle-class houses, sufficient ventilation without creating draughts. To change at least seven or eight cubic feet of air per minute for each occupant of a small room—such as may be found in little houses, without reference to gas or other lights—the whole body of air would have to be constantly in motion, so that the room would be a mere passage for air; hence the importance of large rooms in connection with health, in large areas, such as those of hospitals, theatres, churches, &c. The following rules should be borne in mind in ventilating a chamber:—Air warmed to a moderate temperature will mix without draughts with the air already in the apartment. The air should not be robbed of its normal supply of moisture in being heated, or it will have a tendency to keep the skin too dry, and by affecting the lungs prove productive of disease. Dust ought not to be drawn or passed in by the warmed air. In various other sections of our little work we have dwelt upon and fully explained the vital importance of pure air with reference to healthy life. It is not, however, always owing to the deficiency of oxygen that the air we breathe in small or over-crowded rooms becomes unwholesome or dangerous. A council of health established some years ago by the French Government proved, that in an atmosphere which had not lost one-twentieth part of its oxygen an animal miasmata was diffused in vapours; that on suspending in such atmospheres a glass vessel filled with ice, the vapour diffused in the air being collected in another vessel suspended beneath it, exhaled a fetid odour, and on being exposed to a temperature of 79° Fahr. speedily underwent putrid fermentation. All rooms should of course have an outlet for the air, and on no account should chimney-boards be used to shut up the chimney of a room, especially a bedroom. From the superior levity of foul air the aperture for its escape should be made at the highest point that can be attained, and so arranged as to diffuse the fresh air as it enters over the upper part of the room, and not inconvenience the inmates by descending upon them in the form of a draught. In whatever way fresh air may be made to enter an apartment, it should be, as far as may be practicable, at the part remotest from the fire-place, in order that it may traverse the whole apartment in its passage to the chimney. The most effective species of ventilation is that in which the process of Nature herself is adopted. The simple action of the sun, no less than the devastating phenomenon of the African tornado, tend to the same result. We have only to change the temperature of the air which surrounds us, when a purer portion will rush in from the adjacent spaces, to supply the void thus created. (See *Heat.*) Hence the warmth of a lamp near the aperture in a ceiling tends to keep the air pure; the air rarefied by the heat quickly ascends the funnel aperture above the lamp, and is constantly replenished with the colder air from below, which, as we have said, however, is creative of a draught. It would occupy too much space to describe the various inventions intended to meet the difficulty of ventilating without causing draughts, but as the best are all in the market, they must all be judged by the principles we have laid down above and by certain other facts and hints in these pages, whereby our readers can readily judge for themselves. All we are desirous of doing is to impress emphatically upon our readers the vital importance of pure air as a matter concerning their health, and all that depends upon the full and vigorous action of their mental and bodily faculties. (See *Atmosphere*, *Blood*, *Lungs*, *Indigestion*, and *Exercise.*) A species of ventilating lanterns, which serve the double purpose of lighting a staircase and ventilating the house, have been introduced with excellent effect. Ventilating bricks are useful for ventilating cellars. Perforated plates of zinc or glass are sometimes substituted for the ordinary panes of glass in windows. Where gas is burned the necessity for ventilation is seriously increased, for a single burner will, it is estimated, consume more oxygen than would be required for half-a-dozen candles. With reference to heating apartments, since we English have a strong prejudice in favour of open fire-places—against which, from a scientific point of view, and especially with regard to ventilation, there is much to be said—it is well to arrange it so that its demands upon the fresh air of an apartment (see *Combustion*) may not be too great. The best, or one of the best, ways of doing this, is that of connecting each fire-place with the open air by means of a flue-tube under the floor, opening above the surface and behind the grate. Such a tube might be either a metal or earthenware one, or it might be formed in the brickwork. Both the external and the internal opening should be closed by a grating. This plan supplies the fire and the room with fresh air properly tempered; the more especially as, according to Dr. Arnott, a certain amount of fresh air always enters a room in consequence of the imperfect closing of the doors and windows. Another mode of ventilation is that of earthenware tubes opening in the wall near the ceiling, so that it mixes with the warm air and does not create a draught. The vitiated warm air may be carried off by the chimney flue through an orifice jus tbelow the ceiling, fitted with one of Dr. Arnott's chimney-valves, or some similar contrivance. Dr. Drysdale's plan is a very good one. In 1861 Dr. Drysdale built a house in the suburbs of Liverpool, in which many of the defects of ordinary houses were avoided, and ventilation effected by what he terms a siphon-shaft, the foul air being removed from each room in the house by means of a separate pipe, and conveyed to a foul-air chamber in the roof, whence it was drawn by the "suction-power" or heat of the kitchen chimney. The house in question is a marine villa, facing the sea, and is of two storeys, with the main staircase in the centre of the plan. In a chamber under these stairs a coil of pipes, in connection with a boiler in the basement on the low-pressure principle, warms the air, which comes in through a flue opening to the external atmosphere. The fresh air passing through the chamber and becoming heated is distributed to the various apartments in the house through openings in the cornice near the ceiling, and through "hit-and-miss" gratings forming the upper section of the architraves of the bedroom doors. The vitiated air is conveyed from each room through a perforated ornament in the ceiling, by a zinc tube to a zinc drum about six feet by five feet in the roof. This drum communicates, by means of a zinc tube and a shaft built into the wall, with the bottom of the exhaust shaft, which is formed by constructing the smoke-flue from the kitchen fire of fourteen-inch earthenware pipes placed within a square brick shaft, the intervening space forming the passage for the foul air, which thus finds an escape at a few inches below the coping of the shaft. The fire-places in this house are at the corners of the rooms, and no chimneys are placed in outer walls, while the windows are of thick plate-glass. The general result of the ten years' experience of different families who have occupied it is that it is warm and at the same time airy and comfortable, while Dr. Inman, who visited it on a bitterly cold day, says, in his "Preservation of Health," that he has never before or since been in a house which seemed so thoroughly comfortable. In the house built by Dr. Hayward, also at Liverpool, the same principle is applied; but in this a central lobby forms the ventilating shaft and divides the dwelling centrally. All the rooms on the three storeys open into these lobbies, which, together, form a corridor extending from basement to attics, being connected by lattice-work in the centre of the ceiling of each story and iron gratings at each side of the floor above. By this arrangement the warm air passes from the bottom lobby to the others, but the lattice-work and gratings not being in line sufficient resistance is offered to its passage to compel an ample supply to pass into the rooms on either side of the corridor through a lattice enrichment in the respective cornices and perforations in the separating wall. Over the gaseliers are perforated plates connected to a zinc tube, which conveys the vitiated air to the chamber in the roof, whence it is drawn as before by means of the heated flue in the brick shaft. This plan of ventilating and warming houses is not confined to any special description of dwelling, but may, as the authors asserted, be adapted to the poorest class of houses by building them in blocks, just as easily as a common system of drainage is made applicable. But it is more especially fit for "splendid blocks of offices" and workshops and warehouses, where great numbers of persons spend a large portion of their lives, subjected to continual cold draughts and to the bane of vitiated atmosphere. With respect to expense, the authors offer some sensible observations; for, while acknowledging that the expense of the zinc pipes, and running them through and between the walls and ceilings, together with the other necessary appliances of the scheme, will amount to a considerable sum, they point out that a considerable saving may be effected in the brickwork and plastering of the house, which need not be so lofty or so large for equivalent requirements. Thus, living and bed rooms might be reduced in height, and the latter also in size, for with this system of ventilation a constant supply of fresh air is furnished, which more than compensates for diminished cubical capacity, especially where the air of the larger rooms is all but stagnant. But, as things are, "what can architects do in changing the style of middle-class house building? They are constantly pressed to meet the requirements of the commercial value of a house as at present estimated, and forced to give as many and as large square boxes of rooms as will go under a roof and within four walls as can be got for the money. With such requirements, how can they study convenience, beauty, health, or comfort?"

Vessels of Wood.—A hint for their preservation will be found under the head of *New Wood.*

Vinegar Plant.—To obtain this fungus, which is commonly known as mother of vinegar, dissolve a quarter of a pound of sugar and half a pound of treacle in three quarts of water over the fire. When the water is so hot that these are completely dissolved stir it, taking care that it does neither burn nor boil. When it is done put it in a jar, cover it closely down, and allow it to remain in a warm place for six or seven weeks, by which time the leather-like fungus—which is the vinegar plant—will be found floating on the surface, and the liquid will have become vinegar. The vinegar-plant once obtained is easily propagated. A single plant may be divided into many pieces, and each piece in its turn will become a separate plant. When you have made as much vinegar as you require—it is improved by bottling—the plant may be dried, and when required will again convert more sugar, water, and treacle into a good, clear, strong, and perfectly wholesome vinegar.

Vision.—The eye is of a globular form, and composed of three coats of teguments, one covering the other. The external coat or case, which forms the globe of the eye, is at the back part strong and opaque; the fore part is thin and transparent, so as to admit readily the rays of light, and it is therefore called the cornea, from its resemblance to polished horn. It encloses three pellucid matters called humours, which are of different densities. That in the anterior part, immediately under the cornea, is the aqueous humour, that immediately behind is the crystalline humour, which is a double convex lens of great refracting power, and the rest of the eye is filled with a jelly-like substance called the vitreous humour. The iris, which is the coloured part of the eye, is an opaque membrane, which is perforated by a small hole, the pupil, through which the rays of light must pass to the crystalline humour. The optic nerve enters at the under part, and is spread all over the interior surface, at the back of the eye, in the form of a fine network, and therefore is called the retina. Thus it will be seen that the eye is altogether calculated to act as a convex lens of strong refractive power. From every luminous point of a visible object cones or pencils of light are reflected in every direction; but in order to produce vision, it is necessary that they should be concentrated or converged to such a point as to make a forcible impression on the retina.

Vital Heat.—Vital heat exists in the human body in an active and in a latent form. It originates in the combustion which is always going on, as we have explained in our articles on *Food*, *Digestion*, *Combustion*, and *Blood.* (See page 149.)

Volatile Liquids, how to Keep them.—Chemists and others know well the difficulty of keeping very volatile liquids. Bottles of ether, for example, are shipped for India, and when they arrive are found to be more than half empty. The chemist sometimes puts a bottle of benzole or bisulphide of carbon on his shelves, and when he next requires it he finds the bottle empty and dry. The remedy with exporters is a luting of melted sulphur, which is difficult to apply and hard to remove. A new cement, therefore, which is easily prepared and applied, and which is said to prevent the escape of the most volatile liquids, will be found very useful to many. It is composed simply of very finely-ground litharge and concentrated glycerine, and is merely painted round the cork or stopper. It quickly dries and becomes extremely hard, but can be easily scraped off with a knife when it is necessary to open the bottle.

Wafer Biscuits. — Take the whites of two eggs, to which add two ounces of melted sugar well sifted, and mix with two and a half ounces of fine-sifted flour, one drop of oil of cinnamon and one drop of oil of cloves, and make the whole into a liquid paste. Provide some copper plates tinned, butter them slightly, and on them lay your paste (which must be very thin) in drops about the size of a penny piece four inches apart; increase the size of these drops with the forefinger until they nearly touch each other and are as thin as wafers; bake them a fine colour, and either roll them on a small roller when hot or turn them into little horns. They are excellent to serve with custards, ices, or to ornament a cream.

Warts, to Cure. — Dissolve as much common washing soda as the water will take up, wash the warts with this for a minute or two, and let them dry without wiping. This repeated is said to gradually destroy the largest wart.

Washing.—We shall first treat of

COLOURED DRESSES.—For washing these have ready plenty of clean soft water. It spoils coloured clothes to wash them in the suds of white clothes, a common practice with bad washers. The water must be warm, but by no means hot, lest it injure the colours. Rub soap enough into the water to make a strong lather first, put in the dress (adding a table-spoonful of ox-gall), and then wash it well. For a second water put it into another soap-suds, colder and weaker, and wash it through that; then throw the dress into cold water and rinse out all the soap. Lastly put it into a second rinsing-water with a little blue, and a handful of salt to set the colours. Wring it well. Have ready a large earthen pan filled with weak starch tinged with a little blue. For muslins it is usual to mix a little gum arabic water with the starch—for instance, a table-spoonful. Put the dress into it and run it through the starch, then squeeze it out, open it well, clap it, and immediately hang it out to dry in the shade, taking the sleeves by the cuffs and pinning them up to the skirt, so as to spread them wide and cause them to dry the sooner. Chintzes, &c., should be washed in fine weather; but if it is intensely cold, it is better to dry them at the fire than to risk the spoiling of the colours from their freezing in the open air. But it is still better to defer their washing till the weather is sufficiently temperate to allow drying in the open air. If coloured clothes continue wet too long, no precaution can prevent the colours from running into streaks. This will certainly happen if they are allowed to lie in the water. They must always be done as fast as possible till the whole process is completed. If the colours are once injured, nothing can restore them, but by good management they may always be preserved, unless in low-priced calicoes, and many of them wash well with care. As soon as the dress is quite dry take it in; but unless it is wanted immediately, do not sprinkle it, lest in lying damp the colours should be impaired. It should not be sprinkled over-night if not to be ironed till next day. When perfectly dry roll it up in a clean cloth, and put it away by itself for two or three hours before you iron it.

Silken Fabrics.—To a sufficient quantity of ox-gall add enough boiling water to make it warm. Spread out the silk on a large kitchen table, and dipping a clean sponge in the gall, go over the whole surface of the article on both sides. Then squeeze it well out, and repeat the application of the sponge, having added more boiling water to the gall so as to heat it again. Rinse the silk in clear cold water, and repeat the rinsing (changing the water each time) till the last water appears perfectly clear. Then stretch it and dry it quickly in the air, and afterwards pin it out on a table. To give it the consistence of new silk, dissolve in boiling water a little glue or gum arabic, mix with it sufficient cold water, and sponge the dress all over with it. This must be done on the wrong side. Then dry it, sprinkle it slightly, and roll it up tightly in a towel; let it lie a few hours, then iron it, taking care that the iron is not too hot, as silk scorches very quickly. You may perfume the ox-gall with a little musk, to prevent the silk from smelling unpleasantly after it is done. Unless the silk is a very good quality it is of very little use to wash it. A merino or bombazine dress may be washed in the same way as the above, but the stiffening process must be omitted afterwards. We now give an excellent way of washing with soda soap.

Washing with Soda-Soap.—Mix two pounds of soda and four of the best brown soap cut up small, add two gills of the spirits of turpentine. Put them into a kettle with ten quarts of water (two gallons and a half), and boil them together for two hours. When cool it becomes white and hard. Put it away in a covered box. In using it for washing clothes, allow one pint of the soap to two pails of hot water. Make a lather of it in a large tub, and put in the white clothes. They will require but little rubbing and no soaking. Then rinse them well and hang them out, and boil them a short time in clear, pure water. Afterwards rinse them through two cold waters, with a little blue in the last. Soda-soap will not do for coloured things, and care must be taken not to use too much of it, as it will injure the clothes.

New Flannel should always be shrunk or washed before it is made up, that it may be cut out more accurately, and that the grease which is used in manufacturing it may be extracted. First, cut off the list which lies along the selvage edges of the whole piece. Then put it into warm (but not boiling) water without soap. Begin at one end of the piece, and rub it with both hands till you come to the other end. This is to get out the grease, and the blue with which new white flannel is always tinged. Then do the same through another water. Rinse it through a clean lukewarm water; wring it lengthways and stretch it well. In hanging it out on a line suspend it straight and lengthways, not in festoons. If hung in festoons the edges will be in great scollops, making it very difficult to cut out. It must be dried in the sun. When dry let it be stretched even, clapped with the hands, and rolled up tightly till wanted. If the flannel is intended for petticoats, cut it at once into the requisite number of breadths, as it can then be shrunk with much more convenience than when in one long piece. For other flannel articles of dress it is well, before shrinking it, to divide it into as many straight pieces as the thing to be made will allow. Lay the flannel all night in a tub of cold soft water. In the morning pour off the whole of the water, and drain, but do not wring the flannel. Make a light suds of warm water (not hot) and of white soap or of whitish Castile soap. Wash the flannel thoroughly through this suds, and wring it out as dry as possible. Then, having shaken it, stretch it and fold it smoothly down on a clean table to make it straight and even, hang it out immediately. When about half dry stretch, shake, and turn it. Take it in while it is still damp, fold it smooth, cover it with a clean towel, and after it has lain half an hour iron it with a warm iron. Flannel should always be washed with white soap, otherwise it will neither look well nor feel soft. The water must be warm but not boiling, as it shrinks flannel to scald it. Wash it in clean water, and entirely by itself. Rub the soap to a strong lather in the water, before the flannel is put in; for if the flannel is rubbed with the soap itself it will make it hard and stiff. Wash it in this manner in two warm waters, with a strong lather in each. Rinse it in another warm water, with just sufficient soap in it to give the water a slight whitish appearance. To this rinsing water you must add a little blue from the blue-bag. Cold rinsing water is found to harden the flannel. When you have rinsed it thoroughly, wring it hard, shake it thoroughly, and hang it out on the clothes-line. While drying, shake, stretch, and turn it several times. It should dry slowly. Flannel *always* washed in this way will look white, and feel soft as long as it lasts, retaining a new appearance and scarcely shrinking at all. But if once *badly* washed with scalding water, with brown soap and rinsed in cold water, it will never look well again. If you are willing to take the trouble, flannel washed according to the above recipe will look beautiful if put into a clean dry sheet or towel while it is wrung, and afterwards (while drying) held between two persons and shaken all the time. This may be worth while for very fine new flannel, or such as is worn by infants.

WOOLLEN STOCKINGS.—These are to be washed as fast as possible, and precisely in the same manner as flannel. Stretch and pull the stockings when half dry, and in hanging them out suspend them by the *toes* pinned to the line.

BLANKETS.—Summer is the best time for washing blankets. It is well to commence them early in the morning, that they may be dry by evening. Blankets should be always washed one at a time, first in strong suds, then in weaker suds, then a third time in much weaker suds. Wring them slightly, pull them as straight and even as you can, then hang them up to dry in the sun. If not quite dry in the evening, take them down from the line, fold them, put them into a large basket, and next day, if fine, hang them out again, but if the day is damp dry them off quickly in the house. Fold them smoothly and put them away in a chest, sprinkling tobacco or laying pieces of camphor amongst them.

In large families where economy is a necessity, it is usual to utilise the old clothes of the grown-up members of the family by converting them into garments for the younger ones. We append some hints :—

COATS AND TROUSERS.—Where coats and trousers are concerned, it is proper they should be previously washed. Brush them well before washing. It is best to rip out the pockets and linings, lest they should communicate lint to the cloth. Wash them through two warm lathers of brown soap (soft soap is the best) with a half-teacupful of lye in the first suds. Do not wring them, but pull and stretch them well, and roll them up tight, and press out the water against the washing board, or against the side of the tub. Then lay them (rolled up) on a clean table, and press and squeeze out the remaining suds, setting a tub underneath to catch the droppings. Afterwards rinse them in two light lathers (a little warm), rolling them up and pressing out the water as before, after each rinsing. Wringing in the usual way will cause them to be streaked and shrivelled. When all the water has been pressed out, stretch and pull them well, and hang them up by the wristbands on a clothes-line. When perfectly dry sprinkle them, roll them very tight in a thick damp cloth, and let them lie all night. Iron them on the wrong side till they are perfectly dry, otherwise they may still shrivel. Trousers and waistcoats of light cassimere must be washed in suds of white soap without any lye, and in rinsing them the lathers should be very light, the last one scarcely tinged with soap. Iron them on the right side, and place a fine thin cloth between them and the iron, which must not be too hot.

WOOLLEN TABLE CLOTH. — For washing this it is best for good reasons to select a bright windy day. Having first rubbed out all grease spots and stains (see *Stains*, p. 359), put the table-cover into a tub with some clean suds of white soap and clear water, warm but not too hot, in which has been mixed about two table-spoonfuls of ox-gall, and wash and squeeze it well. Then wash it through a second lather, somewhat weaker, of soap without any gall in it. Afterwards rinse it through light lukewarm suds just tinged with soap. Instead of wringing (which would shrivel it), press out as much of the water as you can with your hands, then fold it up in a tight long fold, and roll or press it hard with both hands on a clean ironing-table, having set a tub to catch the water that drips from it during the process. Roll it always from you towards the end of the table. When the water ceases to come from it shake and stretch it well, and dry it as quickly as possible, but not by the fire. Stretch and shake it frequently while drying. Take it in before it is quite dry, spread it on an ironing sheet, and iron it on the wrong side, pressing it hard.

"STARTING THE DIRT."—Clothes will come out much cleaner and whiter if before putting them into the tub some wetted soap is rubbed well on the dirty places, and the clothes are then rolled up and put aside until the water is hot. This is often called "starting the dirt" by experienced laundresses, who find that it renders the clothes much easier to wash.

Wassail.—At Christmas time the old English wassail bowl sometimes revisits us, and were not its manufacture still a mystery to so many, its adoption might become more common. The following recipe, therefore, from a first-class hand, may prove acceptable:—Direct a small quantity of spices to be simmered gently in a teacupful of water, for fifteen or twenty minutes, to wit, cardamoms, clove, nutmegs, mace, ginger, cinnamon, and coriander. Put the spices, when done, to four bottles of white wine, not sweet, and a pound and a half of loaf sugar, and set them on the fire all together, in a large saucepan. Meanwhile, let the bowl have been prepared, and the yolks of twelve and the whites of six eggs well beaten up in it. When the spiced and sugared wine is a little warm, take a teacupful of it and mix it in the bowl with the eggs; when a little warmer, another teacupful, and so on, for three or four. After which, when it boils, add the whole of the remainder, pouring it in gradually, and stirring it briskly all the time, so as to froth it. The moment it froths, toss in a dozen well-roasted apples, and serve it up as hot as it can be. Should the wine be British (which is not orthodox), dry raisin is to be preferred. This, with the addition of three-quarters of a pint of brandy, makes perhaps as good a wassail as the other.

Water-cress. — The medicinal properties of water-cress are stimulating and diuretic. In medicine the expressed juice, which contains the peculiar pungency and taste of the herb, is used. To experience the full virtues of this herb, it should be eaten at breakfast, dinner, and tea. To thoroughly cleanse water-cress for eating, ordinary water is not sufficient, but strong salt and water is thoroughly effective.

Water Pipes in Frosty Weather.—In an old number of *Once a Week* a contributor says:—"There exists so simple a mode of preventing the water-pipes in houses from bursting by frost, that I suspect the plumbers must be aware of it, and keep it carefully out of sight. It is to have a small spherical cistern of thin copper attached to the lower part of the water-pipe, and a gas-burner fixed below it. If, when the frost comes off, the gas-jet be lighted, the effect will be that the cistern will become a boiler on a small scale, circulating sufficient warmth through the pipes to prevent the action of the frost either in stopping the supply or in bursting the pipes. Every household might be saved from winter's mishap by this simple mode, without the unsightly process of hay-banding their service-pipe."

Waterproof Coats, Restoring.—A correspondent (J. P. R.) writing to the *English Mechanic* says:—"A short time ago I had a waterproof coat which had been lying by some time, and was very hard, and a friend of mine (who had been in India) restored it to its original state by dissolving a handful of best grey lime in half a pailful of water, and wiping the coat at the parts that were hardened, doing so twice, at about three hours' interval."

Water, to Freeze in Summer without the application of Ice.—Take eleven drachms of muriate of ammonia, ten of nitrate of potash, and sixteen of sulphate of soda. Reduce each of these salts separately to a fine powder, and mix them gradually in a glass vessel—or thin metal is better—with five ounces of water (the capacity of the vessel should be only large enough to hold the materials). The result will be, that as the salts dissolve cold will be produced; and a thermometer immersed in the mixture will sink at or below freezing. A little water, about half an ounce, in a test-tube, when immersed in the mixture during its solution, becomes frozen in ten minutes.

Water, to Preserve it Sweet during Long Voyages.—It is necessary that the water-casks should be well charred on their insides. This is found to be the best method of preventing decomposition of the water, which is the cause of its becoming disagreeable to the taste and unwholesome. Many suppose that water becomes tainted in consequence of the putrefaction of animalculæ and small vegetables which it contains; but this is not so much the cause as a real decomposition of part of the water, which is effected by the juices and other parts of the wood of the cask attracting the oxygen of the water. The hydrogen remains in the water, and gives all the unpleasant properties to it. Charring of the casks is the best preventive that can be adopted. Tainted water may be somewhat recovered by stirring in it powdered charcoal.

Waters, Mineral.—(See page 272.)

Wax Candles Imitated.—Put equal quantities of gum benzoin and resin mastic into separate vessels of glass or lead; add spirits of wine, and heat them gently until the resinous parts are dissolved; mix them together. Tallow candles may be coated with this to give them the appearance of wax; they must be heated to 90° Fahrenheit; the candle is then dipped in for six or eight seconds, until the varnish adheres, and afterwards carefully dried in a pot free from dust.

Weather Signs, Popular.—Carious teeth become troublesome, and pains in the face, ears, and gums are sometimes experienced just before rain, and rheumatic pains often become more acute. Limbs once broken ache where the join was effected, and various other slighter bodily aches and pains have been found from time immemorial to indicate a change in the weather. Just before rain ants become unusually busy, as was observed by Virgil, Aratus, Pliny, and many others since. Asses are said to bray and peacocks to squall before rain. Hence the old adage—

> "When that the ass begins to bray,
> Be sure we shall have rain that day."

Another old proverb says—

> "'Tis time to cock your hay and corn
> When the old donkey blows his horn."

Bats flitting about late in the evening in spring and autumn are usually said to indicate a fine to-morrow. On the contrary, when bats are early in seeking their hiding-places, bad weather may be expected. When berries are particularly plentiful in the hedges on the maybush and the blackthorn, a hard winter is, in the country, always looked forward to, but the sign is not, we think, a very reliable one. Beetles flying about late in the evening are said to foretell fine weather on the next day. The appearance of butterflies very early is said to indicate fine weather. When the flames of candles flare and snap, or burn unsteadily and dim, it is said to be a sign of rain or wind. A metrical proverb, to be found in old almanacks, says :—

"If Candlemas day be fair and bright,
Winter will have another flight;
But if Candlemas day be clouds and rain,
Winter is gone, and will not come again."

When cats grow restless and play with their tails, or wash their faces frequently, or seem unusually dull and sleepy, rain is said, in the houses of many old country farmers, to be of a certainty foretold. The same is said of cattle when they are unusually restless and frolicsome in the pastures. Chickens are said to be very noisy just before rain, and cocks to crow at unwonted hours. Milk is apt to indicate thunder-storms by turning sour. Crows utter a peculiar cry before rain. When dolphins or porpoises sport and gambol on the surface, sailors expect a storm. Dogs digging or making deep holes in the ground are said to indicate rain thereby. Drains and cesspools smell stronger than usual just before rain. Many people grow drowsy and sleep heavily before a heavy fall of rain or snow. The clamorous quacking of ducks is also a sign of rain. Noises in the ears sometimes indicate atmospherical changes. Fieldfares, when they arrive early in the autumn and in large numbers, are said to foretell a hard winter. Fishes play nearer the surface of the water, and bite more readily—as all anglers know—just before rain. When the fire burns unusually bright and clear, frosty, clear weather is indicated; when the fire burns dull, rain is indicated. Flies and other insects become more troublesome and sting more often in the intervals of rainy weather, particularly in the autumn. Peculiar hollow mysterious noises sometimes made by the wind in great forests indicate stormy and rainy weather. Frogs croak more noisily and come abroad in the evening in larger numbers before rain. Stormy petrels settling under the wake of a ship are said to foretell severe storms. When wild geese are observed to migrate southwards in autumn and winter they are said to indicate severe weather. When gnats fly in a vortex in the beams of the setting sun, fine weather is, it is said, foretold; when they frisk about more widely, increased heat is indicated; when they seek the shade and bite more frequently, the signs are those of coming rain. Gossamer—the fine web of a certain species of spider—is said, when abundant in the air, to afford a sign of a fine autumn. A halo seen round the sun or moon indicates that hail, snow, or rain, according to the season, will follow. Persons subject to headache frequently experience it just before a storm. When pigs run about squeaking and throwing up their heads with a peculiar jerk, windy weather, it is said, will surely follow—hence comes the old Wiltshire proverb, that "Pigs can see the wind." Jackdaws are unusually clamorous before rain. Kine, when rain and wind is coming, often assemble in one corner of the field, with their tails to windward. Kites flying unusually high are said to denote fair weather. Larks, when they sing long and fly high, forebode fine weather. Magpies flying three and four together, and uttering harsh cries, indicate windy weather. Before a storm the missel-thrush has been observed to sing particularly loud. The air grows clear and distant objects are seen more clearly just before rain. If in the absence of wind the surface of the sea becomes agitated by a long rolling swell, we may expect a gale. This is well known to seamen. Pigeons returning slowly home unusually early foretell rain. In the "Shepherd's Almanack" for 1676, among the observations on the month of January, we find the following:—"Some say that if on the 12th of January the sun shines, it foreshows much wind. Others predict by St. Paul's day, saying, if the sun shine, it betokens a good year; if it rain or snow, indifferent; if misty, it predicts great dearth; if it thunder, great winds, and death of people that year." Guinea-fowls squall and quails are noisy before rain. Many smokers have observed that when the scent of tobacco is retained longer than usual, rain and wind are indicated. Swift thus whimsically records the various signs of coming rain:—

"Careful observers may foretell the hour,
By sure prognostics, when to dread a shower.
While rain depends, the pensive cat gives o'er
Her frolics, and pursues her tail no more.
Returning home at night, you'll find the sink
Strike your offended sense with double stink.
If you be wise, then go not far to dine:
You'll spend in coach-hire more than save in wine.
A coming shower your shooting corns presage,
Old aches will throb, your hollow tooth will rage.
Sauntering in coffee-house is Dulman seen;
He damns the climate, and complains of spleen.
Meanwhile the South, rising with dabbled wings,
A sable cloud athwart the welkin flings,
That swilled more liquor than it could contain,
And, like a drunkard, gives it up again.
Brisk Susan whips her linen from the rope,
While the first drizzling shower is borne aslope:
Such is that sprinkling which some careless quean
Flirts on you from her mop, but not so clean:
You fly, invoke the gods; then turning, stop
To rail; she singing, still whirls on her mop.
Not yet the dust had shunned the unequal strife,
But aided by the wind, still fought for life:
And, wafted with its foe by violent gust,
'Twas doubtful which was rain and which was dust.
Ah! where must needy poet seek for aid,
When dust and rain at once his coat invade?
Sole coat! where dust cemented by the rain
Erects the nap, and leaves a cloudy stain!"

Darwin gives, however, the most correct version of these signs; and as the lines are very readable and amusing, we append them:—

"The hollow winds begin to blow,
The clouds look black, the glass is low,
The soot falls down, the spaniels sleep,
And spiders from their cobwebs peep.
Last night the sun went pale to bed;
The moon in halos hid her head.
The boding shepherd heaves a sigh,
For, see, a rainbow spans the sky.
The walls are damp, the ditches smell,
Closed is the light red pimpernel.
Hark, how the chairs and tables crack!
Old Betty's joints are on the rack;
Her corns with shooting pains torment her,
And to her bed untimely send her.
Loud quack the ducks, the sea-fowls cry,
The distant hills are looking nigh.
How restless are the snorting swine!
The busy flies disturb the kine.
Low o'er the grass the swallow wings,
The cricket, too, how sharp he sings!
Puss on the hearth, with velvet paws,
Sits wiping o'er her whiskered jaws.
The smoke from chimney right ascends;
Then spreading back to earth it bends.
The wind unsteady veers around,
Or settling in the south is found.
Through the clear stream the fishes rise,
And nimbly catch the incautious flies.
The glowworms, num'rous, clear, and bright,
Illumed the dewy hill last night.
At dusk the squalid toad was seen,
Like quadruped, stalk o'er the green.
The whirling wind the dust obeys,
And in the rapid eddy plays.
The frog has changed his yellow vest,
And in a russet coat is drest.
The sky is green, the air is still,
The mellow blackbird's voice is shrill.
The dog, so alter'd is his taste,
Quits mutton bones, on grass to feast.
Behold the rooks, how odd their flight
They imitate the gliding kite,
And seem precipitate to fall,
As if they felt the piercing ball.
The tender colts on back do lie,
Nor heed the traveller passing by.
In fiery red the sun doth rise,
Then wades through clouds to mount the skies.
'Twill surely rain, we see 't with sorrow,
No working in the fields to-morrow."

Redbreasts grow bolder, and peck against the window-panes when the cold threatens to be unusually severe. Sun-rays seen in the clouds indicate rain, as Aristotle noticed. Sea-gulls appearing inland indicate severe weather. In conclusion, we may refer to the well-known sign afforded by the rainbow, and the ancient proverb which says—

"A rainbow in the morning
Is the shepherd's warning.
A rainbow at night
Is the shepherd's delight."

Double rainbows are very rainy signs.

Weights and Measures.—

APOTHECARIES' WEIGHT.

Solid Measure.

20 Grains	= 1 Scruple =	20	Grains.
3 Scruples	= 1 Drachm =	60	,,
8 Drachms	= 1 Ounce =	480	,,
12 Ounces	= 1 Pound =	5760	,,

Fluid.

		Symbol.
60 Minims	= 1 Fluid Drachm	f. ʒ
8 Drachms	= 1 Ounce	f. ℥
20 Ounces	= 1 Pint	O
8 Pints	= 1 Gallon	gall.

The above weights are those usually adopted in formulæ. All chemicals are sold by

AVOIRDUPOIS WEIGHT.

$27\frac{11}{32}$ Grains	= 1 Drachm =	$27\frac{11}{32}$	Grains.
16 Drachms	= 1 Ounce =	$437\frac{1}{2}$	,,
16 Ounces	= 1 Pound =	7000	,,

Precious metals are usually sold by

TROY WEIGHT.

24 Grains	=1 Pennyweight=	24	Grains
20 Pennyweights	=1 Ounce =	480	,,
12 Ounces	=1 Pound =	5760	,,

FRENCH WEIGHTS AND MEASURES, AND THEIR EQUIVALENTS IN ENGLISH.

1	Cubic Centimètre	=	17 minims nearly.
$3\frac{1}{2}$	,, ,,	=	1 drachm.
28·4	,, ,,	=	1 ounce.
50	,, ,,	=	1 oz. 6 drachms 5 minims.
100	,, ,,	=	3 oz. 4 drachms 9 minims.
1000	,, ,, or 1 litre, = to 61 cubic inches	=	35 oz. 1 drachm 36 minims.

The unit of French liquid measures is a cubic *centimètre.*

A cubic *centimètre* of water measures nearly 17 minims (16·896); it weighs 15·4 grains, or 1 *gramme.* A cubic *inch* of water weighs 252·5 grains.

The unit of French weights is the gramme = to 15·4 grains: thus a drachm (60 grains) is nearly 4 grammes (3·88). An easy way to convert grammes into English weight is to divide the sum by 4, which gives the equivalent in drachms very nearly, thus:—

Grammes.			Drachms.		oz.	dr.		Grains.
100	÷ 4	=	25	=	3	1	+	43

TABLE TO CONVERT GRAMMES INTO GRAINS.

Grammes.	Grains.	Decigrammes.	Grains.	Centigrammes.	Grains.	Milligrammes.	Grains.
1	15·4346	1	1·5434	1	·1543	1	·0154
2	30·8692	2	3·0869	2	·3086	2	·0308
3	46·3038	3	4·6304	3	·4630	3	·0463
4	61·7384	4	6·1738	4	·6173	4	·0617
5	77·1730	5	7·7173	5	·7717	5	·0771
6	92·6076	6	9·2607	6	·9260	6	·0926
7	108·0422	7	10·8042	7	1·0804	7	·1080
8	123·4768	8	12·3476	8	1·2347	8	·1234
9	138·9114	9	13·8911	9	1·3891	9	·1389

The unit of French measures of length is the *millimètre.*

The mètre measures 39·37 inches, or 3·28 feet.

The centimètre is equal to 00·39 inches.

A foot is equal to 30·48 centimètres.

A yard is equal to 91·44 centimètres.

A square inch is equal to 6·45 square centimètres.

An inch lineal is equal to 2·54 centimètres.

Whipt Cream.—Put a quart of cream into a bowl with some powdered sugar and orange-flower water, and have another bowl at hand in which to strain the cream through a sieve. Whip the cream with a whisk, and as it rises in a froth remove it with a spoon or a skimmer, and put it into the sieve. Continue thus putting back in the first bowl until you have finished what drained from the sieve. Then put it into a dish for serving up, ornamenting with zest of lemon, or according to taste or fancy. It may also be served in glasses. Should you wish to ice it, put ice and salt around the bowl. When the cream is stale a little gum-dragon will remedy the defect to a certain extent.

Whitewash, To.—Wash with a whitewash-brush and water to remove the dirt; next prepare a wash of whitening, having the necessary quantity of size, and a little blue, such as washerwomen use. Stir up all together, and lay on evenly with a brush, keeping your work up close to prevent blotching. Lime is used for out-door work, and should have some alum mixed with the water in the proportion of a pound of alum to twelve gallons of water. The alum should be dissolved in warm water before mixing. Plasterers use the grounds of beer in common washes.

Wicker Baskets.—Very pretty effects in colour may be got by dyeing these with Judson's dyes. (See *Dyeing*.)

Wills.—When the depositions are numerous and the property extensive, the making of a will should be entrusted to a lawyer; but where the bequest is a simple one, and the meaning can be expressed clearly and unmistakably, the services of a lawyer may be dispensed with. The conditions which are required to give effect to a will are the following:—The testator at the time of making the will must be of age and of sound mind; the will must be written, and must be signed by, or for, the testator in the presence of two witnesses. Nothing must be inserted after the testator's signature is attached. A wife cannot make a will, because after marriage any property she may possess legally belongs to her husband, unless it has been previously settled upon her for her own use, in which case she may dispose of it by will, as a man may whether he be married or single. The witness to a will must be some one who receives no benefit from it, some one who understands the reason why he signs it, and some one who is able to write his name. We append the costs of probate and letters of administration:—

Above the value of			With Will annexed.		Without Will annexed.	
£100	& under	£200	£2	0	£3	0
200	,,	300	5	0	8	0
300	,,	450	8	0	11	0
450	,,	600	11	0	15	0
600	,,	800	15	0	22	0
800	,,	1,000	22	0	30	0
1,000	,,	1,500	30	0	45	0
1,500	,,	2,000	40	0	60	0
2,000	,,	3,000	50	0	75	0
3,000	,,	4,000	60	0	90	0
4,000	,,	5,000	80	0	120	0

With the same rate of increase for every £1,000 from £6,000 to £1,000,000. If the value be £1,000,000 or upwards, then for every £100,000, or fractional part thereof, a stamp duty of £1,500 with a will, and £2,250 without a will.

Legacies (£20 or more).

	Duty per Cent.		
To Children or their descendants ...	£1	0	0
To Brother or Sister and their descendants	3	0	0
To Uncle or Aunt and their descendants	5	0	0
To Great Uncle or Aunt and their descendants	6	0	0
To all other Relations or to Strangers	10	0	0

Husband, wife, and Royal Family exempted. Property left to the husband or wife of a relative pays only the duty chargeable to such relative.

Window Cases for Plants.—There are few subjects in which a few years have produced a greater change than the cultivation of plants in rooms, particularly in those situated in the dense part of the towns and cities. Not a very long time back a few superannuated geraniums in pots and two or three lanky hyacinths in glasses were almost all that could be made to blossom in confined situations; and if the denizen of the metropolis garnished his apartment with a clove pink or a carnation, a verbena or a heath, only for a brief space could he make his pets survive in such a contaminated atmosphere. As to flourishing, it was out of the question. Every shrub he might procure became stunted, black, and flowerless. The daisy, violet, and heart's-ease all died. Even the hardy stonecrop, thrift, and houseleek dragged on but a miserable existence. Thus discouraged, the Londoner aimed no longer to have his *rus in urbe*, and sought in other things for those decorations which he hoped to have reaped from the bountiful hand of Nature. Why this general mortality and disease should take place was variously explained. By one party, and that by far the most numerous, it was thought to arise from want of fresh air, by which term it was understood air such as that of the fields, uncontaminated by the breathing of animals and not deoxidated by the burning of culinary and manufacturing fires. But, said another party, plants ought to thrive better in cities, because they live upon carbonic acid gas, and both respiration and combustion furnish it to them in greater abundance than in the open country. This last opinion being theoretically true, the question arises, how is it, then, that they dwindle under such apparently favourable circumstances? Upon reflecting upon it we trace several causes for this effect. First, we must consider that a plant in its native place of growth, or even in a country garden, is subjected always to a seasonable and natural temperature, not thrown into unwonted vigour by too much heat, nor withered by want of moisture. In those seasons when plants grow most vigorously—namely, spring and autumn—the dews of night fill the absorbent vessels, the moderate heat of day stimulates the languid system of vegetation. These regular alternations of warmth and moisture can scarcely be imitated with convenience in domestic gardening. Here, then, is one cause of want of vigour. A second is to be found in the inferior and unequal degree of light. In the open country the plant is surrounded by the strongest light throughout the day. In a room light comes, perhaps, only through a window, and even then without clearness or brilliance. Thus the stems become elongated, the leaves sickly and white, the flowers pale and scentless, the fruit abortive, although the poor deplorable plant used its best endeavours to escape to a clearer atmosphere by growing towards the window, and to obtain every particle of light it could by turning all its movable parts in the same direction. A third cause of failure is the contamination of the atmosphere in which the plants are placed, not from the presence of carbonic acid gas—that they could probably bear; nor yet sulphuric acid gas, as some have said, but because it is loaded with fine particles of smoke and other exhalations which coal fires always yield in abundance. This, wafted through the air when hot, settles when cold on everything around, plants and all. By this means the pores of the leaves become clogged up, the stomatæ upon their surfaces, which are the organs of respiration, evaporation, and partly of absorption, become impeded in their important functions, and the sap, no longer elaborated by the leaves, ceases to deposit those secretions upon which vegetable vigour and health, we may say life, depend. It must be evident that if we could remove these causes of decay we should be enabled to cultivate plants with success in confined places. Our minds would therefore naturally consider greenhouses as the proper shelter. This is partially true; but these buildings are subject to other and great vicissitudes. For example, the direct rays of the sun upon their glazed roofs concentrates the heat within, and if the windows are opened the moisture evaporates. Thus great attention is requisite, not only to ensure a proper degree of warmth, but of moisture also, and the contamination of the atmosphere is unprovided for. It was suggested by a first-class botanist that if plants were placed in air-tight cases every obstacle to their luxuriant growth would be removed, fuliginous particles would be excluded; these cases being placed in an apartment, sufficiently equable temperature will be preserved, and the moisture with which they are at first furnished evaporating, will roll down the sides of the glass and be again taken up by the roots and passed upwards to the foliage. Thus a succession takes place as in nature, without the least attention being necessary; and, although this does not remedy the want of light, but rather diminishes the small quantity otherwise obtainable, yet it is only to choose such plants as grow naturally in confined situations, amid obscurity and moisture, and we are then enabled to have a flourishing garden, even in the narrowest streets of the city.

The size of such garden may be that most convenient to us, from the extent of an apartment to the confinement of a common glass bottle. The following directions on the formation, arrangement, and management of domestic greenhouses and on the choice and procuring of subjects for them will, we hope, be useful :—Plants have been grown in a common quart bottle (white glass), and are to be managed thus :—Put the plants first into the bottle, and hold it up a little, so that nothing but a part of the roots shall touch the bottom, or if there be room enough not even these. Then having some of the proper earth, in a rather dry state, pour it gradually in so as to surround the roots and lie evenly about them. Next pour in sufficient water to saturate the earth, and this being done, cork up the bottle so as to be completely air-tight. The plant will take root and flourish for a long period without any attention whatever. It should be kept near the light. Plants may be raised from seed in the same manner, putting in the earth first, water next, and the seed being sprinkled on the top, until the seed germinates or begins to grow. It must be placed in a dark situation. Glass cases for growing several plants together may be made as follows :—Procure a wooden box, of any convenient length and breadth, and six or eight inches deep. Have a groove made around the top of the box to hold a glass shade, either made of one piece, like those shades which are used to cover alabaster vases, birds, &c., or else made of five pieces of glass joined by a strip of pasted paper, or by a brass or wooden frame-box. Put the plants or seeds in it ; water them well, and put on the glass cover. The lower edge of this, it will be remembered, fits in the groove, made larger than the cover, so that when the latter is put on a space shall be all around it. It may either remain thus or be filled with water or putty, rendering the case thereby air-tight. The above are adapted to keep within an apartment, as for example, withinside a parlour or study window ; but it may be wished to construct a building which shall be capable of holding a much larger quantity of plants. Such may be constructed exactly like a common greenhouse, but not capable of being opened except by means of a door or window communicating with an apartment ; thus, although not air-tight, it is defended from great and sudden alteration, not being in connection with the open air.

Windows, how to Ornament.—Rub up on a palette sugar of lead, with a little boiled linseed oil. Apply it to the glass with the end of a large hog's-hair tool, with a dabbing motion, keeping the brush at a right angle with the glass ; continue working on it in this way until the effect of ground glass is produced. Let it dry, and when quite hard, draw or trace your ornamental design upon it. This done, the application of a strong solution of caustic potash will enable you to clean away the sugar of lead from the lines and forms described with potash, leaving them clear and well-defined. We have seen conservatory windows very tastefully ornamented by the adoption of this plan.

Wine-cellar.—A wine-cellar should be dry and cool, the air should not penetrate too strongly through its openings, and daylight must be excluded. Sunlight is fatal to wine. Some wines which will not keep well must be in small, others which improve with keeping in large, quantities. Burgundy turns sour with long keeping, and champagne grows thick. In general, it is most difficult to preserve the white wines. Claret and Spanish wines will keep and improve with age. Spanish wines—the sweet ones especially, such as Malaga and Rota—should stand upright, and as warmth improves them, they should be placed accordingly on shelves. Champagne gains by cold. Claret coming immediately out of the cellar gains a softer and more delicious flavour by being slightly warmed before it is drank, but Burgundy is best imbibed fresh from the cellar.

Wine, Making with Grapes.—The method pursued in making wine is generally as follows:—The grapes are gathered when thoroughly ripe, and on a dry day. The green and defective berries being thrown out, the rest are mashed together in a tub. They are then thrown into a cask, and allowed to stand from twelve to twenty-four hours, or until a slight fermentation takes place, after which they are pressed out and the wine put into clean casks, previously sulphured, and stored in a cool cellar. It is allowed to remain until about the 1st of December, when it is drawn off from the lees and returned to the casks, fined down with isinglass, and may be bottled in the beginning of the following May, although it ought to remain in the cask "bung-full" during the following summer, and be bottled in the spring or winter.

Wines.—The numerous varieties of wine depend mainly on the proportion of sugar in the must, and the character of its fermentation. The more perfect and generous wines are those in which the larger proportion of sugar renders the fermentation complete. If the wine is sweet and luscious, the proportion of sugar was too large, and part of it consequently has remained unfermented. If the proportion of sugar was too small, the resulting wine will then be thin and weak. When wine is bottled before fermentation has been completed that process is slowly continued, and the wine when poured out will sparkle as champagne does. White wines are made from the grape separated from its husk; red wines are made from grapes with the husk unremoved, the colouring matter being simply that derived from the skin of the grape, with all its astringent bitterness. Many medical men have stated, with regard to the wholesome qualities of wines, that red are preferable to the white wines. Wines are sometimes denounced in consequence of their acidity, but it by no means follows that a sweet is superior in any sense to a more acid wine. Wine should of course be avoided where fever or inflammatory disease exists, or where it is desirable to avoid everything of an exciting nature. In many cases of indigestion, where a morbid slow fever is going on with a suppression of the healthy functions of the skin, wine must be carefully avoided. In a case of cold hot wine possets taken on going to bed sometimes do good by provoking perspiration; but as a rule they should be avoided at such times. Wines that are of too deep a colour are generally heavy and unwholesome. The prices of wines are usually governed by their age, but the dealers have many tricks and schemes for giving new wines the appearance of old ones. Amongst French wines those of Bordeaux are most popular, and are used for general drinking, being regarded as the most harmless and wholesome; but the stronger wines of Burgundy are preferred for occasional drinking. Champagne wine is highly esteemed everywhere, but it must be taken with caution. Mrs. Dalgairns, in her work on "Domestic Wine Making," says, "All wines are reducible to four general divisions—of dry and strong, sweet, light and flavoured, and brisk. When a dry wine is desired, the liquor is suffered to remain in the vat for three, four, or more days, according to circumstances, and a cask is provided for it sufficiently large to prevent the yeast from escaping at the bung-hole. To make a sweet wine, the fermentation must be discouraged by speedily removing it from the vat to the cask, which is carefully filled as the fluid subsides, and by frequent racking or sulphuring, or by both. To produce a good light-flavoured wine similar to Burgundy, the fluid is allowed to remain from six to twenty hours in the vat; and for wines to resemble champagne it is necessary the juice should remain in the vat but a few hours. Where small quantities are operated upon, the fermentation may be begun in the cask, the must, or mash, being previously strained; for in no case should solid matter be introduced into the cask. The wine is strongest when the fermentation has been partially carried on in close vessels, and the flavour is also better preserved. To have a wine resembling champagne, a partially close mode of fermentation is adopted. For rich and strong sweet wines the whole fermentation may be carried on openly; but in all cases it seems a useful practice to cover the vat with boards and blankets. The fermentation is much sooner completed in a large than in a small vessel. The sweeter and thicker juices require to be treated on a larger scale than the thinner ones. It is easy to make lemon-wine in a cask of two gallons, but it is a very difficult task to operate on so small a quantity of thick and sweet raisin-wine. The most favourable temperature for fermentation (see page 188) is 54° Fahr. When it languishes from cold, a portion of the fruit may be heated to a high degree of temperature and mixed with the mass. The sweetest wines are the most durable, and are improved by keeping; the thinnest and briskest ought to be drank comparatively new. Boiling the fruit tends to make the wine sweet, and white sugar should always be used in preference to brown." All sparkling wines should be kept very cool, and with the cork down; all other kinds horizontally.

Witches, the Dances of.—The following is a plain description of the whole very simple apparatus required for the performance of the entertainment and manner of working it. It may readily be shown in a private apartment, especially where folding doors open from one room into another:—Provide a medium or screen made of tissue paper, which must be the size of the room, and hung up the same as the curtain to the theatre, so that the operator may have a space of six or eight feet on one side of it and the audience on the other. If not made the size of the room, it should be surrounded on all sides with some sheeting, or something similar, to prevent any one from looking behind it; it should, however, be six feet at least in diameter, and if for public exhibition at least double this. On the operator's side of this screen hang up the witch curtain previously made thus:—Get a piece of thick canvas of the requisite size of the room, and paint it black on both sides, or else cover it with thick brown paper, so that no light can penetrate it in any part; then cut out in the centre of it seven holes (Fig. 1); before these holes place the figures of witches cut out in paste-board (Fig. 2), with bars or bands pasted behind to strengthen the figure and to give firmness to the outline. Now fasten over each figure a flap or cover of paste-board, larger than the opening itself. It must be fixed to the curtain by a hinge of rag at the bottom of the hole it is intended to cover. These flaps must be fastened up by a single pin at the top, so that when pulled out suddenly

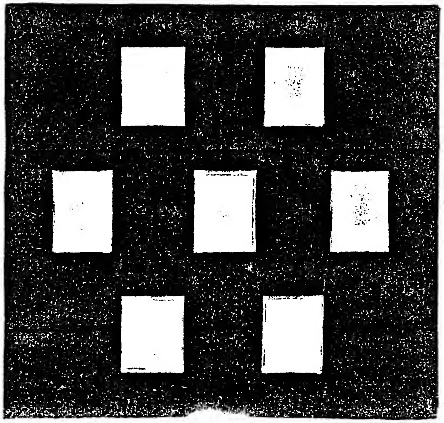


Fig. 1.

the flap shall fall down and discover the figure beneath. This done, you must next prepare two sticks and a cross with a short handle to it, with holes in them to contain some thick wax tapers (see Figs. 3 and 4).

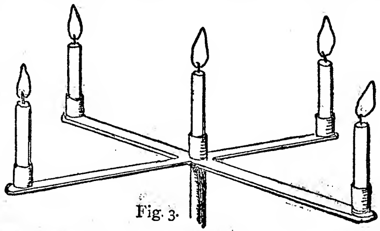


Fig. 3.

Take a twisted taper, unfold it, then cut it into six equal lengths, and twist them together with a bit of common candle wick cotton in the middle of them; cut it into pieces about two or three inches long, of which there should be fifteen in number—five for the cross, six for the two sticks, and four to hold in the hand. All that is requisite is now quite ready, except that, to make the tapers light easily, they should be burnt for a minute, and the tips then touched with spirits of turpentine. To manage the exhibition, for which an assistant will be wanted, proceed as follows :—Light

Fig. 2.

four of the tapers, which hold together in the hand; direct the assistant to loosen the centre flap, which, falling down, suffers the light to shine through the picture of the witch upon the front screen, but nowhere else. One witch will only be seen upon it. Give your assistant two of these candles, and there being now two lights two witches will be seen. Let each of you take one in each hand, and four witches will be seen. As the hands are moved about, so will the figures; and let it be observed that it is always necessary that the assistant should exactly imitate his master in the motion of his hands, &c. Then the sticks being within reach, take one of them and light the three candles upon it, being careful to blow out your own candles as the others are lighted. You will thus have three candles, your assistant two, therefore five witches will appear. Hold it vertically, and two witches with one of them in the centre will be visible; turn the cross round, and so will the witches move. Let the assistant open alternately the various other flaps, and so many groups will start into view, all having the same motion, which may be infinitely varied by the motion given to the cross; and if a second cross be used at the same time the apparent confusion will be indescribable and highly amusing. The dimensions of the

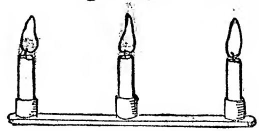


Fig. 4.

various parts are as follow :—Distance between the medium and witch curtain is two feet seven inches; the centre figure is five feet from the ground; the figures about two feet from each other, and about one foot high; the sticks four feet eleven inches each, and the arms of the cross two feet from the centre outwards. The dimensions given above are suitable for carrying out the exhibition on a large scale; where smaller figures will answer or are preferable, proportionate reduction should be made in the size of the apparatus. By substituting paintings on glass for the pasteboard figures colour and greater delicacy is acquired. The magic lantern may also be combined with it with effect; suppose the central figure to be that of a fiddler, shown by the magic lantern, and only movable as to its arms, and around it several groups of dancing dogs or monkeys made with the cross, then the effect would be much more enhanced. The figures themselves also might easily be made to move by means of strings.

Wood Joining.—Amongst carpenters the most common form of joint

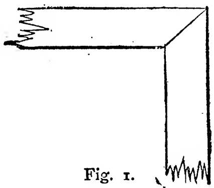


Fig. 1.

is that called the mitre. This joint is used for picture-frames, and is most easily made. The best plan will be for the amateur to get some joiner to make him a "mitre-box," which is simply a

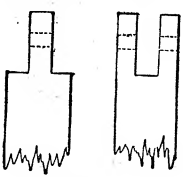


Fig. 2.

couple of pieces of wood, one of which is sawn through, so as to guide the saw at an angle of 45°. When the angles are cut as required, the parts are placed together (Fig. 1). A little glue will hold the parts together, and they may be further secured by carefully *bradding* them. Another useful form of joint is that usually adopted for the frames of slates, and is a modification of the ordinary *mortise* and *tenon* joint. The ends to be joined are cut as shown in Fig. 2, when they should be placed together, and a small hole bored, as shown by the dotted line, and a pin driven through. A little glue will materially strengthen this joint also. The ordinary mortise and tenon is so well known that we need not describe it here; but a useful form of it, which is easily made, deserves a word of notice. Instead of the ordinary square mortise, a round hole may be made with a centre-bit, and into this a pin should be so cut as to fit tightly. If this is well glued and wedged it will be found exceedingly strong, and it is very quickly made.

Worms, to Expel.—The efficacy of the pomegranate in the expulsion of the tape-worm is shown in the case of a person who, having taken two ounces of the decoction of pomegranate root, at the end of an hour expelled at once, and almost without any griping, twelve feet of atenia with a head.

Wounds and Cuts.—If the blood issuing from a cut is scarlet, and throbs, it is arterial blood—*i.e.*, comes *from* the heart; if it is dark, and flows in a continuous stream, it is venous blood—blood going *to* the heart. In the former case a narrow strip of linen should be so tied as to prevent by pressure the flowing of the blood from the heart; in the latter case the ligature should be applied between the wound and the extremity of the limb. This being done, the wound should be well but gently washed, a little pyramid of lint applied point downwards, and a bandage saturated with water bound firmly round above it. If a gash is a long one, a stitch or two should be made with a bent needle and silk, to draw the edges of the wound together, each stitch being tied separately. If the pressure does not arrest the bleeding, a surgeon should be promptly sent for. Wounds are irritated and prevented from healing if not excluded from the air, which is impregnated with minute invisible animalculæ. Ice or extremely cold water will stop hemorrhage. The treatment of wounds will, however, depend in great measure on the cause of the injury. "When it is produced by a sharp instrument like a knife, and the wound is not too deep or of too large a size, it is best cured by gently bathing the part with warm water, so as to remove any dirt from the injury, and then carefully bringing the edges of the wound together into exact contact. They must then be kept in position by the application of slips of some kind of adhesive plaster. It is advisable to leave a slight space between each slip, so as to allow any discharge or matter that may form to ooze through, and not lodge beneath the plaster. It is also necessary in dressing wounds of the fingers not to carry the slips of plaster completely round, so as entirely to surround the finger; for if it should happen that the part began to swell after the injury—which is very likely to happen—the constriction round the finger caused by the plaster would put the patient to considerable pain. If by inadvertence this had happened, it would then be necessary to introduce the sharp point of a pair of scissors beneath each of the slips, taking care to do it as far from the wound as possible, and then dividing them one by one. In applying the plaster, it is best to commence by making each slip adhere to the lower edge of the wounded part, then bringing it carefully upwards across the wound, make it adhere to the sound skin over it. The breadth the pieces of plaster ought to be cut will depend, of course, on the width of the wound, the general rule being that the wider the wound the broader the slips are required. In cases where it is of importance to avoid leaving any scar after the wound has healed, it is necessary to be very careful in applying the plaster that the edges of the cut are exactly in contact, and that not the slightest space is left between them at any part. The better this is done when first dressed the less chance there is of a scar being left after the injury is cured. The ordinary adhesive plaster commonly used for the purpose is usually as good as anything else. In cases, however, where it sometimes happens that the skin is irritable, it is better to substitute either isinglass or white court plaster. The isinglass plaster may be readily made by brushing a solution of isinglass dissolved in water, and to which spirit has been subsequently added, over the surface of a kind of thin gauze. The court plaster is prepared by coating white silk in the same manner with thick gum-water. These plasters require to be dipped for an instant into warm water before applying them. They possess an advantage over the ordinary adhesive plaster in contracting after they are put on as they dry, and thus bringing the edges of the wound closer together. How long this dressing ought to remain on before it is removed will depend in great measure on circumstances. If the wound feels comfortable and free from pain, and there is no swelling of the surrounding parts and no discharge from the wound, the plaster may remain on for three or four days. But in ordinary cases it is customary to dress the wound every second day. Previously to removing the plasters it is necessary to soften them well in warm water, taking care that the water is not too warm, which might put the patient to much pain. It is often advisable, when it is the hand that is injured, to place it in a large basin of warm water, and keep it there until the plaster is completely softened, and able to be detached with a slight effort. Before beginning to take off the dressing it is also advisable to have the plaster we intend to use cut into the proper lengths and sizes required, so that there may be no delay, when the wound is exposed to the air, in again applying the plaster to it. The patient should also be very careful, when the wound is undone and the plaster off, not to move the part in any way, so as not to separate the partially united edges of the wound."

Zairgeth-Egyptian.—This is the name of a very amusing invention issued by the London Stereoscopic Company, of Cheapside. It is so cheap that it is not worth making at home, and so good that we can commend it to our readers.

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