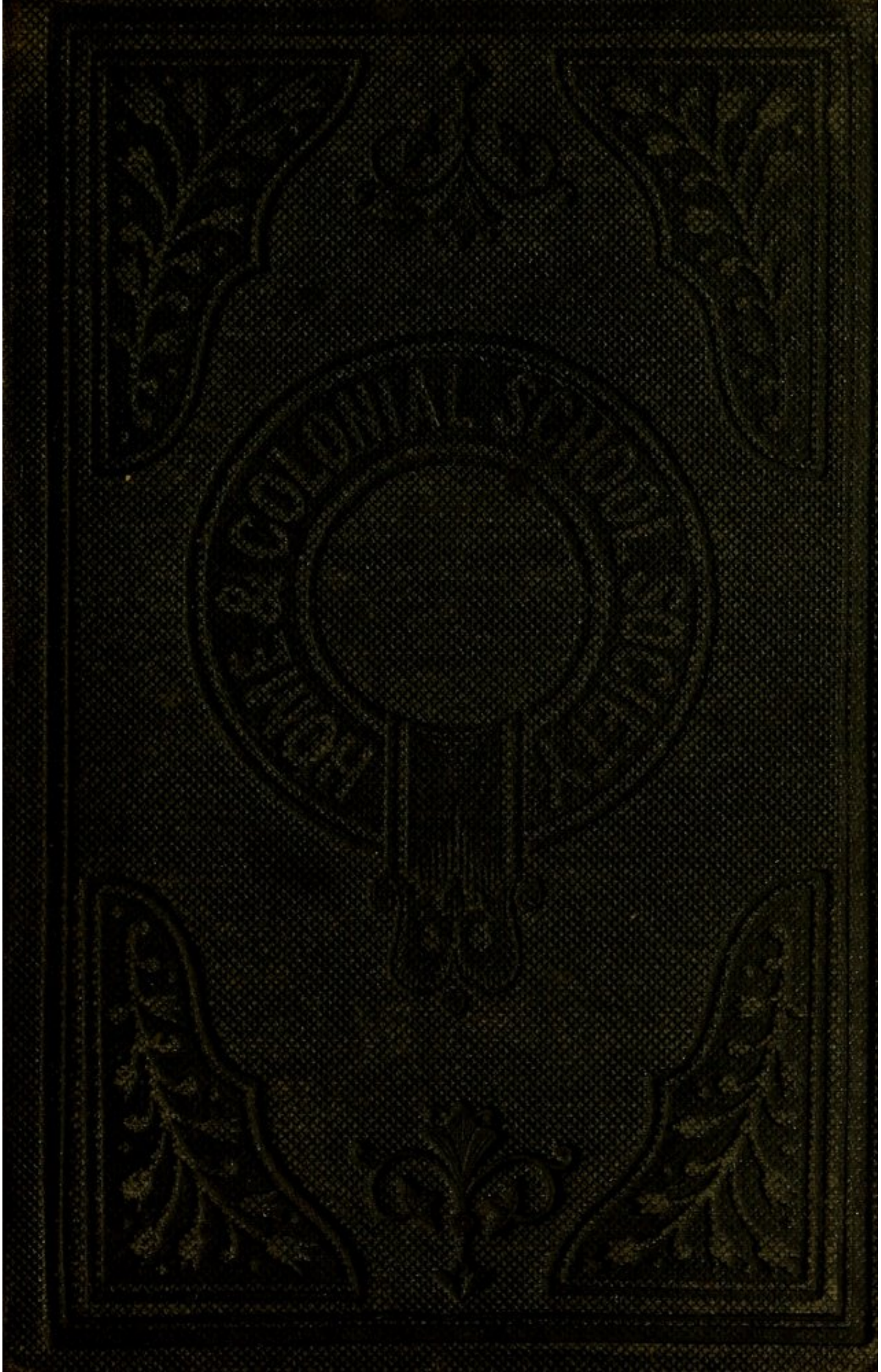
A manual of domestic economy : with hints on domestic medicine and surgery / by W.B. Tegetmeier.



Nellie L. Sharpe

Hygiene. Health.

Hygiene is the art of preserving health. i.e. of obtaining the most perfect action of body & mind during so long a period as is consistent with the laws of life. It diminishes disease, ensures perfect growth, more perfect decay, less rapid, life more vigorous, death more remote

1. Local Hygienic & Sanitary Engineering.
2. Hygienic Architecture
3. Warming & Lighting & Clothing - 5. Food. 6. Care of Invalids.

Local Boards of Health were established under the Public Health Act of 1848; and by the Local Government Act of 1858, any town or village may obtain the powers necessary for carrying out improvements for the health of the inhabitants. In towns there is a medical man appointed as the health officer to give advice upon the sanitary arrangements of houses, and also an inspector of nuisances who may be always found by a letter addressed to the office of the Board of Works for the District.

Personal health depends upon two distinct classes of causes.

I. Upon the place where we dwell.
II. Upon our own personal and family habits

See Necessary sanitary conditions to make a house healthy

1. There must be good drainage both of the land on which the house is built and also of the house itself.
2. There should be free admission for light and air.
3. There should not be overcrowding either in bed rooms or living rooms
4. There should be plenty of pure water.
5. House refuse should be at once removed
6. There ought to be no cesspool attached to the dwelling but if there must be then the drains connecting the house with it should be trapped to prevent the return of bad gases into the rooms.

A MANUAL

OF

DOMESTIC ECONOMY:

WITH HINTS ON

DOMESTIC MEDICINE AND SURGERY.

BY

W. B. TEGETMEIER,

FORMERLY LECTURER ON DOMESTIC ECONOMY AT THE HOME AND COLONIAL TRAINING INSTITUTION, GRAY'S INN ROAD.

TENTH EDITION, REVISED AND ENLARGED.

LONDON:

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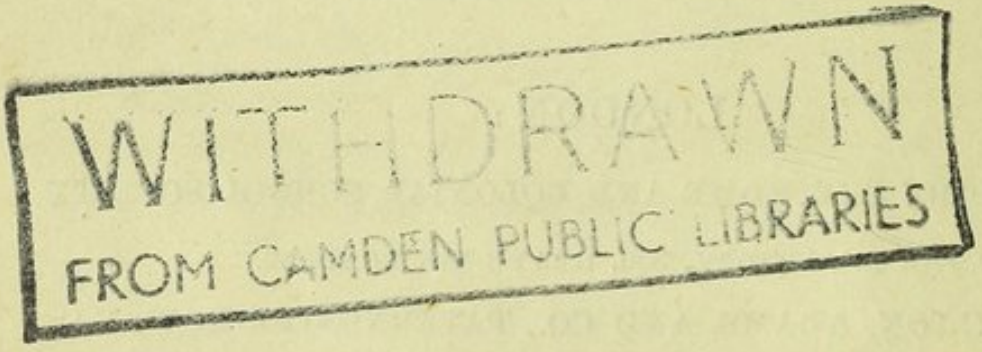

PREFACE TO THE TENTH EDITION.

THE following work was written to supply the want of a text-book on the subject of Domestic Economy and Medicine, that would be suited in its size and price, to the use of female students in Training Institutions, and to the elder classes in girls' schools.

How far it has been successful in its aim may be judged from the facts that already it has passed through nine very large Editions; that it has been adopted as the text-book on the subjects on which it treats, in the principal Training Colleges in the United Kingdom; and that it has been used in most of the large female schools where industrial instruction has been given. With regard to its use in industrial schools, the Author begs to quote the following remarks from the "*Report of the Commissioners appointed to Investigate the Education in Mining Districts.*" Speaking of Messrs. Baird's school at Gartsherrie, they state "That the girls, in three months, can be taught plain cooking, washing, and cleaning, enough to prepare them for service, or to make them useful to their mothers at home. They are all instructed in Tegetmeier's 'Domestic Economy' at school, so that their minds have been directed to many useful principles. On going to service after such a course, a girl would probably get £1 more wages for the first half-year's service."

The present Edition has been very carefully re-arranged, so as to make it more systematic in its course of instruction.

Finchley, N., 1877.

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DOMESTIC ECONOMY.

CHAPTER I.

THE HOUSE AND ITS FURNITURE.

It is scarcely possible to overrate the influence which the character of a dwelling exercises upon the health and morals of its inhabitants. Sound bodily health and the capability of resisting fatigue cannot be enjoyed by any persons who live in overcrowded, ill-lighted, badly ventilated, undrained houses. Common decency and morality are impossibilities in dwellings where, from the want of sleeping accommodation, people of both sexes and all ages herd together promiscuously. All efforts to elevate the condition of the labouring classes are useless whilst they are compelled to reside in dwellings of this kind. It is, therefore, most important to ascertain what are the conditions essential to constitute a healthy house, fitted to fulfil the requirements of a working man's family. Such houses are difficult to obtain. Either they do not exist, or their high rent precludes the possibility of obtaining them. Fortunately, possessors of landed property are awakened to a sense of the evils attending the present state of house accommodation, and fulfilling their responsibilities in this respect.

Situation.—The aspect of a house, or the direction in which it faces, is worthy of some consideration, as the amount of warmth and sunlight received into the rooms depends very much upon it. Houses with a northerly aspect are darker, colder, damper, and therefore less healthy than those built to face in the opposite direction.

Houses deeply shaded by trees are cold, damp, and consequently unhealthy. The greater the proportion of light, the more healthy the habitation. The absence of sunshine is one of the causes which render close, narrow courts and streets unhealthy. It has been observed that a much larger number of invalids are received into the military hospitals from the dark than from the light sides of the various barracks.

In selecting a house, great care should be taken to avoid a neighbourhood where any offensive trade is carried on, or where there is a burying-ground in close proximity.

DRAINAGE.—A damp house is always unhealthy. The presence of undue moisture in the air has a great tendency to produce rheumatism, colds, and inflammatory disorders. By lowering the tone and the vigour of the body, it also predisposes to other diseases. Dampness from the soil may arise either from the house being built in a low, undrained situation, or from the presence of land-springs. When it is absolutely necessary to build in damp situations, the ground on which the house stands, and that for some distance around, should first be well drained. It is also especially desirable to erect cottages built in such places on a raised platform of earth, two or three feet in height; the expense is trifling, and the advantages, both in the healthiness of the habitation, and the durability of the timbers of the building, are very great.

Even in the driest situations cottages should always be built at least six or eight inches above the level of the crown of the road they face.

Dampness may be prevented from rising through the walls by one course of brick all round the house being set in asphalte, or by a layer of slate being interposed between two courses. Floors of common porous brick are objectionable in all situations, particularly on damp soils; if wood cannot be used, concrete should be employed, or hard well burnt bricks, bedded in mortar on a layer of dry brick rubbish and sand.

The floor of the living room should, if possible, always be of wood; and the joists should be so far raised above the ground as to leave an air space beneath. A draught through this space should be secured by perforated air bricks being let in the walls

beneath the floor line. This communication with the external air is essential to prevent dry-rot in the timber, and dampness in the room.

North walls are frequently damp from the absence of the drying effect of the sun; this defect may, however, be remedied by allowing ivy to grow over them—it acts both by preventing the access of rain, and by the rootlets absorbing moisture from the wall.

In very exposed situations the rain is frequently driven with such violence against the walls, as to penetrate through them, although the brickwork is of considerable thickness. This evil may be obviated by dissolving three quarters of a pound of mottled soap in one gallon of boiling water, and spreading the hot solution steadily, with a large flat brush, over the outer surface of the brickwork, taking care that it does not lather. This is to be allowed to dry for twenty-four hours; when a solution formed of a quarter of a pound of alum dissolved in two gallons of water is to be applied in a similar manner over the coating of soap. The soap and alum mutually decompose each other, and form an insoluble varnish which the rain is unable to penetrate. The operation should be performed in dry, settled weather.

In towns, or any situation where a system of draining by sewers or pipes exists, no house should be taken which is built over or near a cesspool, nor in which the drains are in any way defective. Glazed earthenware pipe drains are preferable to those constructed of brick, as the latter permit the sewage to pass into the surrounding soil.

In the country, when cesspools are employed, they should be placed as far as possible from the house, and the sinks for the refuse water should be connected with them by means of glazed earthenware drain pipes. Cesspools that are merely pits dug in the ground permit their contents to penetrate the soil, and this becoming saturated for a considerable distance around, taints the air, and renders the neighbourhood very unwholesome. They should, therefore, be formed of very sound brickwork carefully built in cement.

The employment of earth closets in the place of cesspools is

strongly to be recommended, as being free from offensive odours, much more healthful during the prevalence of infectious diseases, and above all as not contaminating the springs and wells in the neighbourhood. The use of any patent apparatus is not necessary. Any outdoor closet may be constructed with a stout, well pitched drawer or box, beneath the seat, arranged so as to pull out behind when required to be emptied; and a box of dried earth with a scoop in the inside completes the contrivance. Slops should not be thrown into an earth closet.

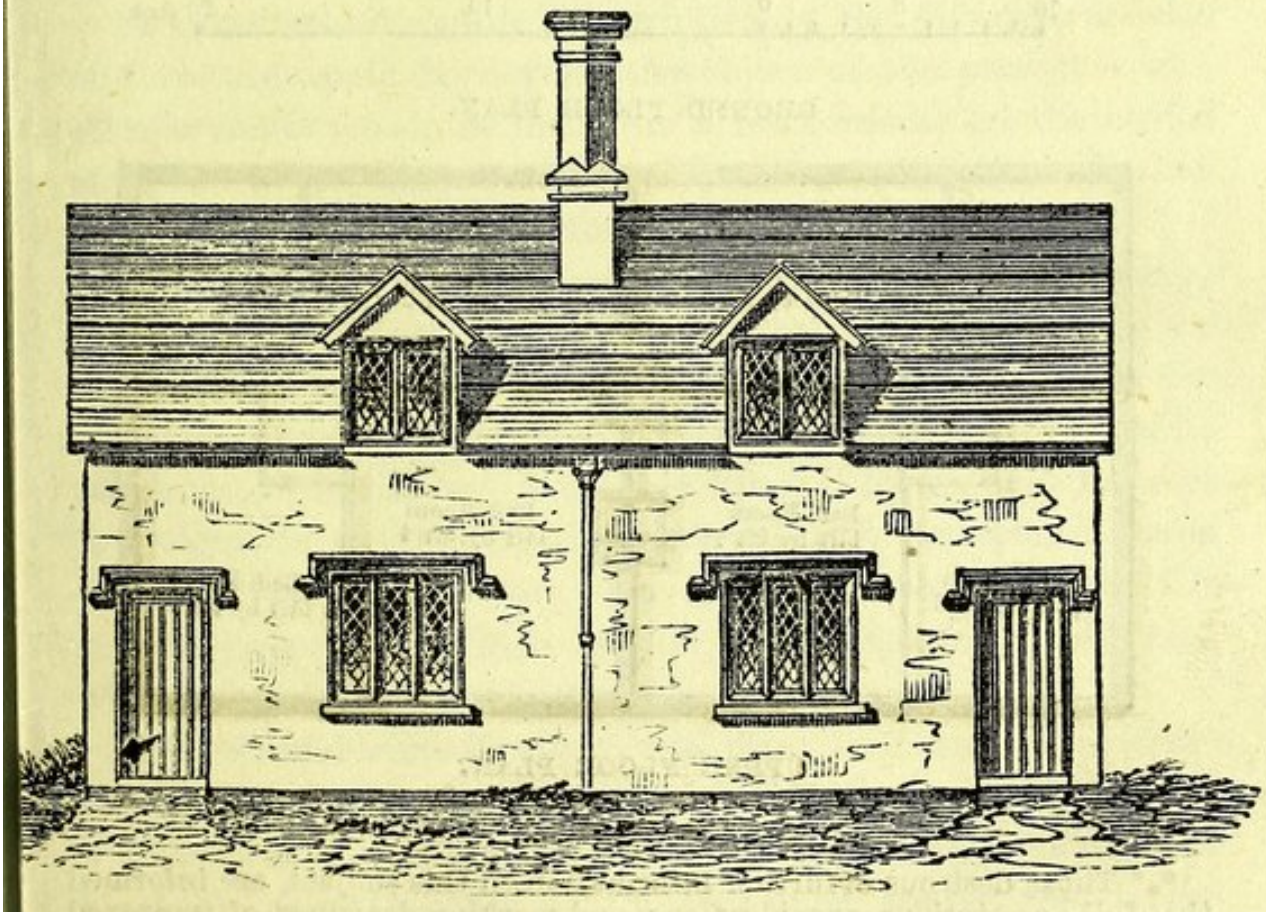
SIZE.—The smallest house for a labouring man, with a grown-up family, should contain at least three bed-rooms—one for himself and wife, one for boys, and another for girls. It is essential that one, at least, of these bed-rooms should have a fire-place, to be used in case of illness; and, as a chimney greatly aids in ventilating a room, it is desirable that each one should be so provided.

It is impossible to state, with any precision, the number of cubic feet of air required in the sleeping-rooms, as so much depends on the amount of ventilation which exists. It is evident that a small room, in which the air is gradually changed during the night, will be more healthy than a larger one perfectly closed. The Poor-law Board require, in the union houses, 300 cubic feet as the smallest space for each person during the night; the smaller bed-rooms in the following plans would, if eight feet in height, contain about 600 cubic feet; 11 × 7 × 8 = 616 cubic feet. In barracks, 500 to 600 cubic feet is the least amount of air space allowed for each soldier; and in most hospitals, upwards of 1,000 cubic feet of space are furnished for each inmate; as a rule, the larger the air space, the healthier the habitation.

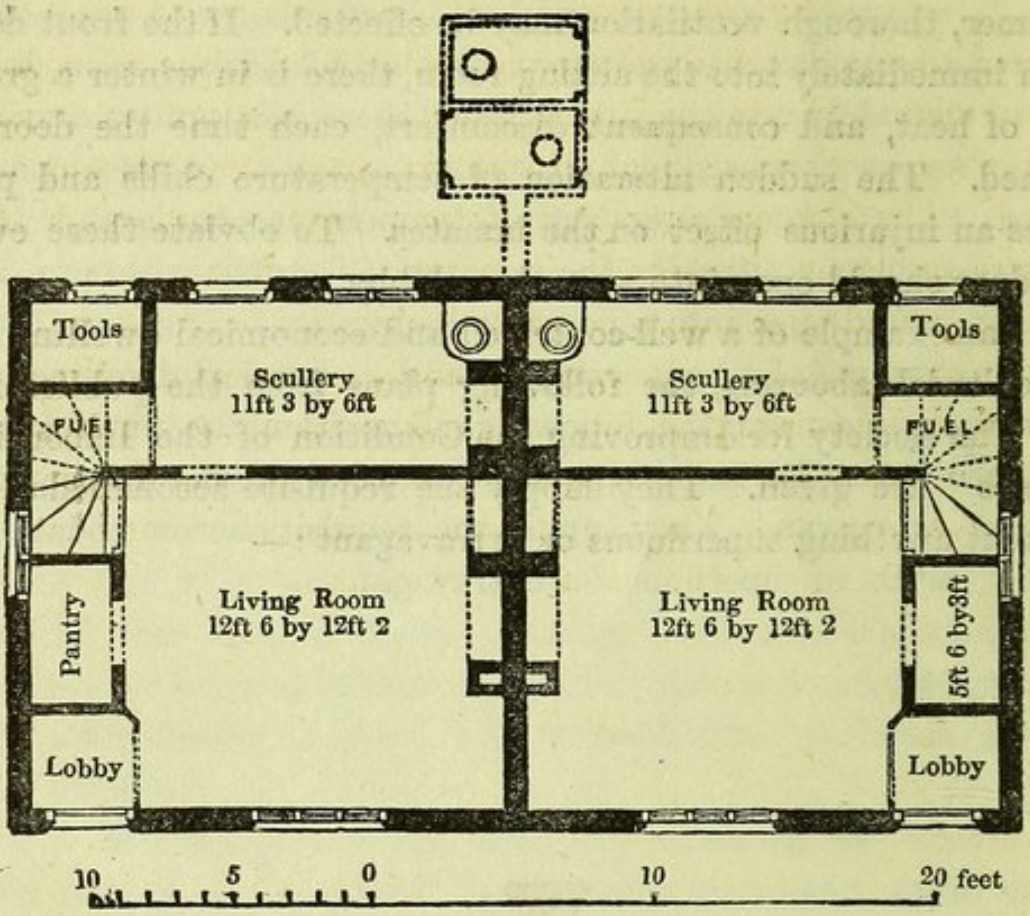
Every labourer's cottage should have a living-room of not less than 150 superficial or square feet, and there should be a small scullery or washhouse. A large kitchen is not desirable, as there is a temptation to make it a living-room, and to keep the sitting-room for ornament rather than use. A pantry for the reception of food is necessary; and it should have a window communicating with the outer air. A place for tools, and another for fuel, are also requisite. Every house should be constructed with a back as well as a front door, so that by opening both in

summer, thorough ventilation may be effected. If the front door open immediately into the sitting room, there is in winter a great loss of heat, and consequent discomfort, each time the door is opened. The sudden alteration of temperature chills and produces an injurious effect on the inmates. To obviate these evils the door should open into a porch or lobby.

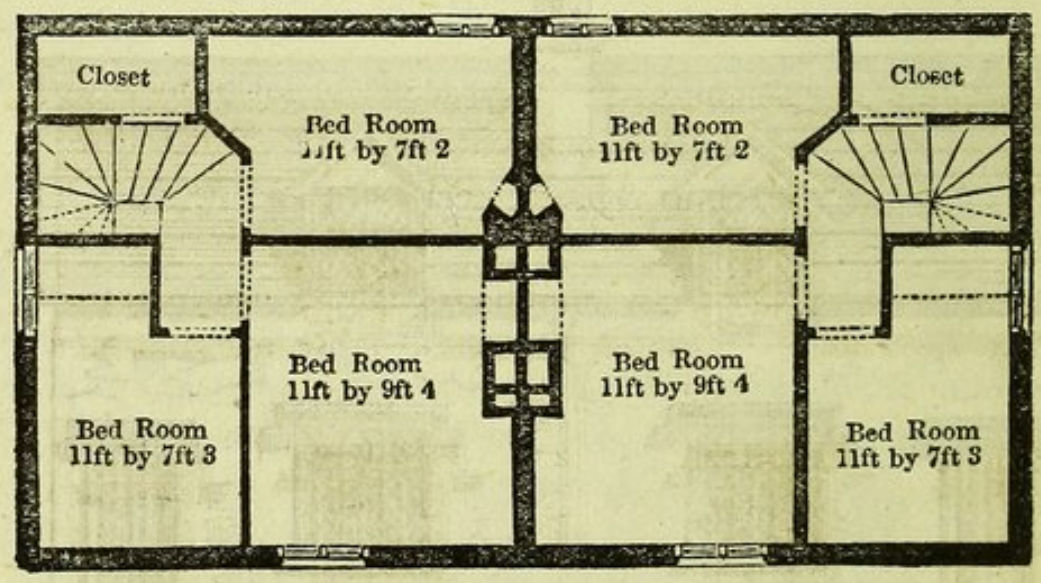
As an example of a well-contrived and economical dwelling for agricultural labourers, the following plans from the publication of "The Society for Improving the Condition of the Labouring Classes" are given. They supply the requisite accommodation, without anything superfluous or extravagant :—



RONT ELEVATION OF DOUBLE COTTAGE FOR AGRICULTURAL LABOURERS.



GROUND FLOOR PLAN.



UPPER FLOOR PLAN.

*** Those desirous of further information on this subject, are informed that full descriptions, specifications, and working drawings of improved dwellings for the agricultural and manufacturing classes, may be obtained from the "Society for Improving the Condition of the Labouring Classes," Exeter Hall, London, E.C. Several very admirable plans will be found in "Birch's Country Architecture" (Plates III. and III a.), Blackwood and Sons, 1874.

HOUSE-RENT.—It is sometimes stated, that the rent of a house should not exceed one-eighth of the income of the occupier. This rule, although applicable to many country districts, cannot be followed in large towns, where house-rent is often exceedingly high. A working man in London, or other large city, earning 30*s.* a week, is obliged to expend far more than 3*s.* 9*d.* a week in order to obtain a suitable habitation. He can rarely procure a decent lodging at less than 5*s.* or 6*s.* a week. Even in the large buildings recently erected as houses for the working classes, the necessary accommodation for a labouring man and his family cannot be obtained under 5*s.* or 6*s.* a week. In the country, where small cottages may often be obtained at a low rent, the rule may be considered a good one; though, when we consider how much the moral and physical improvement of the working classes depends on their being comfortably lodged, it is important that they should reduce less necessary expenses, in order to obtain healthy and comfortable homes.

FURNITURE.—A detailed description of the different articles of furniture would be beyond the object of the present work; all that comes within its limits are a few remarks on the choice of furniture in general, and an estimate of the prices of what may be considered essential for a school teacher's residence.

In all cases it will be found that well-made articles are so much more lasting than those of inferior quality, that they are the cheapest eventually; this is particularly the case with tin-ware, sitting-room furniture, carpets, bedding, &c. Therefore purchasing furniture of a durable kind, although the first cost is greater, is generally real economy. For example, common japanned iron coal-scuttles rust and become useless within a few months, whereas superior articles, lined with zinc, will last, without repair, for many years.

Good second-hand furniture will often be found much more serviceable than new that is of an inferior quality. Articles purchased at cheap shops are almost invariably made of inferior materials, and are, consequently, very much the dearest in the end.

It is desirable, also, not to select articles of furniture which require much time and trouble in cleaning; copper utensils aer

particularly objectionable on this account, and when used in a dirty state for cooking, they are poisonous. Glass and earthenware are more readily cleaned than any other substances, and, for many purposes, are preferable to metal. Enamelled iron goods are very cleanly, but they require a great amount of care in use.

Bedsteads and bedding form an important and expensive portion of the furniture of a house. Iron bedsteads are far preferable to those of wood, as they do not harbour insects, are easily cleaned, and very durable. The objection to iron bedsteads, that the laths become rusty and destroy the mattresses, may be obviated by laying a piece of coarse canvas or old carpet over them; neither oil-cloth nor any other waterproof material should be employed for this purpose, as they retain damp—causing the bedding to decay rapidly, and become unwholesome.

In respect to pattern, those termed French bedsteads are recommended, as the clothes can be thrown across the foot on rising in the morning, and aired for two or three hours before the bed is made; the plan of making the bed immediately on rising is very objectionable; the sheets are then charged with the moisture of the insensible perspiration which has been given out from the skin during the night; it is most essential to health that this should be permitted to escape before the bed is made.

The use of mattresses, made of hair or of wool, is strongly recommended. Their advantages over feather-beds consist in their economy in first cost, their requiring less time to make, and, lastly, in the much more healthy and sound repose which those obtain who sleep on them. Persons accustomed to the use of mattresses find them more pleasant than feather-beds as well as more healthy. Curtains to a bed are rather an evil than otherwise, as they tend to prevent that free circulation of the air so necessary to health.

Persons beginning housekeeping often buy too much furniture, getting at first many things which they afterwards find are useless. A little at a time, and of good lasting quality, is most to be desired. Those who have saved a small sum are very liable

to fall into this error, and to expend money which would be invaluable in after life to meet sickness or those other casualties to which the most successful are subject. Few persons, except from experience, are aware how valuable ready money is, and what miseries people lay up for themselves when they, under any circumstances, get into debt; they do not know, until they become indebted to a shopkeeper, how difficult it is to leave him in order to deal with any other, and how much they are liable, under these circumstances, to be imposed on in the price as well as quality of goods. A very large proportion of the evils which afflict the working, and even other classes, have their origin in getting into debt.

The plan of dealing known as the "Tally" system is an evil which inflicts more injury on the labouring classes than could be believed by those not acquainted with this plan of organized robbery. Tally-men are hawkers who call at working men's houses, and sell showy and inferior goods, to be paid for by small instalments of sixpence or a shilling per week. The articles are generally purchased by the wife, often without the knowledge of the husband, who becomes legally liable for the debt; the tally-man saying that he will not press for payment, when inconvenient. If the payments are omitted, the husband is summoned to the County Court, and ordered to pay by fixed instalments; if, after a judgment has been obtained, *one* of these instalments be left unpaid, the whole balance becomes immediately due, and the unfortunate debtor's property is at once swept away by an execution; this, very often for some showy shawl, or gilded clock, not worth one-fourth the amount charged for it.

The relative expenses of purchasing furniture, and renting unfurnished premises, and of living in furnished lodgings, is very much in favour of the former plan. A much higher rate is always charged for furnished rooms than is sufficient to cover the expenses of the wear and tear of the furniture. As an example, take the case of a single bedroom in London, which, unfurnished, would let at 5*s.* a week; its rent, when furnished, is at least 7*s.*, and often 8*s.* or 9*s.* The charge for the use of the furniture, at the lowest rate, is 2*s.* per week, or 5*l.* 4*s.* per year; this, in two years, would amount to 10*l.* 8*s.*—a sum

sufficient, carefully expended, to furnish a bedroom with every essential requisite.

CLEANING.—One of the conditions most indispensable to a healthy house is cleanliness. In many situations putrefying heaps of animal manure are placed close to the house, rendering the air unwholesome. Too often the ground in the immediate neighbourhood is so badly drained that puddles of water remain long after the rain has ceased, causing wet dirt to be brought in with every footstep. The effluvium of decaying animal matter, which is constantly being given out by our bodies, is absorbed by porous substances—such as the walls, floors, and ceilings, as well as by curtains, carpets, &c. Unless these are often and thoroughly cleansed, they give out the decaying animal particles ; these taint the air to such a degree that they become perceptible to the sense of smell, and produce the *close* disgusting odour that is unfortunately but too familiar to those who visit the overcrowded dwellings of the very poor. This unwholesome condition of the air gives rise to a low state of bodily health, predisposing to and even producing many diseases.

The absorption of this animal effluvium is very much influenced by the nature of the surfaces with which it comes in contact. Papered walls, especially those with a surface of flock, absorb it readily. Glazed papers are less absorbent, and painted walls are the least so, and consequently are to be preferred for crowded dwellings and for all sleeping-rooms.

Carpets and curtains absorb these matters freely, and continue to give them out for a lengthened period, as is evident by their retaining for so long a time the odour of stale tobacco smoke. Rough wooden floors are also absorbent to a considerable degree, and consequently require frequent washing. The smooth waxed floors that are so common on the Continent, are in many cases much preferable to them.

The wholesomeness of dwellings and outhouses is much promoted by their being frequently lime or white washed : the latter process is adapted only for indoor use. White-wash is made by pouring water on cakes of whiting, and stirring the whole together until the liquid is of a thin, creamy consistence ; a small quantity of warmed size, or dissolved glue, is then added,

sufficient to prevent the colour from rubbing off when dry. White-wash is applied with a broad, flat brush, working in a uniform direction, up and down the wall. Should the surface have been previously white-washed, first remove the dirt by washing it with a brush and abundance of clean water.

Lime-washing is, from the cleansing action of the quick-lime, much the more effectual mode of purification, but is less frequently had recourse to, from the general ignorance respecting the proper mode of preparing the lime-wash. If glue is employed, it is destroyed by the corrosive action of the lime ; and, in consequence, the latter easily rubs off the walls when dry. This is the case also if the lime be simply slaked in water and used without any fixing material. Lime-wash should be prepared by placing some freshly-burned quick-lime in a pail, and pouring on sufficient water to cover it ; if the lime is fresh, great heat is given out ; boiled oil (a preparation of linseed oil, sold by all oilmen) should then be immediately added, in the proportion of a pint to a gallon of wash. For coarser work, any common refuse fat, such as dripping, may be used instead of the boiled oil. The whole should then be thinned with water to the required consistency, and applied with a brush. Care should be taken not to leave the brush in the lime-wash for any length of time, or the bristles will be destroyed. Should coloured wash be required, the addition of one pound of green vitriol (sulphate of iron) to every two gallons of wash gives a very pleasing drab.

Quick-lime slaked with skimmed milk, and afterwards diluted with it to the required consistency, also makes an excellent wash for out-door walls ; the lime, by uniting with the curdy ingredients of the milk, forms a coating which is not acted on by the weather. Lime-washing cannot be too strongly recommended as a means of purification, especially in seasons when any infectious disorders are prevalent.

The operations of sweeping and scouring are so well known as scarcely to require a lengthened description. The following directions on the subject, which may be useful to girls who are intended for domestic service, are taken, with some slight alterations, from a small work entitled "Instructions on Household Matters" (Parker) :—

"To sweep a Bed-chamber.—1Open the windows,2 roll the

carpets up and shake them in the open air. Turn up the valance and cover the bed with a large cloth provided for the purpose, and cover also the dressing-table and washing-stands.

"Next, clean the stove and irons; after which, strew tea-leaves over the floor and under the bed and furniture. Kneel down and take a brush with a long handle, and sweep carefully under the bed, the wardrobe, chest of drawers, and all such furniture as cannot be easily removed. If the room be large, you may use the long broom and sweep the rest of it. Having drawn the dirt into one spot, sweep it into the dust-pan, carry it down stairs, and throw it at once into the dust-hole. Before going up again, shake the carpets; you will thus give time for the dust which has been disturbed to settle, for if you wipe the furniture before the dust has settled, you must either do it again, or the room is left in an untidy state. The carpets being shaken, lay them down smoothly, replace the chairs in their proper situations, take the sweeping cloth off the bed, and wipe all the dust from the furniture with a duster.

"To sweep a Carpeted Room.*—Place all the chairs, small tables, and other pieces of furniture that are easily moved, in the middle of the room. Turn or pin up the window curtains, roll up and remove the hearth-rug, and throw a sweeping-cloth over the sofas, especially if they are covered with any rich stuff. Strew the sides of the room with moist tea-leaves, and, with the carpet-broom, sweep carefully, with a steady, but not very heavy hand. Attend to the *corners*, and brush the dirt and tea-leaves towards one spot, the door or the hearth. Having finished the sides, replace the furniture you first removed, and clear the middle of the room: strew fresh tea-leaves, and sweep. You must take a short brush, and kneel down to sweep under the heavy pieces of furniture. When every part is thoroughly swept, remove the leaves and dirt in the dust-pan.

"To dust Furniture.—Take in your hand a soft cloth, or duster, and a dusting-brush, and remember that the object of dusting is to make everything thoroughly clean, not merely to wipe over the parts which are most in sight. For instance, if a table or sideboard is to be dusted, upon which a desk, an ink-table, tea-caddy, work-box, books, or such like articles usually stand, remove the whole of these before you begin. If you satisfy yourself with merely wiping *round* them, a line of dust is sure to be left, and the work is imperfectly done.

"Almost every article of furniture has some sort of ornament cut or carved upon it, and the dust gathers and remains in the

* "If you must have a carpet," says Miss Nightingale, in her valuable "Notes on Nursing," "take it up two or three times a year instead of once. A dirty carpet literally infects the room: if you consider the enormous quantity of organic matter from the feet of people coming in, which must saturate it, this is by no means surprising."

crevices. Just passing the duster over these worked parts will not remove the dust; a moderately hard brush should be used, and the cloth introduced by the finger where the spaces are large enough.

"In dusting tables, the legs must not be forgotten; these are seldom plain, and the dust settles on the projecting parts. The same observation applies to chairs, the seats of which are usually moveable, and the divisions between the stuffing and the frame require attention. An old silk handkerchief makes a good duster for pictures and looking-glass frames.

"Cushions, stuffed chairs, sofas, ottomans, and things of that kind, must occasionally be beaten in the open air with a light cane. Window curtains should be undrawn, shaken, and brushed. If they are made of damask, stuff, or stout chintz, they may be safely beaten with a small cane. Bell-ropes also should be brushed. The dust from picture-frames, looking-glasses, and gilt cornices, is to be removed with a dusting-brush, and touched with a light hand; for the flowers or other projecting parts, being made of plaster, are easily broken. Indeed, all furniture should be handled with careful dexterity, for, though sometimes strong, the surface is polished and smooth; dents and bruises are soon made, and edges and corners easily chipped off and disfigured.

"There are usually in rooms ornamental pieces of china, glass, and other elegant things, which are often very valuable; it is needful to use great care in handling such brittle things."*

"To SCRUB A FLOOR.—Having prepared and swept the room, as already described, take a pail of water, hot or cold, a woollen cloth, a scrubbing-brush, and some common soap and sand; then, kneeling down, first wet as much of the floor with the flannel (beginning at the part of the room furthest from the door, so that you work backwards) as you can fairly reach; then, soaping your scrubbing-brush, rub every part with all the force of your arm, using sand wherever the boards appear very black or stained. Take care to scrub all the corners.

"Having scrubbed as long as is needful to clean the boards, wash the part which has been scrubbed again with the flannel, putting on plenty of water, so that all the soapy dirty water left by scrubbing is taken up by the flannel, and wrung out into the pail. If you are not careful to do this, you will find, when the boards are dry, that they are streaked with dirty marks. Rub the boards dry with a coarse cotton cloth. Then move to the next space within your reach.

* Miss Nightingale has the following sensible remarks on dusting:—"Dusting, in these days, means nothing but flapping the duster from one part of a room to another. You had better leave the dust alone, if you are not going to take it away altogether. Flapping, by way of cleaning, is only admissible in the case of pictures, or anything made of paper. The only way I know to remove dust is to wipe everything with a damp cloth."

"Change the water in your pail frequently; otherwise you will be using dirty water, and this cannot produce clean boards. Clean water, and a strong willing arm, make clean floors. When the floor is dry, remove any sand or bits of wood which may have gathered in the corners with a skewer and a brush.

"To clean Floor-cloth.—1st. Let it be dry swept. 2nd. Take a flannel or soft scrubbing-brush with a lather of *white* soap, and carefully wash the dirt out between the work; then wipe it quite dry with a soft linen cloth, being careful not to use any sand or soda. Floor-cloths may be often dry-rubbed with advantage."

Scrubbing, if persevered in for a length of time, sometimes causes a painful disease, well known to surgeons as "Housemaid's Knee." In order to prevent the tendency to this complaint, a thick soft mat should always be used to kneel upon.

Floors should not be scrubbed so frequently as is often recommended; certainly, in all ordinary cases once a-week is amply sufficient. In wet weather they do not dry, and the house remains damp and cold for a considerable time; it is better, in all cases, to defer the scrubbing even for a week, than to wet the floors on a rainy or foggy day. In cases of illness, this is particularly important; so injurious is the influence of damp air on invalids, that in some hospitals the floors are waxed, and dry rubbing has been adopted instead of scouring, with great advantage to the health of the patients.

It should be a fixed rule that floors, particularly those of sleeping-rooms, are to be scrubbed only on dry days, and, where the health of the inmate is delicate, the drying should be quickened by lighting a fire in the room.

It is exceedingly important not to permit the accumulation of lumber of any kind in a dwelling-house; bones, old shoes and boots, woollen cloths, pieces of carpet, &c., are often kept with a view to their subsequent use or sale; these are exceedingly apt to become mouldy, when they render the air of the house impure, and consequently unwholesome, harbour vermin, serve as breeding places for the clothes-moth, and retain most tenaciously any infection to which they may have been exposed. Let them by all means be got rid of,—burnt or destroyed if they cannot be sold or given away.

Air is a fluid - supposed to extend 50 miles above earth's surface - becoming rarer the greater the elevation. The difference in density is produced by the pressure of the upper air - Pressure of air - whole mass presses with a weight of 15 lbs to the square inch - equal pressure on all sides so not burdensome.

CHAPTER II.

HAIR AND VENTILATION.

AIR.—The purity or impurity of the air we breathe has an important effect upon the health of the body.

The existence of the air, as a material substance occupying space, may be proved by inverting a tumbler, and pressing it below the surface of water contained in a larger vessel, when it will be seen that the entrance of the water into the tumbler is prevented by the air that it contains. how proved

The weight of the air at the surface of the earth is about one ounce and a quarter for each cubic foot. A room 12 ft. by 13, and 8 ft. high, contains 1,248 cubic feet of air, weighing very nearly 100 pounds.

The air is not, as was formerly supposed, a simple substance or element, but is composed of several gases. One of the most important of these is oxygen, which constitutes about one-fifth of its bulk; [a] this gas is the supporter of life, being absorbed in the lungs during respiration, when it purifies the blood, and unites with materials derived from the food, keeping up the warmth natural to the body. [b] Oxygen is also that part of the air which enables fuel to burn. The greater part of the air consists of the gas known as nitrogen, which constitutes four-fifths of its bulk. The use of this gas appears to be to dilute the oxygen, and render it less active and exciting to the system.

There also exists in the air a very small proportion of carbonic[x] acid gas, which is produced by the burning of fuel and the breathing of animals, and occupies the place of the oxygen which is consumed in those cases. When it exists in the air how produced

[x] Carbonic acid gas = oxygen & carbon, another name carbon dioxide.

in large quantity it is exceedingly injurious; air containing only one thousandth part of its bulk (or 0·1 per cent.) of carbonic acid is exceedingly depressing. In close rooms in private houses, and in crowded meetings, the quantity often reaches two or three times that amount (0.2 or 0.3 per cent.). If air of this degree of impurity is breathed for any length of time, it produces headache, weariness, and incapacity for active mental or bodily exertion. Air containing even less than four parts in a hundred, or four per cent. of carbonic acid, has been found to cause the pulse in a short time to fall so low that it can scarcely be counted, and to hasten the breathing to an alarming degree. A greater amount is rapidly destructive to life.

Moisture always exists in the air, but the proportion varies very greatly; the air being sometimes perfectly saturated and at other times very dry. The quantity of moisture that the air is capable of containing varies with the degree of warmth, hot air being able to contain a much larger proportion of moisture than cold. Consequently, a portion of air quite saturated with moisture when cold, is able to take up a much larger quantity when heated; warming the air, therefore, though it does not alter the amount of moisture in it, greatly increases its drying effect.

In addition to these bodies, it has been ascertained that the air also contains a varying amount of organic matter consisting of decomposing animal and vegetable substances. In the pure air of the country, this is small in amount, but in densely-populated cities, in the neighbourhood of heaps of decomposing matter, and, above all, in overcrowded, ill-ventilated rooms, the amount of decaying organic matter is very great.

The air after having been breathed is very much altered in its character; a considerable proportion of the vital element, oxygen, has been removed, and its place supplied by carbonic acid. In every hundred parts of air passing from the lungs carbonic acid is present to the extent of four or five parts. The air as it is breathed out from the lungs is perfectly saturated with moisture; a very varying quantity of water must pass off from the body in the breath; for if the air when taken into the lungs is saturated, it can take up no more, whereas if dry it removes a

large quantity, hence the amount of water given off daily by the lungs varies from fourteen to twenty ounces. The breath as it passes from the body also contains decaying animal matter thrown off from the impure blood whilst passing through the lungs for the purpose of purification.

The following table shows the composition in volume of air before and after it has been once breathed :—

AIR BEFORE BEING BREATHED.		AIR AFTER BEING BREATHED.	
Nitrogen	79·2	Nitrogen	79·3
Oxygen	20·8	Oxygen	15·4
Carbonic Acid	·04	Carbonic Acid	4·3
		Loss	1

From this table it will be seen that whilst the quantity of the nitrogen remains unaltered the oxygen has been greatly diminished, and that the carbonic acid has been increased from four parts in ten thousand to upwards of 100 times that amount, or more than 4 per cent.

In ordinary quiet breathing, each full-grown person takes into the lungs not less than twenty cubic inches of air, or nearly two-thirds of a pint, at each inspiration, and the average number of respirations in quiet breathing is about eighteen per minute, consequently 360 cubic inches pass into and out of the lungs every minute, equal to 21,600 cubic inches, or 12 cubic feet every hour. In quick walking the number of respirations rises to twenty-five or thirty per minute, and in running reach as high as seventy or even more.

Amount of air taken in respiration

The influence of the air upon the health of the body is evident, when we consider that in twenty-four hours about 300 cubic feet pass into and out of the lungs; the weight of this quantity is upwards of twenty-three pounds, being considerably more than that of the food and drink taken during the same period. The air that has been breathed is utterly incapable of supporting life, and even when mixed with ten times its bulk of pure air is still injurious to a very high degree. In the diagram, in which the figures are all drawn to the same scale, Figure 1 represents the amount of air passing through the lungs in each hour. Figure 2 represents 125 cubic feet of space ; the air in which, if closely confined, would be rendered poisonous by the

breathing of one person in little more than one hour. This amount of space is greater than was formerly given in some of the worst of the London lodging-houses, and as a consequence, the air became charged with carbonic acid gas and organic matter, and was extremely injurious to the inmates. In these overcrowded lodging-houses disease was rarely absent. At the present time, the Act for the regulation of common lodging-houses makes it imperative that not less than 250 cubic feet of space should be allowed to each individual sleeping in a licensed house.

Figure 3 represents a cubic space of 512 feet, about the quantity formerly allowed in many of the London barracks, in which the air became so poisonous that the deaths from consumption amongst the soldiers were twice as numerous as amongst the general population.

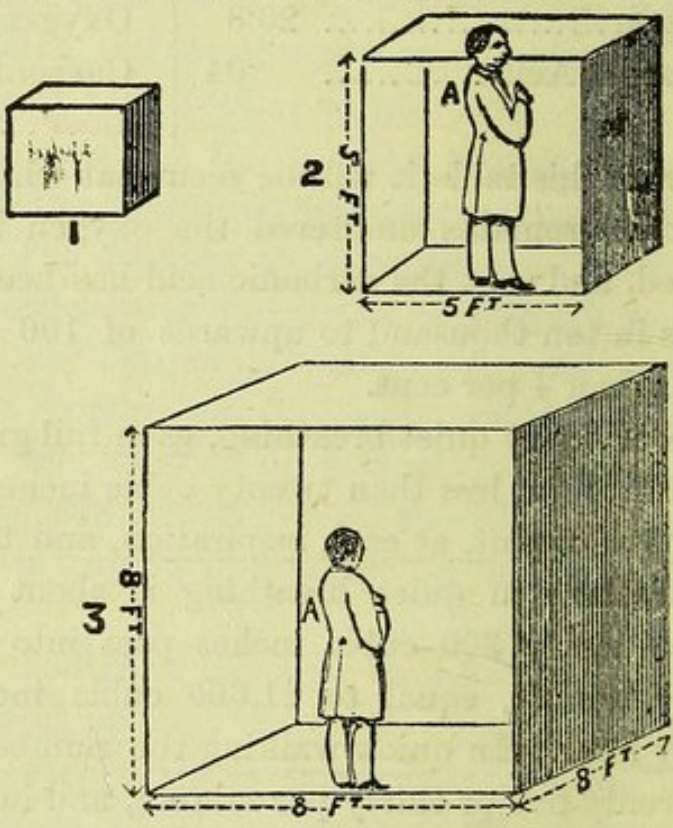


Figure 4 shows the proportion which 1,000 cubic feet, the amount of space allowed in several hospitals, bear to the size of the human body. This is insufficient without proper arrangements for ventilation, for unless these exist, even with 2,000 feet of space, impurity gets in ex-

cess. The 12 cubic feet of air passing out of the lungs every hour require to be diluted with nearly 200 times their bulk of pure air to be rendered perfectly harmless; this would require for each person 2,000 feet of fresh air per hour, which quantity must be provided for by ventilation. In a perfectly closed air-tight room, 45 feet long by 25 feet broad and 15 feet high, containing 16,875 cubic feet, the air would become impure and unwholesome after a person had been sleeping in it for 8 hours; fortunately, however, it is practically impossible to build rooms which are air-tight. A single candle when burning renders nearly as much air impure as the breathing of a child, and a gas or paraffin lamp a much larger quantity. Can it then be a matter of surprise, that in overcrowded dwellings, loss of health and consequent misery are so frequent? Let it be remembered that impurity in the air we breathe involves ill-health, and early death.

Amount of pure air required to purify air after breathing

Under certain circumstances pure air contains a substance known as ozone, which appears to be oxygen in a very active condition. Ozone is only found in pure air, and is most abundant in the early morning, in sea air, and in England in south-west or west winds; it is almost absent during east winds, and quite wanting in the impure air of large towns and that of inhabited rooms. The presence of ozone, which may be detected by chemical tests, appears intimately connected with the salubrity of the air.

VENTILATION.—The ventilation of large public buildings, which requires to be effected by mechanical contrivances, does not come within the scope of this book; but that of ordinary dwelling and sleeping rooms is so important, that it cannot be passed over. The only ventilation practicable in the houses of the working classes is natural ventilation, that is, ventilation caused by the ascent of heated and the descent of cold air; the air which becomes impure by the action of breathing, or by the burning of candles, lamps, gas, or the fire, &c., is heated, and whilst hot is lighter than pure air; it therefore rises to the top of the room, and fresh cold air takes its place below.

Consequently, to ventilate a room well, it is essential that there should be two openings; one above, by means of which

* ventilo-(to blow)-in the process of ventilation a gentle wind or current of air is artificially produced in the interior of a house where the air would be stagnant if such influence were not acquired

the impure, heated air, which has ascended, can pass out, and another below, for the entrance of pure cold air.

In dwelling-rooms, as usually constructed, some of the impure air is carried away by the draught of the chimney; but the whole of the room above the level of the fire-place remains filled with air in an impure state. The openings by which air is admitted are usually left to chance, the space round the doors and windows being the means by which it gains an entrance. If these are not sufficient to admit a proper quantity of air to supply the draught of the chimney, the latter necessarily smokes.

A much better plan is to admit the pure outer air, by means of plates of perforated zinc, or ventilating glass, placed in the upper part of one or more of the windows furthest from the fire; the air, entering through the perforations in small streams, becomes so mingled with the warm air of the room, that a draught is prevented; and when the windows are opposite the fire, the whole air is gradually and imperceptibly changed. If to this mode of admitting pure cold air, be added an opening in the chimney, near the ceiling, to allow of the escape of the impure warm air, much will be done for health and comfort; this opening in the chimney, however, requires a chimney-valve to prevent any downward draught of smoke; the utility of this mode of allowing air to enter and escape for the purpose of ventilating crowded rooms has been satisfactorily proved, and it is now getting into general use. Sheets of perforated zinc may be obtained very cheaply. The thick perforated glass is preferable to the zinc, as the slits are of a conical shape: if the narrow side of the opening is put *outwards*, the air on entering is diffused, and a draught entirely prevented. The cost of the glass is about 2*s.* a square foot. Chimney-valves may be obtained from 4*s.* upwards.

Cold air should never be admitted, as it very generally is, under the doors or at the bottom of a room; it then flows along the floor towards the fire-place, leaving the upper air unchanged, and cooling, most unpleasantly and injuriously, the feet and legs, which are very susceptible of cold.

The fire-places of bed-rooms should not be closed with a chimney-board; those built without a fire-place are most

unhealthy, especially if the doors and windows be kept closed in the night. They may, however, be partially improved by having a large opening made over or in the door, to be filled with a piece of perforated zinc; or, if no other means of ventilation are practicable, a row of large holes should be bored in the upper, and another in the lower, panels of the door.

A very effectual and costless mode of ventilating bed and sitting-rooms, is to place a board three or four inches wide, and whose length is exactly the width of the window, on its edge under the lower sash, which is thus raised the width of the board; by this means a space is left between the two sashes in the middle of the window, through which fresh air enters from without, and being directed towards the ceiling does not cause an objectionable draught. The plan is strongly to be recommended, not only in private dwellings, but also in crowded workshops and class rooms.

Tobin's system - Hole made in lower part of wall, into which a shaft is placed going about half way up the room. Fresh air from the outside passes up the shaft into the room.

800 cub. ft. is the least which should be allowed to each occupant of a sleeping or working room. 18 cub. ft. of fresh air is required every hour, that a person may be in good health.

CHAPTER III.

WATER.

WATER is as essential as air to the existence of both animal and vegetable life. It forms by far the greater proportion of the structures of all plants and animals. Three-fourths of the human body consists of water, and it is by its assistance that all kinds of food are received into the system, every portion of nourishment requiring to be dissolved before it can be taken up by the absorbing vessels and poured into the blood. Living vegetables contain even a much larger proportion. Thus potatoes consist of upwards of three quarters of their weight of water, and cabbage upwards of ninety parts in every hundred. Even substances apparently dry retain a considerable amount; wheat-flour, for example, contains fifteen pounds of water in every hundred; and what is termed dry bread consists of more than one-third of its weight of this fluid.

The presence of water in large amount is essential to life, inasmuch as all the actions of the living body are performed by the movements of the fluid particles. Hence the absolute necessity for an abundant supply, and the extreme importance of obtaining it as free as possible from all injurious substances.

Water was formerly regarded as a simple substance, and was spoken of as one of the four elements. It is now known to be not a simple but a compound substance, being composed of two gases, termed oxygen and hydrogen. Its properties are strongly marked; it is a colourless, transparent fluid, becoming solid at a temperature of 32 degrees Fahrenheit; and being converted into vapour at the heat of 212 degrees Fahrenheit.

Reaches its greatest density at 39° Fahr. At lower temperature it expands, thus ice is formed at the tops of rivers.

4 It possesses a great capacity for absorbing heat; that is to say, it requires a much larger amount of heat to warm it than is required by any other substance; and this heat it gives out again on cooling. It is this property which renders it so useful in filling hot-water bottles for the feet. 5 It is also remarkable for its great solvent power, dissolving a vast number of substances with which it is brought into contact. When freely exposed it absorbs a considerable proportion of air, enough to support the life of fishes and other aquatic animals. Ordinary drinking water contains in every gallon (viz., 277 cubic inches) about six cubic inches of oxygen, two or three of nitrogen, and five to seven of carbonic acid. Water has a much greater power of dissolving carbonic acid and oxygen, than of dissolving nitrogen, hence there is a larger proportion of these gases in the air dissolved in water than in the atmosphere. They render the water sparkling to the eye and fresh to the taste, but are expelled by heating it to the boiling point, hence boiled water which has become cold is tasteless and insipid. Water also absorbs with great rapidity the putrefying odours of decaying animal or vegetable matter.

A considerable amount of the mineral matters of the earth through which water flows is also dissolved, rendering it hard; and the decaying organic or animal and vegetable matter of the surface soil is always to be found in the waters of shallow wells and rivers. Cause of hardness

If the house is supplied by a pump which draws from a shallow well, care should be taken to ascertain that it is not placed, as is frequently done, near a cesspool, manure heap, drain, foul ditch, or any other source of impurity; as drainage will take place, through the soil, for a considerable distance, and the well-water, though clear and apparently pure, thus becomes not only contaminated and unwholesome, but a fertile source of bowel-complaints, cholera, and typhoid fevers. Nearly every case of cholera and typhus may be traced to the employment of water contaminated with the drainage of cesspools or admixture with sewage.

Houses which are supplied by pipes should have the water constantly turned on, so as to avoid the necessity for cisterns.

Water standing for a night in a close or crowded room absorbs the impure air, and becomes unpleasant to the taste and injurious to health.

At present, in most places, this unfortunately is not the case, therefore butts and cisterns must be used; but it should be remembered that these always contain a deposit of mud and decaying organic matter from the standing water, and that this is stirred up every time the water comes in. Hence they abound with impurities. Great care should, therefore, be taken that they are often cleaned out, and that they are so placed that this may be done readily. They should also be properly covered, to prevent the admission of dust and dirt, and should not be placed, as is often the case, near water-closets, dust-holes, manure heaps, or any accumulations which give out unpleasant smells. The power which water possesses of rapidly absorbing the gases arising from decaying substances renders it exceedingly unwholesome when kept in such situations.

It is desirable that rain-water, if employed for culinary purposes, should be collected in a cistern made of slate, or a tank of flat stones, bricks or tiles, set in cement; wooden butts, without great care and constant attention, become covered with green vegetable growth, rendering the water objectionable.

Rain-water—if collected at a distance from cities, and therefore not contaminated by soot—is one of the purest of all natural waters, being peculiarly free from mineral substances; and if care be taken to prevent the leaves of trees or other decayed vegetable matter getting into the cisterns, it is, when collected in slate, stone, or well-cemented brick tanks, perfectly unobjectionable for all domestic purposes; it should not, however, be collected in leaden cisterns, as from its extreme freedom from mineral materials it acts rapidly on that metal, and dissolves sufficient to render it poisonous. Thames water acts very slightly on lead.

The quality of spring water differs very much when obtained from shallow and from deep wells. Shallow well water is often rendered impure by the quantity of organic or decaying vegetable and animal matter derived from the soil. If the well is situated near a cesspool or sewer the quantity of such matter becomes very large. This impurity is not, unfortunately, evident to the eye, owing to the filtration of the sewage through the soil. The water cannot, however, be used as a beverage without the most

injurious results. During the prevalence of such diseases as diarrhœa and cholera, the most fatal attacks have always been found in those districts where such water has been employed.

By exposure to the air the organic matter of the sewers that flow into rivers is in great part destroyed, but the bad influence of such river water on the health of the persons drinking it is precisely in proportion to the amount of sewage with which it had been contaminated. The shallow wells of London show that they have been contaminated with thirty times as much organic matter as the water of the Thames as at present supplied by the water companies. Those of churchyards very often contain forty times the amount, and in Paris a celebrated well was found, the water of which, though perfectly bright, was, owing to the prevalence of cesspools, more poisonous than undiluted London sewage.

It is generally believed that cholera, typhus, and other epidemic diseases are produced by germs existing in refuse animal matter, such as sewage, and that these are so minute that they cannot be separated by filtration; hence water polluted by sewage or manure should never be used for domestic purposes.

Deep well waters are seldon contaminated with organic matter, but frequently contain considerable proportions of mineral substances, as chalk or lime, which, although interfering with the economical use of such waters for washing, are not objectionable when they are employed as a beverage.

River water varies very much in purity; that of the higher part of the river Thames, now supplied by the London water companies, contains less than two grains of organic matter in the gallon; whilst the water of the same river below the outfall of the great sewers of the Metropolis, contains as much as twenty grains, and is not unfrequently in a state of the most unwholesome putrescence.

The chief precautions necessary in regard to the water used as a beverage, may be thus summed up :—

Rain-water should be collected without leaves or other vegetable matter, and not in leaden cisterns. Slate or cemented tanks are preferable to wooden butts; the latter favouring green vegetable growths, unless well coated with pitch internally.

Shallow well waters should be avoided, if possible; they are always injurious in populous and highly manured districts, and near drains or cesspools are positively poisonous.

Deep well water is unobjectionable as a beverage, although hard from containing mineral matter. In some districts it is cloudy or milky from containing undissolved chalk; this turbity may be readily got rid of by filtration, and the water rendered much more pleasant to the eye. For this purpose, a layer of coarsely pounded charcoal may be placed in a large flower-pot, with layers of coarse sand and fine gravel above and below it. This contrivance will be found as effectual as the most expensive filters; but it must not be forgotten that filtering water merely removes the impurities mechanically suspended, and has little influence on poisonous substances actually dissolved in it.

Use of filters

Considered with reference to laundry purposes, water may be regarded as either hard or soft. Hard water generally owes its peculiar properties to its holding in solution a quantity of chalk or carbonate of lime, the hardest waters containing the largest proportions. Some of the well waters of London contain eighty grains of chalk in a gallon; Thames water contains about fourteen grains, whilst rain water is destitute of all traces of this substance.

Pure water is incapable of holding in solution more than two grains of chalk in the gallon; whenever a larger quantity of chalk is dissolved, the water is enabled to hold it in solution by the action of carbonic acid gas, which is found, more or less, in all natural waters. The gas is expelled by boiling; in fact a considerable quantity escapes in small bubbles, even before the water reaches the boiling point. It follows that, on the removal of the carbonic acid, the chalk, having lost its solvent, is thrown down in a solid form, rendering the water, in the first instance, slightly turbid, and afterwards settling on the sides of boilers or tea-kettles, thus forming the rock, or fur, which is found in them.

Hardness removed by boiling

Heating Thames water to boiling point throws down two grains of chalk from a gallon; boiling for five minutes will reduce the quantity nearly one-half, and continuing the boiling for half-an-hour will get rid of all the chalk that can be removed in this manner.

When green vegetables are boiled in hard water the chalk makes them of a dull colour. Hard water not good for making tea, as the strength of the tea-leaves is slowly extracted.

The hardness of water, from the presence of chalk, forms no objection to its use as a beverage, but is a serious evil in cooking and washing. In the latter case it causes a considerable loss to soap, every grain of chalk destroying about ten times its weight of soap before a lather can be raised, or the cleansing power come into operation; one hundred gallons of Thames water used before boiling would cause a loss of upwards of two pounds of soap. Nor is the mere loss of soap the only evil, for the curdy solid which is produced when soap is employed with hard water becomes fixed in the fabrics, and is deposited in the pores of the skin; consequently hard water is much less efficacious in washing clothes, and less pleasant for bathing, than such as is soft.

This kind of hardness is usually spoken of as temporary, in order to distinguish it from that of some waters, the hardness of which is not removable by boiling, and is, therefore, termed permanent. The water of the Ravensbourne is of this latter character. Waters having this permanent hardness, which is occasioned by gypsum or sulphate of lime being dissolved in them, are much less frequent than those of the other kind.

Alum is sometimes employed for clearing turbid water; in the proportion of seven or eight grains to the gallon, it effectually throws down all the colouring matters and visible impurities; but, as a portion of the alum remains dissolved, and renders the water permanently hard, its use is very injurious.

In washing, the previous precipitation of the chalk by boiling is of the greatest importance. If clothes are put in cold water, and then boiled, the chalk contained in the water is precipitated upon them, taking down with it a considerable portion of colouring matter, and this becomes so firmly fixed in the linen or cotton as to be exceedingly difficult of removal; the dirt, also, by such a process, is partially fixed instead of being removed, and thus a brown tint is produced on the articles washed.

These evils may be entirely avoided by boiling the clothes in soft rain water, and lessened by the use of soda to soften hard water, and by boiling the water so as to precipitate the chalk before putting in the clothes.

Oxygen - named from its property of making gas
Hydrogen - considered as the generator of water.
is a very inflammable gas, found wherever
there is carbon. If a light be brought
near it catches fire, and burns until it
has consumed itself. It is the chief part
of the compound called gas. Water is formed
when burning takes place

The most suitable temperature of a room is from 60 to 64 Fahr.
The circulation and respiration are kept in a state of healthy action,
and the body experiences a feeling of comfort when the
degree of warmth is maintained.

CHAPTER IV.

HEAT.

THE artificial heat which is required for the preparation of the food of man, and for raising the temperature of our dwellings during a great portion of the year, is derived from burning fuel, which in this country usually consists of either pit-coal, gas-coke, peat, ~~or~~ wood, coal gas, charcoal

These substances consist chiefly of a material known to chemists as carbon, of which wood charcoal is the purest common example. In order to enable fuel to burn, air is essentially requisite; during the combustion, the carbon of the burning fuel unites with the oxygen of the air, and forms a compound known as carbonic acid. This is an invisible, transparent, colourless gas, which in its ordinary condition is heavier than air; but being heated by the warmth given out by the burning fuel, becomes lighter, and rises, usually passing away by the chimney, with the current of heated air and smoke, the solid black particles of which consist of unburned fuel.

Products of burning

Most varieties of fuel contain also a proportion of hydrogen. This, in burning, unites with the oxygen of the air, and forms water, which, being heated, passes away as vapour along with the carbonic acid.

2

The production of water during combustion may be proved by holding a cold glass over a burning candle or lamp, when the

moisture may be seen condensing in minute drops on the cold surface.

The heat produced by the burning fuel is dispersed in several ways. One portion is thrown off, or radiated in straight lines from the heated fuel, and warms those objects on which it is received. If, however, this radiant heat falls upon bright metallic surfaces, it is not absorbed by them, but is reflected, in the same manner as the sun's light is reflected by a looking-glass.

As this radiated heat is given off by the heated surface only, it is evident that the amount thrown into a room by a fire depends greatly upon the extent of the surface of fuel which is exposed to the room, and also upon the position of the grate. If the fuel be deeply sunk in a mass of metal, it affords much less radiant heat; and if the grate be far back in the chimney, much of the heat is prevented from passing into the room, being intercepted by the jambs.

Another portion of the heat is conducted away by the material of which the grate is formed. If this be of fire-clay, or fire-brick, but a small portion escapes in this manner; but the iron of which many grates are entirely composed, conducts away a very large amount; this, being conveyed towards the back and sides of the fireplace, is of no benefit in heating the room. Another evil also results from the employment of iron as the material for the back and sides of a grate; namely, that by its good conducting power, it carries away the heat so quickly from the burning fuel as rapidly to extinguish a small fire. It follows that a much larger amount of burning fuel is required to keep in a fire in a metal grate than in one lined with fire-clay, which is a non-conductor of heat.

The greater portion of the heat produced in ordinary fire-places is carried upwards by the ascent of the current of heated air. Hence, there is always a much greater amount of warmth above a fire or burning body, than at the sides or below.

The consideration of the most economical modes of using fuel may be conveniently arranged, under the heads of Open Fires, Heating and Cooking Stoves:—

The Open Fire.—The open fire, which is used much more extensively in this than in any other country, possesses the

Advantages

advantage of a bright cheerful appearance. The warmth it throws out is pure and genial, and, by causing the constant ascent of a current of air up the chimney, it aids greatly in the ventilation of the room. It has, however, many disadvantages; it is an exceedingly extravagant mode of using fuel; as, at the lowest estimate, nine-tenths of the heat generated pass uselessly up the chimney, and are wasted. It also causes a draught of cold air along the lower part of the room, towards the fire-place, very unpleasant to those who sit round the fire. These disadvantages may be partly remedied by closing the lower part or throat of the chimney with an iron plate, having a small opening for the ascent of the smoke, as seen in what are termed register stoves; and partly by having the grate near the floor.

Remedies

The sides and back of a grate should be constructed of fire-clay or fire-brick, and not of metal, as the latter conducts the heat away rapidly, and cools a small fire to so great a degree as often to make it difficult, if not impossible, to prevent its going out; whereas fire-brick, being a bad conductor of heat, prevents its escape from the heated fuel, and thus allows a very small fire to be kept in, and to burn brightly, a point of great importance to cottagers and persons of limited means.

Great improvement both in the economy of fuel and in heating power, may be effected in ordinary grates by lining them with fire-bricks or fire-clay, so as to prevent the iron conducting away he heat uselessly.

False backs and bottoms made of iron are comparatively useless, as they only serve to lessen the size of the grate.

Many of the evils attending open fire-places may be remedied by having a fire lump grate, with air-chambers or passages at the back, into which fresh pure air can be admitted from without by means of a pipe. The air having been moderately warmed, passes into the room, which is thus warmed and ventilated at the same time.

When a fire is only required for warming the room, and not for cooking, a very slow and uniform rate of burning may be ensured by the following arrangement:—Cover the bottom of the grate with a sheet of iron or tin plate, accurately fitted, so as to exclude the draught (a sheet of stout paper or paste-board may be em-

ployed as a temporary substitute); this prevents the air entering except at the front. 2 Place fresh coals on the iron or paper until the grate is perfectly filled; 3 on the top place the wood, with a few half-burned cinders to take fire in the first instance; if the wood is then set on fire the combustion passes very slowly downwards through the coals in the grate. The advantages of this plan are, a very slow and economical rate of burning; the almost entire prevention of smoke, which is consumed by passing through the heated coals; and lastly, a fire which will continue to burn many hours without attention—in fact the entire benefit is destroyed if the fire is stirred.

In lighting a fire which is required to burn up quickly in an open grate, care should be taken to clear out the ashes, which, if left in, would obstruct the draught. 1 The cinders should remain; a 2 few pieces of fresh coal having been placed on them, 3 some loosely crumpled small pieces of paper should be added; 4 the wood should be placed lightly on the latter; 5 some half-burned cinders and fresh coal should then be placed above, before the light is applied. The general cause of failure in fire-lighting is the employment of a large quantity of paper spread out flatly, and the wood and coals pressed on it so as to prevent a draught of air passing through the fuel.

It sometimes happens, when a fire has not been lighted for some time, that it will not draw up, owing to the want of an ascending current of air up the chimney. This may be remedied by lighting a piece of paper, and holding it in the chimney so as to warm the air in the flue. This course is also frequently useful when lighting a fire where the chimney is ordinarily disposed to smoke.

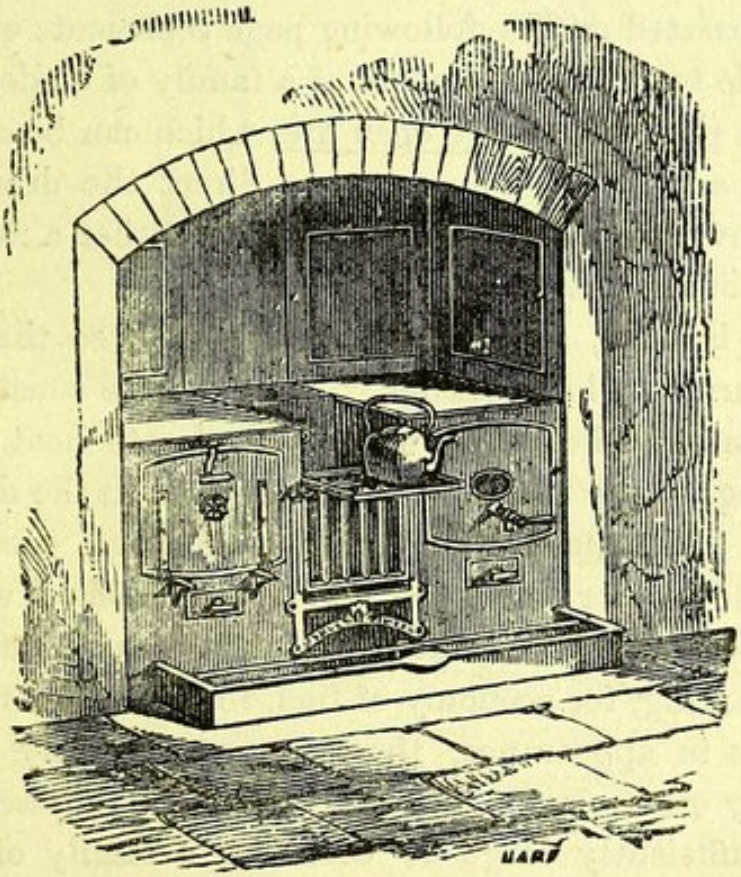
Heating-Stoves.—Heating-stoves are usually so constructed that the fuel is inclosed on all sides, and the air necessary for combustion is allowed to enter from below by means of a small aperture capable of being opened or closed to any desired extent. This contrivance places the combustion of the fuel under complete control, and enables a very slow rate of burning to be maintained. A moderate warmth is thus secured, with a small consumption of fuel. Coke, anthracite, Welsh coal, should be used for these stoves, as the soot

arising from the use of common coal chokes the narrow flues, and, lining the inner sides of the stove, prevents the passage of the heat. These stoves are often used in schoolrooms, churches, and other large buildings, but not often in dwelling-houses or the cottages of the labouring classes. Their advantages are, economy in the consumption of fuel, the length of time they continue burning without attention, and the control they are under as to the amount of heat they may be made to give out. Their disadvantages are several: consuming a small amount of air, they have no appreciable effect in ventilating the room; hence, whenever they are used in a close apartment, a chimney-valve, or some other contrivance, to carry off the impure air, is *indispensable* to secure the health of the inmates. Again: they produce their heating effect chiefly by warming the air of the apartment; this increases its drying power, and it consequently produces an unpleasant sensation of the skin and in the lungs; which is but partially prevented by placing a vessel of water on the stove, to give out a certain amount of moisture. Close stoves frequently cause headache, owing to the absence of the required ventilation, and to the neglect of the use of water. Occasionally they produce an unpleasant smell; this usually arises from their having been allowed to become too hot, in consequence of the valve or ash-pit door having been opened, this increases the supply of air, and consequently the fire in the stove, when the outer casing becomes so hot as to burn the particles of dust floating in the atmosphere, thus producing a burnt odour.

Charcoal stoves should not, under any circumstances, be used without a flue or chimney. The carbonic acid given out by the burning charcoal is fatally poisonous; even when it exists in the air in a less proportion than five per cent. it causes death; producing in the first instance drowsiness, followed by a sleep which is fatal. In spite of the numerous deaths which have been caused by the use of these stoves in close rooms, they are still recommended as being free from danger by some unprincipled vendors.

COOKING-RANGES.—A cooking-range, or grate, should in all cases be furnished with a side oven for baking. These ovens, if

well constructed, are very efficient, baking bread, meat, potatoes, pies, &c., remarkably well; in a working man's house an oven is very desirable, as by its means much greater economy in cooking can be practised. Those which have the door made to fall down to a horizontal position in front, forming a temporary shelf, are more convenient than those which open sideways. A side boiler is a useful addition to a range, but it is not so indispensable as an oven, and its place may always be supplied by a large kettle. Boilers are apt to become thickly incrusted with deposit if hard water is used, and, unless cleansed, become hot very slowly; they should always be filled before the fire is lighted, and never quite emptied, as otherwise they are very apt to be cracked by pouring in cold water when heated. These cracks in cast-iron boilers are incapable of repair, and new ones are expensive. Riveted wrought-iron boilers are more durable, and though dearer in first cost, are cheaper eventually.



Nicholson's Newark Cottage Range may be taken as an example of the kind, fulfilling the requirements of a working man's cottage. It has a fire-clay back, thus economising the heat, and is manufactured in a durable and economical manner.

The cost of one 3 ft. wide is 1*l.* 18*s.* 6*d.*, at the manufactory; the larger sizes being proportionately cheap: without the boiler, they are a few shillings less in price. It is one of the most popular of those selected for the model cottages that are being erected in various parts of the country. For the coals of the south-west of England, which require to be burned in larger bulk, the grates of Hardy and Co., Worcester, are well adapted; they have also fire-brick backs, and cost, exclusive of the fire-bricks, about 1*l.* 10*s.* each.

Cooking Stoves.—On the Continent, where fuel is much more expensive than in England, cooking-stoves of various kinds are in universal use, and in economy of fuel and general convenience, they far surpass the open range.

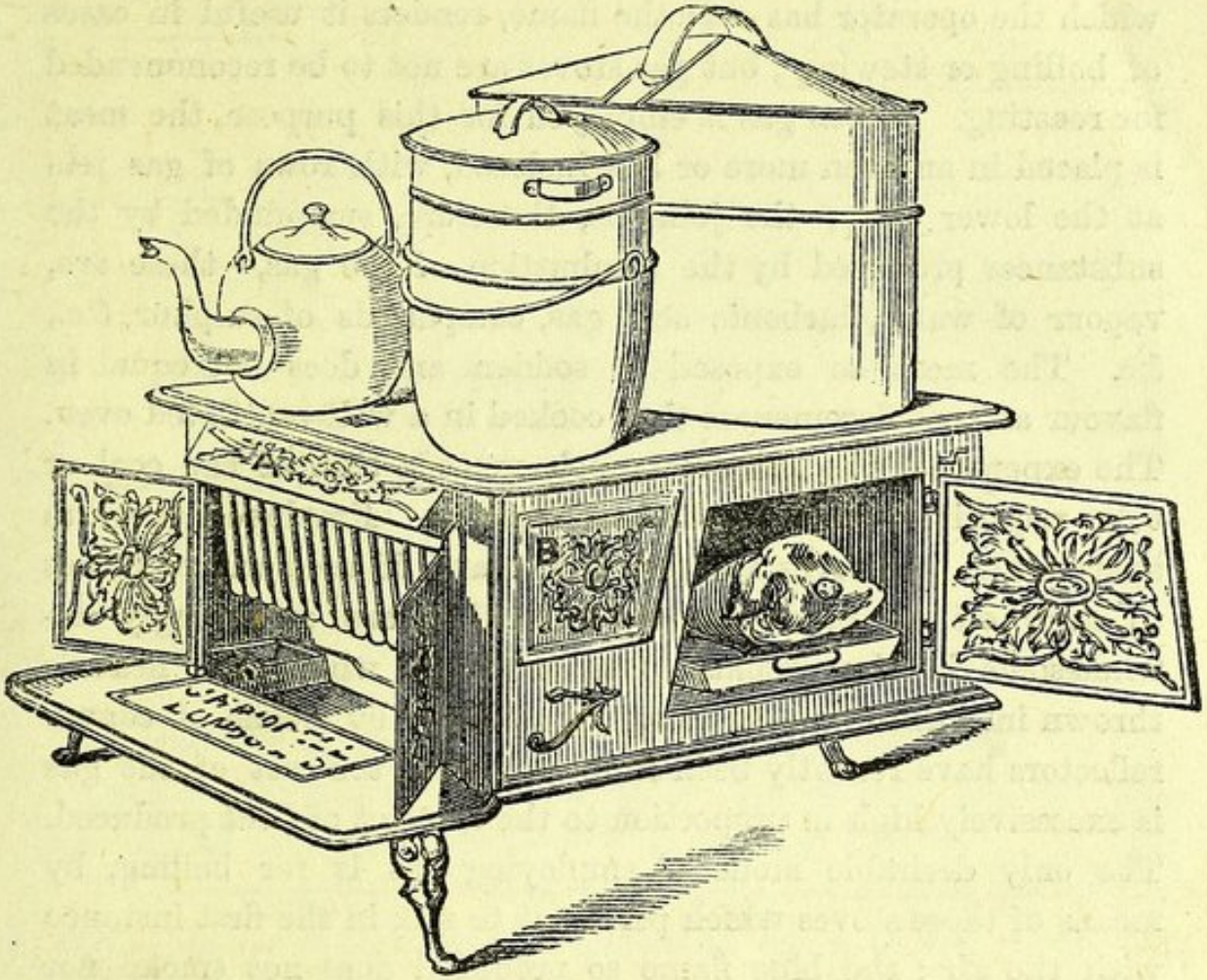
Stoves of this description are much employed in America, where they have been greatly improved. Some of the American designs are now getting into general use in this country: the engraving inserted on the following page represents one of those most suitable to the requirements of a family of moderate size.

Of what it consists

The stove presents a large open fire, which can be employed in roasting, or can be shut up so as to direct the draught either through or over the fire, and thus to cause either a rapid or slow combustion of fuel, as may be required.

The oven is large, and is heated all round, so that bread requires no turning whilst baking. The top is so constructed that it can be used as a hot plate when a moderate heat is required, as in stewing, or the vessels may be exposed to the direct action of the fire. The movable boiler, placed above, ensures a large supply of hot water; and the whole is furnished with a very complete stock of cooking utensils. For convenience and efficiency in cooking, for economy of fuel, for cleanliness in use, and cheerfulness in appearance, these stoves certainly far surpass those of any other class. The cost of the one represented above, which is sufficiently large to cook for a family of twelve or fourteen persons, is 5*l.*, with the whole of the utensils complete. Stoves of this character may be obtained in London of Murdock and Co., 115, Cannon-street; or Smith and Welstood, Ludgate-circus.

Advantages



OVENS.—Several varieties of ovens are manufactured, capable of being used before an open fire. They are usually formed of rough iron and bright tinned plates; those parts which are intended to absorb the heat and become hot being of the former material, and the surfaces, which are to reflect the heat, of the latter. As heat is reflected better by bright, smooth objects than by those that are dull or rough, it is necessary to keep the reflecting surfaces brightly and smoothly polished; the slightest dimness lessens very greatly their reflecting power. The absorbing surfaces, on the contrary, are most efficient when dull and rough. Although very convenient where other ovens are not available, reflecting ovens are not economical, as they require a large fire to render them serviceable, and are rapidly going out of use owing to the increasing employment of cooking stoves.

GAS STOVES.—In situations where gas is available, it is sometimes employed as a source of heat in cooking, as well as for other purposes. Its constant readiness, and the perfect control

which the operator has over the flame, renders it useful in cases of boiling or stewing; but gas stoves are not to be recommended for roasting. When gas is employed for this purpose, the meat is placed in an oven more or less inclosed, with rows of gas jets at the lower part; the joint is, therefore, surrounded by the substances produced by the combustion of the gas,—these are, vapour of water, carbonic acid gas, compounds of sulphur, &c., &c. The meat so exposed is sodden and does not equal in flavour and wholesomeness that cooked in a well-ventilated oven. The expense of the gas very much exceeds that of the coal or coke requisite to cook to the same extent. Employed to warm apartments, gas stoves are very costly, and, if used without flues to carry off the products of combustion, are exceedingly unwholesome in close rooms. Gas stoves in which the heat is thrown into the room or used for cooking by means of copper reflectors have recently been introduced, but the cost of the gas is excessively high in proportion to the amount of heat produced. The only desirable mode of employing gas is for boiling, by means of those stoves which permit it to mix in the first instance with the air; the blue flame so produced does not smoke, nor soil bright objects placed within it. As an occasional source of heat for boiling a kettle of water, &c., during summer, these stoves are very useful, as they frequently render the lighting of a fire unnecessary.

Fuel.—With regard to the relative cheapness of different sorts of fuel, so much depends on the locality that little can be said; experience is the best guide. There are some places in England where wood is cheaper than coal, and in others peat is the cheapest fuel. In the neighbourhood of gas-works coke is often economical. Coals that cost the least money are often not by any means the cheapest, as they are of inferior quality, burn away rapidly, and leave a great amount of ash.

Many gas lights in a close room make the air very damp, and the moisture they produce may often be seen settling on the cold glass of the windows or running down the walls.

** Many gas lights in a badly ventilated room, or even one in a room that is not ventilated at all, cause the air to become very unwholesome from the presence of carbonic acid gas.

CHAPTER V.

LIGHT.

THE artificial light which is required in our dwellings during a considerable portion of the year, is derived from the combustion of various bodies capable of burning with a flame.

The presence of flame is always due to the combustion of inflammable gases, composed, in almost all cases, of two elements, hydrogen and carbon, united in very variable proportions. The hydrogen in burning unites with the oxygen of the air, and forms water, which, from the high temperature of the flame, is driven off in vapour, but may be collected on a cold substance held above the flame.* The carbon in burning forms carbonic acid gas, which, being invisible, passes unnoticed into the surrounding air.**

When solid or liquid substances burn with the production of flame, they are always converted into gas in the first instance. Thus, in a candle, where solid fat appears to burn, the several steps of the process may be thus described:—1The fat is first melted, and collects around the bottom of the wick, 2up which it passes by capillary attraction, and so reaches the centre of the flame. 3Here it is, by the high temperature, converted into gas, which, burning in the air, produces the flame, so that a candle is in reality a portable gas-lamp, manufacturing the gas as it is consumed. The hydrogen being the more inflammable of the two substances of which inflammable gas consists, burns first,

and the carbon is set free in the solid form. The existence of solid carbon in all ordinary flames may be proved by holding any cold, solid object in them, when it will be deposited upon the solid, in the form of lampblack ; but if the carbon is in very small quantity, the flame will not blacken the object. This is the case with the flame of spirits of wine. If there is not enough air to enable both the hydrogen and the carbon to burn, the former is first consumed, and part of the carbon passes away unburnt in the form of smoke. On the contrary, should the air be in excess, or the current too strong, the carbon burns at the same time as the hydrogen. The flame is almost colourless, and but little light is given out. This result is seen when a gas flame is first lighted, if the air has gained entrance into the pipes ; or when a current of wind blows against gas jets in the open air.

The consideration of the different kinds of illuminating materials may be most conveniently arranged under the following heads :—Those that are used in the solid form, as candles ; those that are employed in the liquid form, as the materials burned in lamps ; and those that are gaseous, as ordinary coal gas.

The solid inflammable materials, known as tallow, wax, paraffin, spermaceti, composite, stearine, &c., &c., are made into candles ; and, when ignited, the melted liquid is drawn up to the flame by means of the wick. The character of the material influences very greatly the nature of the wick required. If the liquid be thin and limpid, a very thin wick is required ; but with coarser materials, a thick wick is necessary ; this from filling up the flame, lessens, to a considerable extent, the amount of light.

Again, if the wick is allowed to become too long, a part of the unburnt carbon is deposited on it, forming masses which obstruct the flame to a very great extent. Wicks that have been twisted or plaited in the manufacture, turn to one side in burning, consequently the ends are thrust out of the flame and are burnt off as they come in contact with the external air.

The attentive examination of the flame of a candle gives much information respecting the nature of flame in general. At the lower part is a blue margin, produced by a rapid current of

× Substance contained in the products of the distillation of tar, tasteless & odorous

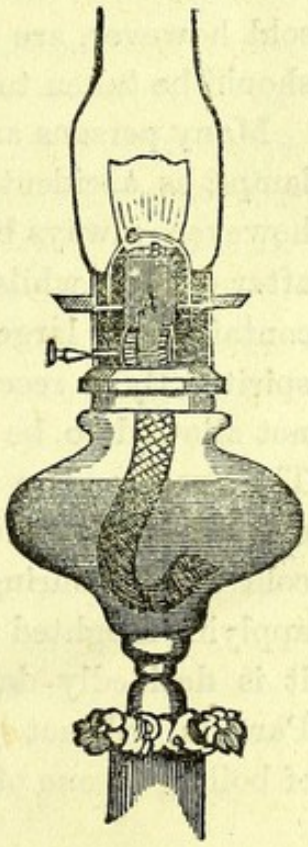
* Stearine, the solid parts of all animal fat which when melted resembles wax.

air which causes the perfect combustion of both carbon and hydrogen; the interior is dark, as, from the absence of air, no combustion can take place there; the exterior bright and vivid, from the inflammable gas burning when it is in contact with the air.

Candles, because of the cheapness of their first cost, are largely employed as a source of artificial light; but, from the small amount of light yielded by them, they are almost the dearest source of light we employ.

The lamps now in most frequent use are of two kinds; the first constructed for burning fat oils, as whale and seal oil from animals, and colza or rape oil from vegetables; the second, constructed for the purpose of consuming the various mineral oils know as paraffin and petroleum oils, photogen, and other names.

The first great improvement in fat-oil lamps was made by a lamp manufacturer of the name of Argand, who constructed the burner so well known under his name. By means of a cylindrical wick, he caused a current of air to pass into the centre of the flame, thus insured a much more perfect combustion, and prevented the loss arising from the escape of unburnt carbon in the form of smoke. In these lamps a glass chimney is required to ensure the passing of a rapid current of air through the centre and around the flame.



The mineral oils, known as paraffin oil, photogen, petroleum, &c., &c., contain a much greater amount of carbon than any animal or vegetable fat oils; hence, when set on fire in the open air, they produce dense clouds of black smoke; they consequently require lamps of peculiar construction to enable them to be burnt with advantage.

The construction of one of the most common form of these lamps is shown in the engraving.

The wick is flat and is capable of being raised up to the required height, or turned down into the wick-holder, A, by means of a toothed pinion. In order to cause

× Colza from a kind of cabbage
* Rape from a kind of French turnip

a sufficient amount of air to come in contact with the flame, so as to ensure the perfect combustion of the carbon and prevent the production of smoke, a cone or cap, C, with a slit at its upper part corresponding to the position of the wick, is placed around the lower part of the flame, and is so constructed that the rapid current of air produced by the ascent of heated air through the chimney is directed against the sides of the flame, ensuring a very perfect combustion, attended with the production of a brilliant white light. Certain precautions must be observed in using paraffin oil lamps, as the liquids employed in them are volatile and inflammable. They should never be trimmed after dark. In trimming them care should be taken not to spill any of the liquid on the outer surface of the lamps, as it becomes volatilized, and produces a disagreeable smell. After the wick is lighted the flame should be lessened to the lowest possible point, by turning the exposed part of the wick, B, down into the wick-holder. The chimney should then be placed on, and the flame gradually increased by turning the wick upwards.

With the most ordinary care these lamps are perfectly free from danger or the production of smell, and are amongst the cheapest and best sources of artificial light. Many of the lamps sold, however, are of very flimsy and inferior manufacture. Care should be taken to select those which are substantially made.

Many persons are prejudiced against the employment of these lamps, as accidents have occurred from their use. These may, however, always be traced either to the folly of filling the lamps after dark or whilst in use, or to the employment of inferior oils containing a large quantity of very volatile and inflammable spirit. By a recent Act of Parliament very dangerous oils are not allowed to be sold by persons who have no special licence. The quality of an oil may be readily tested by mixing in a basin a cup-full of perfectly boiling-water with an equal quantity of cold water, pouring a teaspoonful of the oil on the surface and applying a lighted match ; if the oil takes fire at that temperature it is decidedly dangerous. Really good oil, such as Young's Paraffin, will not ignite even if poured on a mixture of two parts of boiling to one of cold water.

A very volatile and inflammable liquid termed benzoline, or benzoline spirit, is employed in the small sponge lamps. These are filled with sponge or cotton wool which, when in use, is saturated with the benzoline; the wick-holder, carrying a small round wick, is then screwed on, and when lighted a small flame, about equal to that of a candle, is produced. If these lamps are always trimmed in the daytime far away from fire, and the excess of benzoline poured back, they are perfectly safe and supply a very convenient and exceedingly economical source of light, but it should always be remembered that the benzoline is exceedingly inflammable and that its vapour readily takes fire on the approach of a flame.

Coal gas is unquestionably the cheapest source of light, in all cases where a fixed light is desirable. In private dwellings its economy is not so great as is generally imagined; the flame cannot always be brought near the object or part of the room required to be illuminated, consequently a much greater amount of light is necessary than when moveable lamps are employed.

The particular kind of gas-burner to be used should be determined by the amount of light required. For small rooms, the two-hole or fish-tail burner is advantageous, as being cheap, simple, and capable of causing a very perfect combustion of the gas. With this burner the flame is spread out into a thin, flat sheet (resembling, in shape, the tail of a fish), by the two currents of gas striking against one another. In a fish-tail burner the gas should always be turned on so as to cause the full expansion of the flame without flickering, as otherwise the gas is not perfectly burnt. Hence a large-sized burner should not be used under the idea that it can be turned down so as to afford the same light as a smaller one. In cases where a fish-tail is placed over a table to light objects below, it will be found to give a greatly increased amount of light if the flame is placed horizontally, and not in the usual position. An ordinary sized fish-tail consumes from three to four cubic feet of gas per hour, giving the light of from six to nine candles. The glass globes ordinarily used with fish-tail burners are very badly constructed. They cast a shadow, and cause the flame to flicker in a manner that is exceedingly

tiring to the eyes of persons writing or sewing by their aid; the burners are much better used without them.

Where a great amount of light is required in one spot, the Argand burner is more economical than the fish-tail. In most Argands the chimney is too high; this causes too strong a current of air, and consequently the gas is much overburnt, and a great loss of light ensues. An Argand with a ring having fifteen holes, should not have a chimney more than seven inches high. Such a burner will consume about five cubic feet of gas in an hour, and give an amount of light equal to that of fifteen sperm candles.

In all cases where gas is extensively employed, means should be adopted for carrying off the products of combustion, otherwise the atmosphere of the room becomes very largely impregnated with carbonic acid and vapour of water.

Dangerous explosions sometimes occur after the escape of gas from a leaky pipe or a burner that has been carelessly left open. These accidents are almost invariably caused by the folly of some person taking a lighted candle to discover the situation of the leakage, when the escaped gas, having mingled with the air so as to constitute an explosive mixture, takes fire instantaneously, and burns with a violent explosion. Whenever a strong smell shows that there has been a large escape of gas, the maincock at the meter should be immediately turned, and the doors and windows opened to allow the gas to escape. No attempt should be made to search for the situation of the leakage with a light, but notice should be instantly given to a gas-fitter.

about ½ part of the bodies is wasted & wears away every day so that in 40 days the whole body has to be renewed. food must be capable of absorption, and (2) it must contain the elements of wh. the body is composed.
the most important elements of the body C. N. O.
is derived from the lungs. The food supplies N. & C.
od is composed of material wh. contains force or energy latent.
od enters the body - is digested - becomes tissue - then it is oxidized, or
rnt up - & during oxidation it yields up its energy and becomes
educed to CO_2. Water & urea.
the forces evolved from oxidation of tissues are (1) heat & muscular force
⅓ leaves the body as mus. force & ⅔ as heat.

CHAPTER VI.

FOOD.

GENERAL PURPOSES SERVED BY FOOD.*

THE food of man and the lower animals serves several distinct purposes when taken into the body. It supplies the materials required for the growth of all the organs of the body and the formation of those secretions, such as the bile, saliva, &c., that are produced by it; it replaces the daily waste or "wear and tear" of the animal machine; the consumption or oxidation of the food is the source of the whole of the power or force exercised by the muscles, and also of the natural warmth of the body. Any pure unmixed substance, such as sugar, starch, fat, gelatine, albumen, gum, &c., cannot fulfil all these purposes, and if taken alone any one of them is insufficient to support life for a length of time.

Comparison of the body to a steam engine

The body of a living animal may be compared to a working steam-engine, in which metals are required to construct and to repair the waste and wear of the machine, and fuel is also necessary to originate, by its combustion or oxidation, the heat, which is the moving force of the machine.

In the animal body the machine is constructed of nitrogenous substances, which represent the metal-work of the steam-engine,

* The statements in this chapter differ very considerably from those in the seventh and previous editions; the present contains the results of the latest investigations of the most eminent physiologists both in this country and on the Continent.

whilst the muscular force which is exercised and the natural degree of warmth necessary to maintain life are derived from the oxidation or combustion of the carbonaceous articles of diet, which represent the fuel consumed in the ordinary steam-engine.

The bodies of animals are constructed chiefly of substances somewhat similar in composition to albumen or the material which constitutes the solid matter of the white of egg, this contains nitrogen. Hence these substances are termed Albumenoid or Nitrogenous, and articles of food capable of supplying these materials to the body are termed Albumenoid, Nitrogenous, or flesh-forming foods. The most important of these are [1] *fibrin*, or the fibre of the flesh of animals; [2] *albumen*, which, united with water, constitutes the white of egg; [3] *casein*, which is identical with the curd of milk; and [4] *gelatine*, or the basis of glue.

One of the most important facts discovered by modern chemists is, that substances similar in character to those above mentioned, if not precisely the same, exist in vegetables; the [5] gluten or nitrogenous part of wheat and other grain, for example, resembles the *fibrin* of flesh; a substance identical with *albumen* exists in flour; and the nitrogenous matter of peas and beans termed [6] *legumin*, possesses not only the chemical but also the nutritive qualities of curd.

The earthy substances necessary for the growth of the bones in young animals, and for the repair of the daily waste in mature ones, must be present in the food, or weakness in these organs will result. Bone-earth is contained in large proportion in milk; having been extracted by the cow from its food during digestion. The saline and other mineral substances, which occur in large proportion in the blood, exist in considerable quantity in fresh vegetables.

The fuel that is burned in the animal machine consists chiefly of substances not containing nitrogen, resembling in this respect oily bodies, hence they are frequently termed oleaginous foods. One of their most important functions is to maintain the warmth of the body; hence they were formerly termed warmth-giving foods, but this is not a good name, as it only expresses one of their characteristics. Being consumed by the process of breath-

ing they are sometimes termed respiratory foods. The substances consumed in this manner are combustible bodies, and they contain a large proportion of carbon or charcoal, which passes off in the breath as carbonic acid ; hence they are also frequently termed carbonaceous foods.

The warmth and temperature of the human body, when in health, remains nearly the same at all seasons and in all climates, viz., about 100° Fah., being regulated, in some degree, by the evaporation of the perspiration (which is secreted in greater abundance during exertion); it therefore follows that a larger amount of that description of food which gives warmth is required in cold seasons or situations than in those that are warm.

During exercise, or under excitement of any kind, the breathing is hastened, and consequently a large amount of carbonic acid is thrown off by the lungs. On the contrary, in quietude or during sleep, the breathing is slow, and the quantity of carbon consumed in this manner lessened. The most important oleaginous foods are, 1 *starch*, 2 *sugar*, 3 *gum*, the 4 *softer fibres* of plants, and 5 *oily* or *fatty* substances.

The fat which is found in the bodies of all animals exists, to some extent, ready formed in their food. All grain contains a considerable proportion of oil ; in one hundred pounds of wheat flour, there are from two to four pounds ; in the fine middlings, or sharps, from five to six pounds ; in oats, from five to eight pounds. The fat in the food answers several purposes : 1 it replaces the daily waste of that existing in the body, 2 it assists in the regular action of the digestive organs, 3 and acts as a respiratory food, tending to keep up the natural warmth, and to produce force by serving as fuel for the animal machine. It follows that there is a greater appetite for fat in cold weather, and amongst the inhabitants of the Arctic Regions, than there is in warm weather, or in more temperate climates, and that persons exercising much muscular force, and engaged in active labour, always select a food containing a great amount of fatty material. Fatty matters taken in larger quantity than required for the immediate use of the system accumulate in various parts of the body, as is obvious in animals fattened for the food of man, and even in man himself.

Perfect Food

Milk—provided expressly by the Creator for the subsistence of young animals—is an example of a substance containing all the requisites for supporting a healthy and vigorous existence. Amyloid The carbonaceous matters are the sugar, which it contains to the extent of about four parts in every hundred, and the butter; Fat these together form the fuel for the supply of muscular force Proteid and animal warmth; the curd furnishes nourishment to promote the growth of the muscles; whilst the whey contains material Mineral for bone-making, with saline ingredients in the requisite proportion. Finally, water, which forms nearly three-fourths of the entire mass of the body, is present in milk to the extent of nearly 90 per cent.

It is a well-ascertained fact, that no amount of any simple article of food used alone is able to support life. Dogs fed on pure carbonaceous foods—as sugar, cooked starch, fat, &c., &c.—die at the end of five or six weeks, living only a few days longer than when subjected to absolute deprivation of food, death taking place from the want of albumenoid or nitrogenous substances to supply the waste of the body that is constantly going on; and animals fed entirely on any one pure, albumenoid material—as white of egg—die in an equally short space of time. In order What is necessary to life to support life in a healthy state, both kinds of food must be taken; and the nearer we can follow the example set forth by the Creator, and proportion these ingredients as they exist in milk, the nearer we approach to a perfect food.

The necessity for a mixed diet is proved by the instinctive longing shown by mankind for a variety of food, and the nauseating effect occasioned by the continued use of any one article, however palatable it may have been in the first instance.

That the natural food of man is a mixed diet of animal and Proofs vegetable substances is proved by a number of facts. In the first place, the universal habits and instincts of all races of mankind are opposed to that view which would make man a purely vegetable feeder. His bodily structure, as evidenced in his teeth, the formation of his stomach, the arrangement and length of his intestines (which are alike intermediate between those of purely carnivorous and herbivorous animals), point to the same truth. Did we require any further proof we might appeal to the Biblical

authority given to man to use every living thing for meat, or to what has been so appropriately termed "the admirable sanatory code of the Hebrew theocracy."

The relative advantage of animal and vegetable food may be briefly stated. Animal food is much more concentrated and superior in nutritive quality; it is also more easily assimilated or converted to the uses of the body. It is, however, deficient in starchy materials, and in fat, unless the animal from which it is derived has been fattened. Vegetable food, on the contrary, possesses an excess of carbonaceous matters, and the nutritive materials which it contains are in some cases in such a condensed form as to be difficult of digestion. Hence the superiority of milk over peas, although both contain curdy materials of a very similar character.

It may be imagined that in a work of this kind these purely chemical considerations are out of place; but it is impossible, unless they are to some extent understood, to comprehend the relative value of the different kinds of food; and it is hoped the slight notice which has been taken of the subject will be found to materially facilitate the understanding of the value, whilst it will shorten considerably the description, of the different articles of diet.

CHAPTER VII.

ANIMAL FOOD.

THE most important animal food employed in this country is the flesh of the ox, sheep, and pig. That of the horse is largely used in some parts of the Continent, where it is regarded as wholesome and palatable; but it is not employed in England. Fish form an important article of diet in Great Britain, as do milk and eggs.

Flesh.—The flesh of animals is of a very compound character, it consists of various albumenoid or nitrogenous substances: the most important of these are *fibrin*, *albumen*, and *gelatine*; it also contains about four-fifths of its weight of water, which has dissolved in it several soluble materials, and constitutes the *juice of the flesh*.

Fibrin, as its name implies, constitutes the fibrous part of the flesh, and forms also a very considerable portion of the clot or solid portion of the blood; fibrin is insoluble in water, and is hardened and rendered tough by long-continued boiling. It may be obtained in a nearly pure state by washing shreds of lean meat in repeated waters, until they become colourless, or by stirring some recently-drawn blood with a rod as it coagulates, when the fibrin will adhere to the stick, and may be rendered white by washing. The amount of fibrin in butcher's meat and poultry is about 15 per cent., and less in fish.

Albumen exists in a very pure state, united with a large proportion of water, in the white of egg, from whence it derives its

name. It forms a small portion of the flesh, usually about three to five per cent.; it also exists in the brain, and in the blood, of which it forms nearly one-fifth. It is readily dissolved in cold or warm water, but when the solution is heated to about 160 degrees, or about 50 degrees below the boiling point, it coagulates, or becomes solid. In a liquid condition, or if coagulated in a state of fine division, as when beaten up with tea, or made into a custard with milk, it is remarkably easy of digestion, and exceedingly nutritive, but when hardened by heat, as is the case when eggs are hard boiled or fried, it becomes very solid and even horny and is digested with difficulty.

3. *Gelatine* is found in small quantity only in lean flesh, being rarely more than two per cent. of its weight; it exists chiefly in the tendinous sinewy parts of animals, and constitutes nearly about one-third of the weight of dry bones; it is distinguished by its solubility in boiling water, and by forming a jelly on cooling. Though a valuable article of food, its employment without the use of the other constituents of flesh is not desirable. It is remarkable, that although it forms so large a proportion of the solid parts of the body, it is not found in milk, the typical food, nor in eggs, from the materials of which the body of the young chick is formed, nor in the blood that nourishes all our tissues; hence it has been erroneously stated to be of no value whatever as an article of diet; but the absence of gelatine from the blood no more proves it to be unnutritious than that of casein or curd from the blood proves milk to be destitute of nourishment. The general instinctive relish for gelatinous articles of food, and the appetite for jellies shown by invalids, renders it certain that it is, when taken along with other substances, a valuable article of diet, serving a useful purpose in the animal economy.

The fact that dogs can be maintained in health for any length of time when fed on bones or cartilaginous substances, is alone a proof of its utility as food.

Isinglass, which is almost entirely composed of gelatine, is the dried swimming bladder obtained from several species of fish. The prepared gelatine of the shops is manufactured from the refuse trimmings of skins, and other gelatinous parts of animals, purified by chemical means, and, from its mode of preparation

is not by any means so desirable an article of diet as the jelly freshly prepared from calves' or cows' feet, or other gelatinous parts of animals.

Those joints of meat in which tendons and sinews abound are of less value than the more fleshy joints, and require a process of stewing or slow boiling, to render them useful for food.

The juice of the flesh, which forms about four-fifths of its weight, contains a considerable quantity of liquid albumen, and small quantities of other nutritious substances, of great value as food. It is readily extracted from chopped flesh, by warm water. A large proportion of it is also withdrawn during the process of salting, forming the brine, and its loss causes salted to be much less nutritious than fresh meats, and even renders them unfit, when used for a long period of time, to support healthy and vigorous existence. It is from the impoverished character of the meat, and not from the presence of salt, that scurvy arises in ships' crews kept for a long time on salted provisions.

The substance sold as extract of meat consists of the solid materials of the juice of the flesh, the water having been got rid of by careful evaporation. Though of considerable value for making soups and gravies, the cost of its preparation renders it an expensive substitute for fresh meat, and it is an extravagant mode of using flesh, as the fibrin, albumen, and gelatine are wasted. To be truly nourishing it requires the addition of albumenoid and starchy matters.

Fat, which exists to a greater or less degree in all animals used for food, is of the highest value as an oleaginous diet; it not only serves as fuel, supplying by its consumption the warmth and force of the animal machine, but when largely taken is stored up in the body, and thus increases its weight. A certain proportion of fat is also requisite to the due action of the digestive organs, and is essential to health; there is consequently an instinctive desire for such proportion; hence has arisen the practice of using butter with bread, bacon with fowl, veal, and other lean meats, and also with cabbage, as well as the fattening of our oxen, sheep, poultry, and other domesticated animals used for the food of man.

The chief varieties of flesh used for food in this country are *Mutton*, *Beef*, *Pork*, *Veal*, and *Lamb*.

Mutton was not formerly regarded as being in perfection until the sheep from which it was obtained was three years old; but, owing to the improvements effected in the breed of these animals, they now arrive at maturity at a much earlier age. Mutton is one of the most wholesome and digestible of all kinds of meat, and is, therefore, usually selected for invalids.

Beef, though equally nutritive, from the greater firmness and size of its fibres, is not so readily digested as mutton.

The digestibility of *Pork* depends, in a very great degree, on the age and food of the pig, and, therefore, varies considerably; it is, generally speaking, more difficult of digestion, and, therefore, more likely to disagree with delicate persons than either beef or mutton. It may be added, that, from the very artificial state in which pigs are often kept, and the offensive character of the food on which they are sometimes fed, they are frequently subject to disease, in which case the flesh is not to be regarded as wholesome.

The flesh of young animals, such as *Veal* and *Lamb*, is less dense, and not so nutritious as that of animals of mature age; it is deficient in solid matter, containing nearly two ounces more water in every pound; at the same time it possesses a larger proportion of gelatine, as shown by the gelatinous character of the gravy when cold.

The internal organs of the body vary considerably in their value as food. The heart consists of firm, fleshy fibres, and is very nutritive, but, from its extremely solid character, not so readily digested as ordinary flesh or muscle.

In the tongue, on the other hand, the fibres are small and much interlaced; consequently the organ is not only very nutritive, but extremely digestible. In the liver and kidney, again, the structures are dense and solid, and are consequently not easy of digestion.

As the blood of animals contains a large proportion of nutriment, it has often been proposed to utilize it as human food; but there is a very general repugnance to its use, and almost all races of men seem instinctively to obey the Hebrew ordinance forbidding its employment.

The stomach of the Ox when cleaned and boiled forms tripe
Brain consists chiefly of albumen and water and if properly
prepared forms a useful food (mesalic bags & boiled).

PROCESSES OF COOKING.—The processes of cooking to which meat is usually subjected are *Roasting*, *Baking*, *Broiling*, *Frying*, *Boiling*, and *Stewing*.

Roasting is one of the most simple and wholesome modes of cooking. During the operation, a portion of the fat is melted, and escapes, forming the dripping, and some of the water of the juice evaporates. These changes always occasion a loss of weight, which varies very considerably in different joints, amounting in the case of some joints without bone to nearly one-third of the original weight. When meat is put down to a brisk fire, the albumen in the outer portions is hardened, and thus an impervious external layer is produced, which prevents the escape of the nutritive juices. If the temperature of the inner parts is raised to a sufficient degree, the colouring matter of the blood is coagulated, and so changed that the meat loses the natural red tint it possesses when uncooked or underdone. The albumen also is coagulated, and the flesh rendered sufficiently firm to retain its form when cut into thin slices. It is a common but unfounded opinion, that meat underdone is more nutritious than when perfectly cooked. There is no ground for such an opinion, on the contrary, well cooked meat is readily digestible, and is free from the objection to half cooked meat, that the latter may contain the larvæ or germs of tape worms, trichinæ, and other entozoa in a living state.

During the process of roasting, peculiar odours and tastes are developed, which render the flesh much more sapid than when cooked by the aid of moist heat. Roasting is less applicable to small than large joints, as the former become dried up and hardened, making them less palatable and digestible. It is also a wasteful mode of cooking tendinous or sinewy joints, which become in great part so dried as to be uneatable, whereas, if boiled or stewed, they afford much nourishment.

The time usually allowed for roasting is a quarter of an hour to each pound of meat; but when the joint weighs less than five pounds, the time required is greater in proportion; the larger the joint, the greater the distance at which it should be hung from the fire, so as to permit the gradual passage of the heat to its centre without scorching or burning the outside. To roast

in perfection, the meat should at first be placed before a brisk, clear fire, to coagulate the albumen of the outer portions, and so prevent the escape of the gravy; this accomplished the cooking should be completed slowly. The joint should not be perforated with skewers or a large spit, as these form channels through which the gravy escapes from the interior, and the joint becomes dry.

Baking closely resembles roasting in its effects; but in overheated ovens, the flavour of the meat is apt to be injured by the burnt odour arising from the decomposition of the fat which falls on the heated floor of the oven. The steam arising in the process, also, if not permitted to escape, as it ought to be, soddens the meat. Ovens, therefore, designed for cooking meat should be furnished with small apertures, to allow the escape of steam. In baking, as the moisture does not evaporate so readily as in roasting, there is rather less loss in weight.

In a clean oven, not overheated, meat may be so perfectly cooked as not to be distinguished from that which is roasted, and with a much less amount of trouble and cost of fuel.

Broiling produces the same effect as roasting, although more rapidly; the albumen on the outside is more quickly hardened, and retains the juices, thus rendering the meat savoury. Care should be taken not to prick or cut the lean of the meat before broiling, as in that case the juice flows out of the apertures. In London chop-houses, where broiling is carried on to a high degree of perfection, chops and steaks are placed over a clear, bright, smokeless fire, and turned frequently, so as to prevent the escape of the juices; tongs being used for this purpose instead of a fork.

Frying, if performed at a high temperature, renders the fibres of the flesh more dense and tough than any other mode of cooking. In addition to this evil, the melted fat, being heated to a high temperature, becomes partly decomposed, and converted into acrid substances of offensive odour, difficult of digestion, and very irritable to weak stomachs; hence fried meats are not admissible as a diet for the sick.

On the Continent, frying is generally performed in a much less objectionable manner than in this country. In England, a small

quantity of fat is placed in a shallow pan, and put over a fierce fire, by which it is decomposed, rendering the over-heated food tough and indigestible, and filling the house with disagreeable vapours. On the Continent, a vessel termed a *saute-pan* is used, resembling a shallow stewpan in form. A sufficient quantity of fat is employed to cover the meat to be cooked, and it is heated to a moderate temperature over a cooking stove; the proper degree of heat being ascertained by noting whether it renders a crumb of bread of a pale brown. The advantages of this plan are, that the meat is neither sodden in fat at too low a temperature, nor hardened and rendered unwholesome by too high a heat. As thus conducted, this process is not expensive, the fat being reserved for repeated use.

The superiority of chops and cutlets which have been dipped in egg and bread-crumbs before they are fried, depends on the albumen of the egg being immediately hardened by the hot fat; thus forming a coating which prevents the escape of the juice of the flesh. The food is, in consequence, more juicy, as well as more nutritious and digestible.

Boiling is one of the most wholesome modes of cooking. It is usual to place the meat in cold water, and bring it slowly to the boiling point; during this time, some portion of the albumen is dissolved, and as the water approaches the boiling temperature, it coagulates, forming the scum; if this scum be not removed, it is carried down by the agitation of the water, and adheres to and disfigures the joint. Portions of the gelatine and juice of the flesh are also dissolved, and remain in the liquor. Boiling is a more economical process than roasting, as there is no waste from dried portions; the tendinous and sinewy parts are generally eatable, and the broth serves as stock for soup. The time allowed for boiling is generally somewhat less than twenty minutes to every pound; but small joints require a longer time in proportion than those that are large. In boiling, a fork should never be thrust into the meat, as by passing into the interior, where the albumen is not hardened, it allows the free escape of the juices; and for the same reason skewers should not be used, but the joint tied round with string if necessary.

If the liquor is not required for soup, a more advantageous

mode of boiling than that usually adopted is, to place the joint in perfectly boiling water for a quarter of an hour to harden the outside, then to cool the liquid either by adding a portion of cold water, or by removing the vessel some little distance from the fire, and keeping the whole at a reduced temperature until the meat is thoroughly cooked. Boiling should never be performed rapidly, as in that case the fibrin is hardened, and the meat becomes tough.

Stewing is perhaps the most economical mode of cooking; by its use every part of the meat is retained, and nothing is lost or wasted. The flesh of old animals, and joints too tough or sinewy to be used in any other mode, may be stewed with advantage.

Stewing consists in subjecting meat for a considerable time to a very moderate heat in a small quantity of water. No good stew for an early dinner can be made the day it is wanted. The meat, either whole or cut in pieces of the required size and packed closely together, should be barely covered with cold water, or, what is preferable, broth; and the stewpan placed where it will become gradually warm, and keep for some hours at a heat *considerably short* of boiling. The albumen is thus dissolved, and the fibres so far softened and separated, that the toughest parts become tender and digestible. The stew may be put away in an open vessel until the next day, when the fat should be removed from the top, vegetables and seasoning added: it may be thickened with flour or meal if required. If the meat is slightly browned by frying with a gentle heat before stewing, the juices are more perfectly prevented from escaping, and the flavour is in many cases greatly improved.

The process of stewing at a moderate temperature is admirably performed in Captain Warren's cooking pots, which are constructed on the same principle as a carpenter's glue-pot, the meat being placed in an inner vessel, which is heated by the boiling-water contained in that which is exterior.

On the Continent vinegar is frequently added in the process of stewing. It acts by softening the fibrin, and so renders the meat more tender and digestible.

The value of stewing, as the most advantageous mode of

cooking meat, has been long insisted on by the author in his lectures, and he has much pleasure in condensing the following remarks from Dr. Brinton's admirable treatise on "Food and its Digestion." Speaking of the general mode of cooking in France, which consists in the employment of the *pot au feu*, or stewing pipkin, Dr. Brinton says :—

"The *pot au feu*, from its great saving of fuel, food, time, and skill, is the climax of cookery; to roast aright demands a large fire, a good cook, perpetual attendance, and excellent meat; to boil meat affords a broth too good to waste, yet hardly good enough to form a soup. The French *pot au feu*, or stewing pipkin, gives us broth and meat of almost equal excellence, and these can be produced with little fuel, from indifferent, tough sinewy joints, by an unskilled cook, almost without attention. The meat, barely covered with cold water, is raised gradually in one or two hours to nearly the boiling point, and then is maintained there for a time, which may be roughly stated as an hour for each pound of meat: the water which is lost being replaced. If this process is properly carried out, the result is, a meat thoroughly tender and well cooked, a broth pure, clear, strong, and fragrant, whilst the time employed is sufficient to cook the various vegetables which are thus prepared with the meat, whilst their soluble flavoury materials constitute a pleasant addition to the broth."

Salting beef before boiling or stewing is a wasteful and injurious practice, it extracts a very large proportion of the nutritive juice of the flesh and the albumen, &c., in the form of brine, and renders the fibres of the muscle hard and indigestible. The injurious nature of the practice may be inferred from the fact that salted meat will not support healthy existence for any length of time. The preservation of fat meats, as bacon, etc., by salting is not open to the same objection.

Bones.—Bones contain two-thirds of their weight of animal matter, chiefly gelatine; the other portion consists of earthy substances, which remain as ashes when they are burned to whiteness.

The gelatine may be extracted by long boiling, provided the bones are crushed or broken up small; used in this manner they

To boil fish. Place it in a fish kettle with cold salted water in which salt is dissolved (1 teaspoonful to the quart) set it over the boiling point slowly and then simmer for five minutes, when it will be fully done, and leave

furnish, if quite fresh and wholesome, nutritious and economical stock for soup.

FISH.—The flesh of fish is more watery and, therefore, less nutritious than that of land animals. In those termed white fish, such as sole, cod, haddock, whiting, plaice, &c., the flesh is nearly destitute of fat, which is accumulated in the liver; in some others, as in salmon, herring, conger eel, mackerel, &c., the whole body is more or less oily. White fish, when boiled, are light, easy of digestion, and less stimulating than meat. The oily fish require stronger digestive powers, and are, in consequence, unfitted for invalids. Fried fish, for the reasons before stated, should not be taken by persons of weak digestion.

In the poorer districts of London, Manchester, and other great towns, where fried fish is largely sold, it is cooked with great skill. The plan adopted is to dry the fish thoroughly, afterwards to dip it in a thin batter, and place it in a deep pan filled with fat previously heated to the required temperature.

Boiling fish is not the most economical mode of employing them, as much of the nourishment escapes into the water; baked with or without bread-crumbs and seasoning, or stewed, it is more pleasant and economical. In the Channel Islands a delicious soup is made of the conger eel, a fish which is rejected on many parts of the coast of England and Ireland.

Salting fish extracts much of the watery portion, and thus renders it firmer, but at the same time, as in the well-known instance of salt cod, hardens the fibre, and makes it less nutritive and digestible. Salt cod is almost valueless as food. The process is more advantageous in the case of the oily fish, as herrings, sprats, pilchards, &c., &c.

EGGS.—The eggs generally used for food in this country are chiefly those produced by the common domestic fowls and ducks.

The white of eggs consists of 15 per cent. of animal matter, chiefly albumen, combined with water; the yolk contains nearly 20 per cent. of albumen and 30 per cent. of a yellow oil. As eggs consist chiefly of albumenoid substances, they should be used with starchy articles of diet, as bread, rice, or potatoes. When low in price they afford a cheaper supply of animal food than meat. Eggs form a very nutritious and easily digested

Character as food

article of diet if taken in a raw state or lightly cooked; on the contrary, if boiled hard, or fried, the white requires a long period to digest. A fresh egg beaten up with tea, coffee, or a little weak wine, or brandy and water, forms a very valuable food for invalids. Employed in the form of omelets, viz., the white and yolk beaten up together, with the addition of a very small quantity of milk and flavouring ingredients, and light fried, they are readily digested.

In cookery, eggs are largely employed, particularly for cakes, batter-puddings, &c. They render pastry light by increasing the tenacious character of the dough, and thus enable it to become more perfectly distended by the gases and vapour which are liberated by the heat employed in cooking. The so-called egg and baking powders which are sold as substitutes for eggs, add no nourishment to the food; they consist of similar ingredients to the well-known "soda powders," namely, tartaric acid and carbonate of soda, to which is added some potato or other starch; when these ingredients are mixed with flour and moistened, effervescence takes place, and the gas liberated distends the dough, rendering it light or spongy.

Eggs, when kept, gradually become lighter, arising from the evaporation of the moisture through the shell, and the entrance of air to supply its place. Hence the relative freshness of an egg can be ascertained by observing the size of the air bubble at the larger end, in a new-laid egg this is not as large as a fourpenny piece. The evaporation may be partly prevented, and the eggs, consequently, kept much longer, by greasing the shell over with lard, melted suet, or oil, so as to close the pores; or they may be plunged in a mixture of freshly slaked lime and water mixed to the consistency of thin cream; in this manner they may be kept good for months. If eggs are kept on their sides without being turned, the yolk, which always rises to the top of the white, will adhere to the shell; this is prevented by packing them with the large end upwards, the yolk is then kept from touching the shell by the air bubble which exists at that end.

MILK AND ITS PRODUCTS.—In its fresh state, as drawn from the cow, milk is an opaque white fluid, with a soft bland taste,

and a faint, peculiar odour; it is slightly heavier than water, usually in the proportion of about 1,030 to 1,000, but the weight varies considerably, even in the same animal, under different conditions as to exercise, food, warmth, &c., &c.; consequently, those lactometers or milk testers which act by determining the goodness of milk by its specific gravity are not quite accurate though very useful. Those which consist of an upright glass-tube, showing the quantity of cream rising in twenty-four hours, afford a better indication.

If allowed to remain undisturbed some hours, varying according to the temperature—being less in warm weather and more in cold—milk separates spontaneously into two parts; the cream rises to the surface, and the skim milk remains beneath; this separation also takes place to some extent in the udder of the cow, the milk as it is drawn increasing in richness to the last drop.

This rising of the cream is greatly assisted by setting the milk in shallow vessels; when a much larger quantity of cream is obtained than if the milk is several inches in depth.

The quantity of cream is very variable, not only in different cows, but in the same animal under a change of pasture, &c.; it is much increased by feeding in rich pastures, and on such food as brewers' grains, oil-cake, &c. It is lessened in a very remarkable degree by much active exercise, and particularly by exposure to cold.

Cream is formed of small globules, each of which consists of butter enclosed in a thin skin of curd; in the operation of churning, this skin is broken, and the butter unites into a solid mass. This change takes places most readily at a temperature of 60°, and it is desirable to add either warm water to the cream or milk that is being churned until that degree of heat is attained. In making butter, it is of the greatest importance that this curd should be washed away as completely as possible, as it is exceedingly liable to putrefy, and, if permitted to remain, soon affects the butter, and renders it rancid. It is important that pure soft water should be employed for this purpose, and that the salt should be perfectly pure; sea salt is inferior for this purpose to that obtained from the mines of Cheshire.

In Switzerland, butter intended for keeping is sometimes placed in a vessel containing warm water, until the whole is melted; then it is allowed to cool, and the curd which has settled at the bottom is removed. Butter so prepared will keep a long time, if care is taken to conduct the process very slowly, and not to use the water hotter than is absolutely requisite.

In some parts of this country, particularly in Devonshire, the separation of the cream is rendered more speedy and complete by the employment of heat. The milk, after standing ten or twelve hours in a flat metal milk-pan, is placed, with as little disturbance as possible, over a stove or clear fire until a scum rises to the surface; a small portion of this scum is gently removed with the finger from time to time, and when a few small air bubbles are seen underneath, the whole is immediately removed from the fire, and allowed to stand twenty-four hours. The cream thus obtained is much more solid than usual, and butter is readily produced from it by a few minutes' stirring with the hand. This cream, which is called scalded or clotted cream, possesses also the advantage of keeping some days without turning sour. The operation, however, requires to be carefully conducted; for if the milk is allowed to remain on the fire after the bubbles appear beneath the scum, there is great risk of failure.

The skimmed milk remaining after the separation of the cream consists of two distinct substances,—curd, and the whey in which the curd is dissolved. A very small quantity of acid causes the coagulation of the curd, and its separation in a solid form; this process is effected naturally, as the milk becomes sour from keeping. In Holland, diluted muriatic acid is used for this purpose. It is, however, much more advantageously brought about by means of a fluid obtained by soaking in water the salted and dried stomach of the unweaned calf, which is called *rennet*. So energetic is its power, that milk can be rapidly and completely curdled by the addition of $\frac{1}{500000}$ of its weight of rennet. The quantity of curd existing in milk varies at different times and with different foods, even in the same animal; it is increased in quantity by moderate exercise, such as that taken by the animal whilst grazing, and by albumenoid food, as beans, peas,

&c. ; the latter are given for this purpose to stall-fed cows in Scotland.

In making cheese, the curd is first separated from the milk by the use of rennet. When it has become solid, it is broken up, salted, and so pressed as to force out as much of the whey as possible. The richness of cheese is in proportion to the amount of butter it contains ; thus the best Cheshire cheese is made from unskimmed milk, other kinds from milk which has been half-skimmed, and inferior varieties from milk skimmed several times. The colour of ordinary cheese is produced by the employment of a dye termed Arnatto, a very useless addition.

Cheese making is much more successfully pursued in some parts of the kingdom than in others ; the inferior quality of that of many districts is usually attributed to the character of the pasturage, but there is no good reason for supposing this to be the true cause, which ought rather to be sought for in the bad methods of making followed ; very slight differences in the process of manufacture affect very materially the quality of the cheese. So important is a knowledge of these small differences, that the Agricultural Association of Ayrshire sent a deputation to inquire into the plans adopted in those counties of England which produce the best cheese. The method most strongly recommended by the deputation was that followed in the Cheddar district, where the very best cheese is produced with the least amount of labour.

The following is an outline of the process :—Immediately after the morning milking, the evening and the morning milks are mixed together, and the temperature of the whole is raised to 80 degrees by heating a small quantity of the evening's milk ; the temperature should be ascertained by the use of a thermometer, as it is found that the most experienced persons cannot detect a difference of several degrees without its employment. The requisite amount of rennet* is added, and in an hour the whole of the milk is found to be coagulated ; the curd is

* In the best English dairies, the vells, or dried salted stomachs of the calf, are most carefully cleaned and prepared, and are never used until they have been kept a year. The liquid obtained by steeping one vell is sufficient to coagulate milk enough to make ten hundredweight of cheese.

then slightly broken, so as to allow a portion of the whey to be removed; this whey is immediately heated by placing the vessel in which it is contained in a boiler of very hot water; the whole of the curd is then minutely and most carefully broken by passing instruments, termed shovel breakers, repeatedly through it: after it is thus broken, as much of the heated whey is added as will raise the temperature to 80 degrees. It is then left undisturbed for an hour, at the end of which time the whey is drawn off and heated to a rather higher temperature than before, when the curd is again minutely broken, and pailfuls of heated whey are poured in so as to raise the temperature to 100 degrees; the whole is constantly stirred during the time, so that the curd becomes somewhat consistent; it is then left half an hour, in order that it may settle, when the whey is dipped out, and the last portions drained off, without any pressure, by a spigot. The curd is next heaped up in the centre of the tub, so as to drain for an hour by its own weight; it is then cut into large slices, turned, and allowed to drain, without pressure, for half an hour; when it has drained, and its temperature has fallen to 60 degrees, it is put into vats and subjected to moderate pressure for half an hour; at the expiration of this time the curd is broken fine in a curd mill, and the best refined rock salt is added to it in the proportion of two pounds to one hundredweight of curd. It is then made into cheeses, and placed in the cheese press. The next morning the cheeses are turned and pressed again; and the third morning they are laid upon the shelf in a well-aired cheese room, having been previously laced up in a piece of canvas to preserve their shape whilst drying. At first they are turned daily, the room being kept at a temperature of 55 to 60 degrees—in winter a stove is used for this purpose.

It is considered that the inferior character of the worst cheese depends on a rapid coagulation, caused by the use of too much rennet and a high temperature of the milk. By the Cheddar plan a low temperature in the earlier stages gives richness of taste, and the higher temperature afterwards renders easy the separation of the whey. The most absolute cleanliness is indispensable; the spilling of a small quantity of whey on an absorbent floor will cause the production of many sour cheeses

during the season. The plan advocated is remarkably simple; and as it is regarded as an established fact, that difference of management is the great cause of difference in the quality of cheese, it is strongly to be recommended, good cheese thus made being worth nearly double the price of inferior kinds.

The natural souring of milk takes place with slowness in cold weather. The milk becomes rank-tasted and partially putrefied; the cream also separates slowly, acquiring a strong, unpleasant taste, consequently good butter cannot be made. These evils may, however, be prevented by scalding the milk according to the directions before given. One frequent cause of rankness in butter is the want of absolute cleanliness in the dairy. A little milk spilled, and not carefully washed away, undergoes the putrefactive process, and gives out putrid odours; these become absorbed, and often occasion the same change in the whole quantity of milk and cream in the dairy.

Many plants also affect very injuriously the flavour of milk and butter—the wild onion, frequent in many pastures, gives it a most offensive flavour—cabbages and ordinary turnips have, although to a less degree, a similar effect. Even red clover, although not imparting any perceptible flavour to the milk or butter when first made, is said to render it rancid after it has been salted and barrelled for six months.

Milk is an excellent article of diet, especially for the young. When swallowed it is coagulated by the digestive fluid, and the curd so formed is easily digested. Skim milk is a most useful article of animal food, and is far too valuable to be employed in pig feeding, as is frequently the case. Its importance to the children of the working classes can hardly be over-estimated. Landowners and farmers cannot be regarded as fulfilling their duties towards the labourers they employ provided they do not afford them facilities for obtaining from their dairies this, which is one of the best, and certainly the cheapest, article of animal food within the compass of their means.

Cheese contains a greater proportion of albumenoid food than any other substance; but, from its solidity, it requires good digestive powers. Where these exist, its value as an addition to vegetable diet can hardly be overstated. When heated and con-

solidated, as in toasting, it becomes particularly indigestible. Butter, if heated after having been mixed with starchy matter, as in rich pastry, is difficult of digestion, and should be avoided by persons having weak stomachs, or by those suffering from indigestion. In its uncooked condition it is of great value as food, being easily assimilated or converted to the uses of the body. Where it is to be obtained in abundance, as in the dairy districts of Switzerland, the mountaineers will eat a pound daily with evident advantage to their health, in the exposed condition in which they live.

CHAPTER VIII.

VEGETABLE FOOD.

CORN-PLANTS AND THEIR PRODUCTS.

THE corn-plants, or cereals as they are often termed, are the most important of all vegetable foods, and their capability of being cultivated in all climates has enabled men to grow the different species over the entire habitable globe, from the oats and barley produced within the arctic circle, to the maize and rice and millet of the torrid zone.

In addition to their albumenoid and fatty materials, which closely resemble those described in the last chapter, the corn-plants contain a peculiar substance known as starch, the properties of which it is desirable to investigate.

Constituents

In the chapter on the "General Purposes served by Food," the utility of starch as a respiratory diet was noted, as well as the part it fulfils in the production of muscular force and animal warmth. The fact, however, cannot be too strongly insisted on, that pure starch does not supply materials for the growth of the body or to replace the daily waste that goes on in the animal machine; an animal fed on starch alone becomes thin, pines away, and dies in a short time: those varieties of diet in which it occurs in great excess, such as rice and potatoes, are not adapted for the *sole* support of man, still less are such substances as arrowroot, sago, tapioca, &c.; however advantageous as part of a mixed diet, they cannot alone support life; an invalid or infant may be actually starved to death upon an abundance of arrowroot and tapioca, if prepared without milk or other albumenoid food.

Amyloid

Starch, in its purest forms, as it is extracted from potatoes or wheat, or as it exists in arrowroot, or corn flour, is a fine, white powder, consisting of small grains, or granules, the outer layers of which are perfectly insoluble in water; hence starch may be repeatedly washed without undergoing any change; heated to a degree somewhat short of boiling water, the outer layers of these grains crack, and the inner part of each dissolves in the water, forming a thick gummy solution. In this state starch becomes one of the most easily digestible and least irritating articles of food, and is frequently given to invalids with great advantage.

It should be remembered, that the grains of starch, before they are thus broken by heat, are not readily digestible by man; hence the absolute necessity for cooking wheat, rice, and any other article of food of which starch forms a considerable proportion. The digestion of all articles of food containing starch depends greatly on the action of the saliva, hence the great importance of eating potatoes, rice, bread, and other starchy articles of food slowly, and masticating them thoroughly, so as to cause an intimate mixture of saliva with them.

Arrowroot is a very pure variety of starch, obtained chiefly from a plant cultivated in the West Indies, South America, Ceylon, and other tropical countries. It is prepared by bruising, washing, and straining the underground tubers; the fibrous portions are thus separated, and, on allowing the liquid to stand, the arrowroot settles at the bottom.

Arrowroot is readily prepared for use in the sick-room, by mixing an ounce in cold water, and pouring on it a pint and a half of thoroughly boiling milk or water, stirring it the whole time; the heat used must be sufficient to render the whole mass a transparent jelly. If desired, lemon-peel, or a little wine, may be added to give an agreeable flavour.

Potato-starch may be used instead of arrowroot, to which, in a nutritive point of view, it is not much inferior.

Sago is obtained from the pithy interior of the trunk of a species of palm growing in the Molucca and adjacent islands. Its globular form is given by rubbing it through a sieve into a heated vessel. It possesses similar properties to those of arrowroot, but is much cheaper. For invalids, an ounce, after having

been well washed, may be soaked in water for an hour, then boiled for twenty minutes with a pint or a pint and a half of water or milk, and flavoured as may be required.

Tapioca is the produce of a Brazilian and African plant, which, in its fresh state, is poisonous, but by washing and the action of heat, the soluble poisonous parts are entirely dissipated, and a very pure starchy matter remains.

For the sick, tapioca is usually prepared by soaking an ounce in water, until it is swollen considerably, and then boiling it in a pint and a half of milk or water, adding sugar, lemon-peel, wine, nutmeg, or other flavouring ingredients.

It is said that tapioca is less apt to disagree with the stomach of infants, when in an irritable state, than any other substance, and it is generally much relished by invalids.

It is scarcely necessary to remark, that the addition of one or two eggs to a pint of the arrowroot, sago, or tapioca, prepared as above mentioned, renders the ingredients fit for a light, nutritious pudding, especially adapted to persons recovering from sickness.

The substance, sold under the title of corn flour, Oswego flour, maizena, &c., is a very pure variety of starch, obtained by the removal of the glutinous and fatty portions of maize or Indian corn. In a nutritive point of view it resembles the other starches ; but for forming vegetable custards and blanc-mange, in combination with milk and eggs, it is far superior to arrow-root, and more economical.

When starches are used for food they require the addition of nitrogenous and fatty matters, which may be supplied in the form of milk. Thus by simply placing a little rice, tapioca, or sago in a baking dish, pouring on cold milk, with the addition of a little sugar, and baking in a slow oven for about an hour, a cheap and nutritious pudding is easily produced.

The consideration of sugar follows naturally that of starch, to which it is closely allied : sugar exists in many articles of food, but that used in a separate state in this country is chiefly obtained from the sugar cane, though a considerable quantity of beet-root sugar is imported from the Continent, where it is manufactured and used in immense quantities. Sugar, like starch, is purely carbonaceous, but being soluble it is more rapidly

digested, and therefore forms a very desirable diet for the young. It is not, however, an economical food, and its use should, except with very young children, be regarded rather as a luxury than a necessity. As an article of diet, raw sugar is more economical than refined. Sugar possesses strong powers of resisting the decay of both vegetable and animal substances, and is therefore largely used in making preserves, jams, &c., and is advantageously employed in curing pork and beef.

Treacle, which contains the impurities and uncrystallizable portions of the sugar, is not economical in use.

The chief grains used for food in this country are, *Wheat*, *Oats*, *Barley*, *Rice*, and *Indian Corn*.

WHEAT AND ITS PREPARATION.—Wheat is one of the most nutritious of the corn-plants; the grain, before it is ground, contains from ten to twelve per cent. of albumenoid substances, chiefly gluten. When ground, the fine flour extracted is not so rich in these albumenoid substances, as a large proportion of them resides in, and is removed with, the inner coverings, which constitute what are called middlings and thirds.

The substances that compose the flour may be partially separated from each other by the action of water; if a mass of dough be formed of moistened flour, tied up in a muslin bag, and well washed under a stream of water, a milky liquid is produced, whilst a tough tenacious substance remains in the bag—this is the gluten. The milky liquid, on being allowed to rest, deposits the starch of the flour, and the clear liquid contains the albumen, sugar, gum, and other soluble ingredients.

Household flour contains all the most important substances required to support life, namely, albumenoid food in the gluten, carbonaceous in the starch, and oil, with a large proportion of bone-making and mineral materials, in the middlings; it follows, that bread made from this flour is a more valuable food than bread made from the finest flour, from which these substances have been entirely extracted. The proportion of albumenoid substances in the entire grain in the middlings and in the flour of wheat may be stated as follows:—If the whole grain contain twelve per cent., the portion removed as middlings will contain eighteen per cent., whilst the fine flour contains only ten per

cent. The coarse outer husk constituting bran and pollard, which is sometimes recommended to be retained in the flour, is not an advantageous article of food. It is not capable of being acted on by the digestive organs of man or even of pigs, and it is apt to excite an injurious amount of irritation, causing the food to pass along the digestive canal so rapidly that the nutriment escapes without being taken up by the absorbing vessels.

Bread.—Good bread should be made of wheaten flour, water, salt, yeast, and a small quantity of potatoes. Bakers' bread frequently contains also a quantity of alum, added for the purpose of enabling inferior flour, that would otherwise form a sticky, clammy, dark-coloured bread, to be used. The employment of a powerful astringent, such as alum, is, however, generally regarded as injurious, though it is undoubtedly decomposed in the process of baking, and therefore exists in an inactive form in the loaf.

Flour, when mixed with water and yeast, and allowed to stand, undergoes a process termed fermentation. A portion of gas is generated, which, owing to the tough, glutinous character of the dough, does not escape. This gas causes the dough to swell, and assume a spongy character, greatly contributing to the digestibility and excellency of the bread.

In preparing home-made bread, the usual plan is to place the flour in a kneading-trough or pan, and, after making a hole in the centre, to pour in the yeast, with a small quantity of lukewarm water; then, with a spoon or the hand, to stir into the liquid as much of the flour as will make a thin batter. This is dusted over with flour, and the whole allowed to stand in a warm place until the batter rises and cracks the flour strewed above it; salt is then added, and a further quantity of lukewarm water, sufficient to enable the whole to be kneaded into dough. It is then formed into a mass, and allowed to rise; and, when sufficiently light, divided into loaves, and placed in the oven. Bakers, however, adopt a different course; they mix a small portion of the flour with yeast, and set it to ferment for some hours previous to making the mass of dough; this they term "setting the sponge." The great advantage of this process depends on the fact that a less quantity of yeast is required; the whole of the sponge acts as a ferment, and the bread is

the yeast acts upon the starch of the flour & converts it into sugar, hence the sweet taste of good bread.

rendered much lighter than it otherwise would be. Good bread is of so much importance in a family, that the writer has taken some pains to procure the best directions possible; he has to express his obligations to the late Mr. Duer, of Bond-street, for the following receipt, which, he can state from experience, furnishes bread greatly superior to that ordinarily made in private families.

To make a Half-peck Loaf.—Take three-quarters of a pound of well-boiled mealy potatoes, and mash them through a fine cullender or coarse sieve; add to them one-eighth of a pint of yeast (about two table-spoonfuls), or three-quarters of an ounce of German dried yeast, and one pint and three quarters of luke-warm water (88° F.), together with about a quarter of a pound of flour, to render the mixture the consistence of a thin batter; this mixture should be set aside in a warm place for six or eight hours in order to ferment; at the end of this time it will be found (if it has been warmly and closely covered over) to have risen considerably, and, except as to colour, to resemble yeast in appearance. The sponge so made is then to be thoroughly mixed with one pint of water nearly blood-warm (viz., 92° F.) and poured into half-a-peck of flour, which has previously had one ounce and a quarter of salt mixed with it. The whole should then be kneaded into dough, and allowed to rise in a warm place for three or four hours before baking. After the dough has risen, it should be handled as little and as lightly as possible whilst making into loaves.

If bread be desired without the addition of potatoes, the following directions may be followed: they furnish very excellent bread.

To make nine pounds of flour into bread. First set the sponge by thoroughly mixing three pounds of the flour with two pints and a quarter of lukewarm water, to which has been added two ounces of German yeast, or three-quarters of a pint of brewers' yeast. When this has risen (the rising may be hastened in cold weather by standing the kneading-pan near the fire or in a vessel of warm water) the sponge is to be mixed with one pint and a half of luke-warm water and an ounce and a half of salt, and thoroughly broken down into a uniform consistence, when the

remainder of the flour—six pounds—is to be added, and the whole perfectly kneaded into dough, which is allowed to remain in a warm place until it has risen, when it is divided into masses of the required size for baking, kneaded into loaves, and placed immediately in the oven.

If fresh German yeast is employed the sponge rises, *if kept warm*, in less than two hours, and the dough, after kneading, in from two to three hours.

In seasons when the harvest-time is damp, and the grain not well matured, the flour is apt to yield a sticky, clammy, tenacious, dark-coloured bread, in consequence of the starch changing into gum in the process of bread-making. In order to render such flour useful, it is necessary to make some addition to the bread; it is for this purpose that alum is employed by bakers; but a proportion of clear lime-water may be used with equal advantage, and is less open to objection, or a certain amount of bean flour may be added. These substances prevent the sticky character and dark colour of the bread, and enable flour to be used with advantage which would otherwise be unfit for bread-making.

Ordinary bread contains nearly one-half its weight of water, partly derived from that existing in the flour, and partly from that added in making the dough. Good flour absorbs a larger proportion of water in bread-making than the inferior kinds; flour which has been long exposed to the air and become musty absorbs very little. Various plans have been proposed in order to make flour absorb the largest possible quantity. One of the most successful is to thicken the water with rice boiled to a pulp, but as the bread becomes less nutritious in precisely the same proportion as it contains more water, no possible advantage can ensue from the plan. Another mode sometimes recommended is to boil bran in the water before using the latter for making the dough; this acts by inducing the same condition of the starch as is produced by damp harvesting, and the result is a dark, clammy loaf, which is neither palatable nor digestible.

Some few years since, unfermented bread, in which the place of yeast was supplied by carbonate of soda and muriatic acid, was extensively tried, but the nicety of manipulation required, and

the great attention necessary in weighing and measuring, renders this plan unfitted for general use; with care, however, it is capable of furnishing a palatable and wholesome bread. To those desirous of trying the plan, the following receipt may be recommended as yielding a very good unfermented bread :—Flour, five pounds; bicarbonate of soda, half an ounce; carbonate of ammonia, half a drachm; salt, half an ounce; mix these very carefully, then add two and a half pints of cold water with five drachms of muriatic acid; mix the whole immediately with a wooden spoon; bake it directly and thoroughly in a hot oven.

The carbonate of ammonia employed is converted into vapour by the heat of the oven, and, whilst rendering the bread light, is itself entirely carried off during the process. It is frequently used alone in the preparation of those varieties of biscuits termed cracknels, &c.

The substances sold as baking, egg, or custard powders, consist of chemical substances that give out carbonic acid gas when moistened, which distends and lightens the dough. Baking powder, fully equal to any sold at a high price, may be made by mixing two ounces of bicarbonate of soda, one ounce and a quarter of tartaric acid, and a quarter of a pound of corn flour, or potato starch. These ingredients should be quite dry, and mixed by passing them twice together through a sieve, which effects a more intimate mixture than stirring. The powder so made should be kept in a bottle or canister closely corked, so as to prevent the access of moisture from the air. It should be employed in the same manner as the baking powders ordinarily sold. Patent or Self-raising Flour is merely flour with which the above ingredients have been mixed, so that it only requires the addition of water to make a light and spongy dough. Recently another combination of chemical substances, containing phosphoric acid, &c., has been recommended for raising bread, but it is doubtful whether the bread formed by any combination of chemical ingredients is equal in quality to that produced by the aid of yeast.

Aërated bread is made by mixing the flour in close, air-tight metal vessels, with water highly charged with carbonic acid gas,

in this respect resembling soda water. When the dough is taken out of these air-tight vessels the gas expands, causing it to rise instantaneously. It is found that the carbonic acid gas obtained from the breweries, where it is produced in large quantities during fermentation, is much more efficacious than that obtained by chemical means: this is probably owing to its containing the germs of the yeast plant, which probably excite the ordinary fermentation in the sugar and starch of the flour. The bread produced is perfectly wholesome, but, as the plan requires special machinery, it is not applicable to domestic use.

German dried yeast is simply the solid matter of common yeast separated from the watery portion; it possesses the advantage of keeping for several days, and is perfectly unobjectionable.

Bread should not be eaten until it is twenty-four hours old. When taken sooner it cannot be easily masticated; and is, therefore, swallowed in doughy masses difficult of digestion. If kept for several days, it becomes apparently dry and unpalatable; this alteration is not, however, owing to its becoming drier, but to a peculiar change in the arrangement of the substances which form it. Stale bread may be readily restored to a palatable state by closely covering it with a tin, and placing it for about an hour in an oven moderately heated. It should be eaten at once, as it very rapidly resumes its stale condition.

All cakes which contain, in addition to the ingredients used for bread, fatty materials, as butter, lard, or dripping, are not readily digestible, and therefore unfit for persons with weak digestion. Fat, when heated with flour, forms a compound which is acted upon by the digestive fluid slowly and with difficulty; hence most kinds of pastry, as pies, and ordinary puddings made with flour and suet, are not suited for young children or invalids. Biscuits containing butter are also open, though in a less degree, to the same objection.

One of the least objectionable dry biscuits for children or luncheon is that called pulled bread; it is made by tearing the crumb of a new loaf into small pieces, with two forks, so as to avoid pressing it with the fingers, and baking the irregular shaped masses thus obtained in a slack oven, until of a pale

brown colour ;—in this form they keep well, and constitute a very pleasant and wholesome article of food.

Infants' Food.—From what has been already stated it is obvious that all preparations containing butter, such as rusks, tops and bottoms, &c., are objectionable as food for infants ; plain bread, made into pap, is also apt to turn sour in the stomach, in consequence of having been fermented. A much better food for very young children is made of the best household or seconds flour, baked in a slow oven until it has acquired a light fawn colour ; in this state its taste is agreeable, closely resembling that of biscuits, and, after having been rolled to crush the lumps, it is readily prepared for use by mixing it with cold water, and boiling for two or three minutes. In situations where there is no convenience for baking flour, a somewhat similar preparation may be made by tying a quantity of dry flour very tightly in a cloth, placing it in a saucepan of boiling water, and boiling it for several hours. The water does not penetrate more than half an inch, and the interior closely resembles baked flour, except that it has not its pleasant biscuit flavour. The plan has the disadvantage of being wasteful, as the flour which adheres to the cloth cannot be used. In cases where it is necessary to render the food somewhat more relaxing, a coarser meal may be employed, or one-third of fine barley meal added before baking.

All pure starches, such as arrowroot, are unfit for the entire support of growing children, as they are almost entirely destitute of albumenoid substances.

A new variety of food for infants has been proposed by Baron Liebig. In it the starch of wheaten flour is rendered more digestible, and the diet is a closer imitation of the natural food.

The following are the directions for its preparation, as given by Liebig. Half an ounce of the best seconds wheaten flour, an equal weight of flour from pale malt, and seven grains of bicarbonate of potash, are mixed with one ounce of water and five ounces of cows' milk, and the whole heated over a gentle fire. As soon as the mixture begins to thicken, it is removed from the fire, stirred for four or five minutes, then heated again, when it becomes thin, and finally made to boil, when it is strained to separate the bran of the malt flour, and is ready for use. The

preparation does not require any sugar to be added, as the malt converts the starch of the wheat into a kind of sugar, which is exceedingly easy of digestion. There can be no doubt of the value of this food, but the trouble of preparation is an objection to its adoption; many chemists, however, prepare the materials ready for use, so that the weighing and straining are not required. In cases where it is preferred to prepare the ingredients at home, a common coffee-mill kept exclusively for the purpose may be used to grind the malt.

OATS.—The common oats cultivated in this country furnish several articles of food. Deprived of the outer skin, they are known as grits; these, when crushed, are termed Embden Grits. Both kinds are used for making gruel. Oatmeal is prepared for general purposes by grinding the grain after it has been dried in a kiln; it forms, in Scotland and the north of England, the chief support of the labouring classes. When furnished by the employer, the quantity generally allowed for the support of a labourer is two pecks of ground meal per week.

Oatmeal contains a large proportion of nitrogenous and fatty matters: hence it is exceedingly nutritious and wholesome. It cannot, however, be formed into a light and spongy fermented bread, as it has not, when moistened, that tough glutinous character which is necessary to retain the gases liberated by fermentation.

Oatmeal is used either in the form of oatcake or porridge. The former is prepared by slightly moistening the meal, so as to render it adhesive, and rolling it into thin cakes, which are baked on a hot plate. Porridge is made by boiling oatmeal and water in such proportions that a thick mixture is obtained, which, on cooling, becomes nearly solid. The coarse Scotch oatmeal is far superior for these purposes to the fine meal ground in England. The most approved method of making porridge is to strew oatmeal with one hand into a vessel of boiling water (to which salt has been previously added), so gradually that it does not become lumpy, stirring the mixture at the same time with the other hand. After the requisite quantity has been stirred in,—namely, about two large handfuls of coarse oatmeal to a quart of boiling

water—the whole should be allowed to stand by the side of the fire, so as to simmer gently for twenty or thirty minutes. During this time it thickens considerably. As thus prepared it is usually eaten with the addition of milk. It is an excellent article of diet, and especially adapted for children, being nutritious, wholesome, palatable, and very economical.

Oatmeal is also sometimes employed in thickening soups and broths, being mixed with a small quantity of cold liquor, and stirred into the boiling liquid.

One great drawback to the use of oatmeal is that, having been kiln dried, it absorbs moisture very rapidly from the air, becomes pungent to the taste, and unfit for food; hence, even if kept for a short time, it should be stored in a very dry place and in close vessels. It should only be purchased at places where there is a quick sale for it.

BARLEY.—Several varieties of barley are cultivated in this country. The grains, when deprived of their outer husk by a mill, are termed Scotch barley; when every portion of the husk is removed, and the grains are rounded, they constitute what is called pearl barley. It is so hard as to require 3 or 4 hours boiling before fit for use.

Barley, although not so nutritious as wheat or oats, is a wholesome and desirable article of diet; it is regarded as rather more laxative than other grains, and is, therefore, sometimes added to infants' food.

Barley, like oatmeal, is not well adapted for making fermented bread, as the glutinous character of the dough, on which the lightness of wheaten bread depends, is wanting; barley bread, moreover, is dark in colour, and dry and unpleasant to the taste. This grain is however extensively used in the form of Scotch or pearl barley in soups, but it should not be forgotten that it requires from two to four hours' boiling or stewing before it is thoroughly cooked and fit for use.

RICE.—Rice contains a larger proportion of starch and a less amount of gluten than any other grain, consequently it is less stimulating; it is also destitute of fatty substances, and is, therefore, less laxative: for this reason it is frequently ordered as a diet for the sick.

Barley chiefly used in the production of malt

Rice use in case of diarrhœa when it should be well cooked or will not digest. Rice water made a little more glutinous with gelatine forms an excellent drink in the same disorder.

Paper Hats spirits made from

Dry rice absorbs a very large proportion of water in the process of cooking, and hence furnishes a large bulk of food; but it should be remembered that this bulk is chiefly owing to the water absorbed, and that, like all substances consisting chiefly of starch, it is not, if used alone, well calculated to support life, although very advantageous and economical when forming a portion of the food of man. Where practicable, it should be used in conjunction with fatty and albumenoid substances; it is therefore employed to the greatest advantage in soups, or mixed with milk in rice puddings and rice milk.

Rice at 1½*d.* per pound is not so economical a food as household flour at the same price, and at 2*d.* per pound is considerably dearer as a source of nourishment.

INDIAN CORN.—Maize, or Indian corn, is employed to a great extent in America, and some parts of Asia and Europe. Compared with our corn-plants, its produce is very great, and therefore several attempts have been made to cultivate it in this country, but, owing to our short summers, which prevent its ripening, without success.

During the famine in Ireland, large quantities of Indian corn meal were imported into that country; but, having generally a sour or musty flavour, it did not become a favourite food with the people.

Indian corn is about as nutritive as wheat, but is chiefly remarkable for the large amount of fatty substances it contains, amounting to about one-twelfth of its entire weight. Being rich in force producers it is largely used instead of oats for horses; large quantities are also employed, in the place of barley, in the production of distilled spirits, particularly gin.

Bread made from maize is drier and not as palatable as the best wheaten bread; it is usually prepared by first scalding the meal, when cool, yeast and salt are added, and the mixture is allowed to rise for about an hour, a quantity of wheat-flour is then added, and the dough allowed to remain for one or two hours before it is placed in the oven. The proportion of wheat flour employed varies, but Indian meal and wheat flour in equal quantities make very good bread.

The meal of Indian corn is largely used, in the same manner as oatmeal, for porridge, but it requires boiling for a long time; it is eaten hot, with milk, butter, or molasses, or when cold cut in slices and fried. In the United States of America this preparation is termed mush, and in the South of Europe, polenta. Mixed with eggs and milk, Indian corn meal is made into a great variety of cakes, which are cooked on a hot plate or griddle. These form the staple food of the poorer classes in many parts of the United States.

Macaroni, Vermicelli, Semolina, are dried paste made from the finest Italian wheat & containing a large quantity of gluten. The first two are shaped by forcing the paste while moist through holes in a sieve; the last is formed into grains instead of tubes or threads. Any of these may be baked with milk, or put into soups. Macaroni is frequently baked with grated cheese. Macaroni is greatly used in Italy.

CHAPTER IX.

VEGETABLE FOOD.

LEGUMINOUS SEEDS AND FRESH VEGETABLES.

Leguminous Seeds—Leguminous seeds, or pulse, are the produce of a strongly-marked tribe of plants, distinguished by their butterfly-shaped or papillionaceous flowers, and their peculiar fruit; the latter is termed a pod or legume. The leguminous seeds used for food in this country are *Peas*, *Beans*, *Haricots*, and *Lentils*.

Leguminous seeds in general contain a very large proportion of an albumenoid or flesh-forming substance, termed *Legumin*, very similar in its chemical and nutritive properties to the dry curd of milk, as this forms about one-fourth of the weight of the dry seeds, they are more nutritious and tend more to the formation of flesh than any other vegetable substances. They contain a less proportion of starch than the different varieties of grain, and most of them are remarkably deficient in oil or fat. From their extremely solid and dense character, they are much less easily digested than the cereal grains, and they consequently require careful and thorough cooking in order to ensure their perfect digestion. When they are softened by proper boiling, the starch grains are burst, and the whole tissue being as it were broken up, is much more readily acted on by the digestive fluids. But even when thoroughly well prepared they are not, with some delicate persons, of quick digestion; with strong, hearty individuals, however, they form an excellent diet. The use of beans in supporting the strength of the horse is well known, and the flesh of bean-fed bacon is always hard. At the present time, the different kinds of pulse are not so highly esteemed as their value entitles them to be.

All leguminous plants are not wholesome; many of our common medicines are produced by tropical species; and in our own country, the seeds of the laburnum are poisonous, and those of the broom and others medicinal.

Peas are the seeds of a well-known climbing plant, originally brought from the South of Europe, but are now cultivated in all temperate climates. There are several varieties adapted to field and garden culture. The seeds of some are eaten green, whilst others are chiefly used in a dry state. Green peas are exceedingly nutritious and wholesome. Dried peas are chiefly used in making soup, and in this form they furnish a very economical diet for strong persons of healthy digestion; from the quantity of albumenoid substance they contain, the addition of animal food is scarcely required; the liquor, however, in which meat has been boiled or stewed may be used with advantage. Pea-soup may also be made exceedingly savoury without meat, by previously frying the vegetables employed (usually celery, turnips, carrots, onions, or leeks) in dripping, with a little flour, until of a brown colour, and then adding them to the liquor in which the peas are boiling. It may be remarked that the boiling quality of peas is very much influenced by the soil on which they are grown; some peas, even after long-continued boiling, do not readily soften so as to mix with the water, and are, therefore, unfit for soup; whereas, good boilers readily dissolve in two or three hours. Dried peas should not be used in the whole state, as the shells or skins are exceedingly indigestible, and by unduly irritating and quickening the action of the digestive canal, cause a loss of digestible food.

Beans.—The seeds of the broad bean are generally used in this country in a green state, and will be described under the head of Fresh Vegetables.

Haricots, which are the seeds of the white kidney-bean, are extensively used on the Continent. Their nutritive properties are similar to those of peas and beans, but they are less apt to disagree with delicate persons.

Haricots are usually cooked by putting them into water and boiling for two hours, after which they are served up with a little melted butter or thickened gravy; a better plan is to soak

the previous night in water, when they require less boiling and become softer; a still better method is to malt them, by soaking them from eight to twelve hours in cold water, then pouring it off, and allowing the beans to remain from twenty to thirty hours before cooking. During this process the beans (like barley when malted) begin to grow, and the starch that they contain is partly converted into sugar, a change which breaks up the substance of the bean. Prepared in this way, they require a shorter time for boiling, are more mealy and sweeter to the taste, and form a digestible, nutritious, and economical food.

The seeds of any of the different varieties of our ordinary scarlet runner, or dwarf French-beans, are equally pleasant and valuable as food, although those of the darker kinds are not so sightly on the table.

Lentils have been used as food in the East from the earliest ages. (Gen. xxv. 34.) On the Continent, at the present time, they are as largely employed in soups as dried peas are with us, and often supply the place of haricot beans. Two varieties are imported into this country; the large, brown French lentil, which is the more expensive, is used in the same manner as haricots; and the smaller red Egyptian, as split peas for soup. Disguised under the names of "Revalenta," and "Ervalenta," ground lentils are sold at exorbitant prices, and recommended as a diet for sick persons. Except in a few cases, however, they are too nutritious and stimulating to be so used; as a food for healthy persons, they are exceedingly valuable, being equally nutritious with peas, and capable of being readily softened into a soup by boiling.

FRESH VEGETABLES.—Green vegetables form an essential portion of the food of man, and the continued use of a diet from which they are excluded, produces a diseased state of the body often terminating in scurvy.

The number of vegetables so used is very great; the most important of those employed in this country are *Potatoes, Cabbages, Turnips, Carrots, Parsnips, Peas, Beans, and Onions.*

Potatoes.—The tuber of the potato contains three-fourths of its weight of water. The solid matter which constitutes the remainder is principally starch; hence the potato alone is not

well calculated to support life ; the saline substances it contains, however, render it valuable as a preventive of scurvy ; it has been found that the addition of a few pounds of potatoes weekly to the diet of sailors, &c., is the most effectual in preventing the attacks of this disease ; potatoes preserved in a fresh state are now, in consequence, taken by all vessels proceeding on long voyages.

In addition to these constituents, the potato contains a small quantity of a peculiar substance, having medicinal properties, and an extremely nauseous, unpleasant taste ; this substance is in great part dissipated by the heat employed in cooking ; a portion of it, however, remains in the water in which potatoes are boiled, and imparts to it a disagreeable taste and odour, as well as medicinal properties ; consequently in making an Irish stew, or any soup, or other dish of which potatoes form a part, it is desirable to parboil the potatoes separately in the first instance, and reject the water in which they are cooked.

Potatoes should be cooked with their skins on, except when baked under meat ; if peeled before boiling there is great waste, as well as considerable loss of time ; they can also be cooked to a much greater degree of perfection when boiled unpeeled. Many kinds of potatoes are much better steamed than boiled, and there is less risk of their being badly cooked. It should be borne in mind, however, that, as the condensed steam runs back into the saucepan underneath, the water becomes contaminated, and imparts an unpleasant taste to any food boiled in it.

Potatoes, like all starchy articles of diet, especially such as are of a solid character, should be thoroughly well masticated and mixed with the saliva, which aids greatly in the digestion of starch. Children are often told to "chew their meat will," but it is of much greater importance that the potatoes, &c., should be well masticated.

Small potatoes are frequently used as food for pigs. They should never be given in the raw state, but boiled, steamed, or baked. The latter plan has, by experiment, been found by far the most advantageous, and may be strongly recommended to those cottagers who possess an oven.

The starch which potatoes contain, is readily extracted by grating them into water ; the starch settles at the bottom, and the liquid containing the fibrous parts may be poured off. To obtain the pure starch, fresh clean water should again be poured on the deposit, the whole mixed together, the starch again allowed to settle, and the water poured off. This process should be repeated until the water comes away quite clear. The starch should afterwards be dried on a cloth in the sun. As thus prepared, it is a brilliant white powder, and, as a diet, is in almost every respect equal to arrowroot, for which it is often substituted.

For the purposes of the laundry, potato starch is rather inferior to that from wheat or rice, being apt to lose its stiffness in damp weather.

Cabbage.—The plants of the cruciform or cabbage tribe, which includes savoys, cauliflowers, brocoli, the various greens, &c., are distinguished by their antiscorbutic properties. Like most green vegetables, they contain water to the extent of about nine-tenths of their weight : the solid residue is distinguished by the absence of fat or oil (which in this tribe of plants is always stored up in the seeds), and by containing a large proportion of albumenoid or flesh-forming material ; it is therefore remarkable nutritious, and, when properly cooked, readily digestible.

Green vegetables should be boiled in soft water ; where this is not attainable, the employment of a very small quantity of soda is advantageous ; and, in order to throw down as much of the lime in the water as possible, it should, before the greens are put in, be made to boil rapidly for a short period ; it should also boil quickly during the whole time they are cooking, otherwise the vegetables become brown in colour.

Turnips.—Turnips, like cabbages, contain about ninety per cent. of water ; the solid portion of the root is remarkably nutritious, easily digested, and very wholesome. Turnips are largely employed as fresh vegetables, and also used for the flavour they impart to soups, broths, &c.

Boiled and pressed so as to get rid of the superfluous water, and mashed up with a small quantity of butter or dripping, pepper and salt being added, they furnish a very valuable article of food.

Carrots and Parsnips.—These vegetables are even more nutritive than turnips; they contain a considerable proportion of sugar in their juice; parsnips also, from their large size and capability of keeping many months without injury (if the crowns are cut out, and they are placed in damp sand), and from their extremely pleasant, although peculiar flavour, are deserving of a much more extensive culture than they receive.

Beans and Peas.—Two kinds of beans are employed as green vegetables; the broad Windsor-bean, of which the seeds only are used, and the scarlet-runner or French beans, the pods of which are sliced and boiled. Both kinds are wholesome. Broad beans and peas are more nutritious than most other vegetables which are used in a green state.

Onions.—Onions, leeks, challots, and garlic owe their peculiar flavour to a volatile pungent oil; taken in a raw state they are not readily digested, but when boiled or roasted, they furnish exceedingly nutritious, wholesome, and easily-digested articles of food, the bulb containing a large amount of albumenoid matter. They are also largely used as flavouring ingredients. In warm climates where onions grow to a larger size, and are less pungent than in temperate regions, they form a very important portion of the food of the people.

Fruits.—Fruits are frequently regarded merely as articles of luxury, and not as necessaries of life. Like other vegetables, they possess antiscorbutic properties of the highest value; and those medical men who have attended to the diseases of the poor in large towns, well know that there is a larger amount of illness, especially amongst children, in seasons where there is a scarcity of fruit. Apples, pears, oranges, as well as such fruits as gooseberries and currants, &c., should enter largely into the dietary of children. The instinctive avidity with which children devour green gooseberries and other acid fruits in the spring, after the abstinence of winter, is in itself a proof of the value to fruits as food. Nuts, which consist chiefly of oil and starch in a very solid form, are digested with extreme slowness, and unless very perfectly masticated are apt to produce serious disturbance of the digestive organs.

CHAPTER X.

CONDIMENTS.

CONDIMENTS.—Condiments are substances employed to season food, to render it more digestible, and stimulate the stomach to increased action. Those most in use in this country are *Salt*, *Vinegar*, *Mustard*, *Pepper*, and the various *Spices*. As is well stated by Dr. E. Smith, in his valuable "Practical Dietary," "Condiments act by increasing the relish for food and stimulating the digestive process, beginning with the mouth, where the flow of saliva is increased by them, and extending to the stomach and the whole alimentary canal. Hence their use is very great with defective appetite and repulsive food, and to persons who are advanced in life, as well as to many, whether well or ill, in whom the process of digestion is slowly performed; but they are less required by the young, and by those, of whatever age, who have been accustomed to take only simple food prepared in a plain manner. Common salt has also the advantage of supplying two elements which the body requires for its nourishment, and hence is a true food as well as a condiment.

"It cannot be doubted, I think, that the habitual employment of these substances should be restricted to the smallest amount which is compatible with health; for whilst common salt in considerable quantity is beneficial, not only as a condiment and a food, but as a radical agent in the prevention of worms, any

excess of it in the blood impedes vital changes and leads to ill-health; and the use of pepper renders the palate less pleased with the taste of plain food, and the digestive process more dependent upon the presence of this stimulus."

Salt.—Salt is a substance which enters into the composition of the human body, and is absolutely essential to health, and even to life. The Creator has therefore wisely ordained that it should be one of the most abundant and extensively distributed of all minerals; in many parts of the world it exists in beds or strata in great quantities. The waters of the various seas contain usually about three per cent.; it is found in small quantity in all fertile soils, in the water of most springs and rivers, as well as in those vegetables which are used for the food of man and animals.

Salt, when dissolved in water, may be regarded as a compound of hydrochloric acid and soda, both of which are necessary for the right performance of the digestive process. These substances are separated by the action of the living body; the acid enters into the formation of the digestive fluid of the stomach, and the soda into the bile, a fluid that must be added to the dissolved and softened food, before the nourishment can be extracted from it. It follows, therefore, that if persons are compelled to live without salt, or on such food as does not naturally contain a sufficient quantity, disease is the result. The quantity of common salt required to maintain the health of an adult may be estimated at from a quarter to half an ounce daily. This quantity includes that contained naturally in the various articles of food and drink.

Salt possesses the power of preserving meat and other substances from putrefaction. It acts partly by removing a large proportion of the liquid parts, and partly by a preservative action. The injurious effect of salted meat, when used for a lengthened period, depends chiefly on the fact that in the process of salting, a large proportion of the most nutritious juices are abstracted, and constitutes the brine, and that the fibres are contracted, hardened, and rendered less digestible; it follows that it is not desirable to salt meat where it can be avoided—this objection however does not apply so strongly to very fat meats, such as bacon, &c., as they are but little injured by the process.

On the Continent salt is largely employed in preserving fresh vegetables for the winter, and it might be very advantageously used in this country for the same purpose. Scarlet-runners, for example, are readily kept by cutting them in the same manner as if for immediate use, packing them in a jar with alternate layers of salt, and pressing them down so that no portion is above the salt brine, which is rapidly formed by the extraction of their juice. If tied over and placed in a cool situation they will keep without change for many months, and are ready for use on being washed to remove their saltness.

Cabbages are extensively preserved in a similar manner, furnishing the well-known substance termed sauer-kraut. It is usually prepared according to the following directions, and furnishes so valuable an article of diet, that its employment is regarded as equally efficacious with that of fresh vegetables, in preventing scurvy in ships' crews on long voyages.

Sauer-kraut.—Cut some large white-heart cabbages into thin slices of equal thickness. Have ready a cask sufficiently large to contain the quantity of cabbage you intend to prepare; open it at one end, put a layer of salt at the bottom, on which lay some slices of cabbage; on this put another layer of salt, and a little pepper; then another layer of cabbage, and so on alternately till the cask is nearly full: put it in a cellar or some other cool place. Place a lid, just large enough to enter the cask, on the cabbages, and a very heavy weight on the top of it. In a short time, the water extracted by this pressure, will rise above the lid; and then it is that the kraut is fit to use. Be careful when any of the sauer-kraut is taken out of the cask, to use a wooden spoon, and to put the lid and the weight on again, leaving also sufficient brine to cover the sauer-kraut which remains. Sauer-kraut should be steeped some hours before it is used, to take out the salt. It may be either plain boiled or fried afterwards, and served with bacon, ham, or sausages. During the long severe winters of the Continent, when fresh vegetables cannot be procured, sauer-kraut is of the utmost value. In the milder climate of England it is not of so much importance.

Salt should be regularly taken as an article of diet; for, although, as before observed, it exists in our food and beverages,

a sufficient quantity is not obtained in this way to supply all that is necessary to health; a desire for salt has been implanted in almost all animals, and many of them perform long migrations to obtain a more important supply than can be procured in their usual locality.

Salt, placed within the reach of most domestic animals, such as horses, sheep, and oxen, is eagerly licked by them, and lumps of rock salt are placed for their use by most intelligent stock-keepers.

Vinegar.—The vinegar used in this country is, in general, prepared from malt, by boiling it in water, to form a sweet wort; this is afterwards fermented with yeast, in the same manner as beer, except that the fermentation, instead of being checked after the formation of the spirit, by the exclusion of the air, is allowed to run on until the liquid becomes sour. Vinegar owes its acidity chiefly to the presence of acetic acid; the manufacturers are, however, permitted by the excise laws to add a very small portion of dilute sulphuric acid or oil of vitriol, in order to prevent mouldiness.

Vinegar possesses several strongly-marked properties; it is capable of retarding, and, in many cases, of preventing altogether, the putrefaction of animal and vegetable substances; hence its employment in pickling. Taken in moderation, it allays thirst, cools the system, and assists digestion; in large quantities, it is exceedingly injurious, preventing digestion, weakening the tone of the stomach, producing emaciation, &c.

Used in cooking, it renders the fibres of flesh tender, and softens them, so as to be more readily digested.

The value of vinegar in economical cookery may be tested by the use of the following recipe:—

Take some meat from the coarsest joints of the ox, such as the leg, shin, or sticking-piece, cut it in slices of two or three ounces each, dip each piece into good vinegar, and then pack the whole without water in a stewpan, with onions, turnips, or other vegetables, cut small; cover it *closely*, and let it stand by the side of the fire for six or eight hours; it will then be found to be thoroughly done, and to have yielded abundance of gravy, being at the same time remarkably tender. The only precaution neces-

sary is that the heat should never be suffered to approach the boiling point. The meat, vegetables, and flavouring materials may be placed in an earthenware jar, which can be closely tied down, and then placed in a large saucepan of *water*, or in a *very* slow oven. This mode of cooking is applicable to any kind of meat, and will be found exceedingly economical, giving little trouble, and furnishing very nutritious, digestible, and delicious food; the acid of the vinegar, being volatile, is entirely dissipated during the process.

Pickled vegetables, such as onions, cabbage, &c., are very indigestible, and, therefore, undesirable articles of diet. Those of a bright green colour, frequently owe their bright tint to the presence of poisonous colouring materials, such as the salts of copper.

If required as a seasoning condiment, it is much more advantageous to employ vinegar which has been seasoned by steeping in it some flavouring substance, as ginger, shallots, horseradish, tarragon, &c., than to use the pickles themselves.

Mustard.—Flour of mustard is prepared from the ground seeds of the well-known English plant of the same name. Its pungency depends upon the presence of a volatile acrid oil, which is not apparent in the dry state, but is developed when it is mixed with water. When taken in very small quantity as a condiment, mustard tends to promote appetite and quicken digestion; in excess it irritates the stomach, and is very injurious.

As a domestic remedy, mustard is of great value. Applied as a plaster, it inflames the skin and acts as a counter-irritant, frequently subduing the most violent pain; and in cases of vegetable poisoning, two table-spoonfuls of flour of mustard in water form a rapid and effectual emetic.

The flour of mustard, as it is usually sold, is largely adulterated with flour, the colour being heightened by a yellow dye, termed turmeric; and it is often rendered more pungent by the addition of Cayenne pepper.

Pepper owes its pungency to a very acrid volatile oil, more heating and irritating than that of mustard. In addition to being used as a seasoning, it is taken with substances of difficult digestion, such as cucumbers, crabs, &c., in order to stimulate the stomach to the increased action requisite for digesting them.

Spices.—The several spices used in cooking, such as ginger, allspice, nutmegs, mace, cinnamon, &c., owe their pungent flavour to the volatile oil they contain. Their action is very similar to, though milder than, that of pepper. Nutmegs are among the least irritating, and, therefore, better adapted for the use of the sick than others: all may be used without evil, if the quantity is so small as merely to impart a slight flavour, without making the food pungent.

CHAPTER XI.

BEVERAGES.

THE artificial beverages employed by man may be arranged under two classes; those that are unintoxicating, as tea, coffee, &c.; and such as are intoxicating, as beer, cider, and other fermented liquors, &c. Some writers on domestic economy have objected to the use of the former among the labouring classes, stating that tea and coffee are enervating slops, expensive in their first cost, wasteful of time in their daily preparation and consumption, and destitute of nourishment or utility in their use. The remarkable fact, that nearly all nations of the globe removed from positive barbarism use some beverages of this kind, tends to prove that there must be in the human constitution an instinctive desire for such drinks; and chemical analysis discloses the fact that they all contain small quantities of peculiar substances which have a tonic and wholesome action on the animal body. The beneficial effect of tea or coffee on those exposed to cold is well known to all travellers. Taken in moderation, these beverages produce a cheerful state of mind, and conduce to mental activity; apart from this view, a taste for anything which can render a man's home more comfortable and attractive should be fostered; it is therefore desirable to encourage so innocent a luxury as tea and coffee drinking, which has undoubtedly had the effect of greatly diminishing the gross forms of intemperance which formerly prevailed extensively in almost all grades of society.

TEA.—The action of very strong tea upon the human body is more powerful than that of any substance not used as a medicine, except tobacco and spirits. When taken in moderation, it pleasantly excites the nervous system, increases the respiration, and the action of the skin, and tends to quicken the digestion; more largely, it causes watchfulness and want of sleep, and in some constitutions it produces most distressing effects; on the other hand, it has a decidedly soothing effect upon the action of the heart, and hence is often advantageously employed in cases of palpitation and headache. Tea is injurious in many cases of indigestion, and, when taken in large quantities, the mere bulk of fluid greatly impedes the digestive powers. Injurious effects on the health are, however, much more frequent and severe from the use of green tea than from black, but excess of either is to be avoided. Dr. E. Smith thus sums up the value of tea. "It may be useful," he states, "to the corpulent and over fed after a full meal, and at the end of the day, when food has accumulated in the system, and the digestive processes proceed slowly, and for the sedentary, who do not perspire freely and eat too much starchy food, but to the ill-fed, the spare, and the young, it is hurtful after the absence of food, and it is not adapted to sustain exertion, nor to those who perspire freely."

In some districts, as amongst the mill working population of Belfast, the quantity of tea consumed is very great; and its injurious effect on the health of the people is said to be strongly marked. On the other hand, in many parts of Russia tea is employed in enormous quantities without any apparent ill effect on the health of the people, but it is boiled so as to dissipate the volatile constituents.

The chief points to be attended to in making tea are, that the tea-pot should be kept thoroughly dry—if allowed to remain damp after use it acquires and imparts to the tea a musty flavour. The water should be boiling, and, if possible, soft; when hard water is of necessity used, it may in general be much softened by being kept boiling for half-an-hour, the lime which usually causes the hardness is thus in great part thrown down, forming what is called *fur* or *rock* on the kettle; a very small quantity of carbonate of soda may also be used with advantage

to correct this hardness, or the tea may be allowed to remain soaking for half-an-hour by the fire-side, or be covered over with a woollen cover to prevent the escape of heat. As a general rule, the harder the water the longer the infusion should be allowed to remain before use, care being taken to keep its temperature as near as practicable to that of the boiling point.

COFFEE.—Coffee is more stimulating in its effect than tea, and it has not the same soothing sedative action upon the circulation. Unlike tea, it lessens the action of the skin and increases that of the heart. If taken immediately after a meal, it appears to aid the digestive powers; hence the Continental practice of taking it after dinner. Like tea, if drunk strong, it produces watchfulness, which sometimes lasts for many hours. Coffee contains a bitter principle, but its flavour mainly depends upon a volatile aromatic substance which is dissipated by boiling; hence, to preserve its peculiar taste, it should be made without boiling. The French cafétière, consisting of two cylindrical vessels, the upper furnished with a perforated metal plate, on which the ground coffee is placed, and through which the clear infusion runs into the lower one, is strongly recommended. The flavour of coffee is also very greatly improved by the employment of hot boiled milk.

Compared with Tea

Chicory is the root of a plant belonging to the same family as the dandelion, and possesses, in a slight degree, a tonic and aperient medicinal action. Being much cheaper, it has of late years been greatly used in adulterating ground coffee, but the sale of this mixture is prohibited, unless sold as such by the vendor. Chicory is, however, sold separately, and if thus purchased, may be advantageously and very economically used in the proportion of one part to three or four of coffee. It imparts a deeper colour, as well as greater strength, to the infusion, and is an economical, wholesome, and pleasant addition.

COCOA AND CHOCOLATE.—These beverages are prepared from the seeds of a plant growing in Central America. As imported, the seeds consist of kernels covered by husk; the kernels contain nearly half their weight of solid vegetable fat (which has but little disposition to become rancid) and a proportion of starch and gum; the husks are chiefly composed of woody matter.

Chocolate is prepared by grinding the kernels in a hot mill with sugar, and a portion of starch. Cocoa should consist solely of the ground kernels, but the cheaper sorts contain in addition a large proportion of the ground husk. The cheaper kinds of both are adulterated with potato-starch, and earthy substances, as red ochre, &c. Soluble cocoa contains a large proportion of starch, which thickens when boiling water is poured upon it. At the average wholesale price of the unprepared nuts genuine ground cocoa cannot be sold under about fourteen pence per pound.

Cocoa is a very nutritious beverage, and does not produce those effects on the nervous system which, with some persons, render tea and coffee objectionable. In certain cases the fat, although remarkably easy of digestion, disagrees; when this is the case the evil may be remedied by allowing the liquid to cool, and removing the solid fat, re-warming the cocoa when required for use.

When genuine ground cocoa cannot be obtained, the bruised kernels, or nibs, as they are termed, form an excellent substitute, and indeed are sometimes preferred. They should be simmered in water for three hours, and will then be found to furnish a light, nutritious, and wholesome beverage.

Beer.—As beer from malt forms so large a portion of the drink of the labouring classes of this country, it has been thought desirable to give some directions for its manufacture. Beer brewed at home is cheaper, better, and more wholesome, than that purchased by retail; and, as it is usually taken at meal-time only, its use is not attended with the evils that usually accompany visits to a beer-shop.

The materials required for brewing on the smallest scale are, a pot or boiler that will hold four gallons, and two or three tubs,—say, a washing tub and a bucket or two; and a small cask to preserve the beer.

To brew the least quantity desirable, rather more than three gallons of soft water should be boiled, and allowed to stand until the reflection of the face can be seen in it; a peck of ground malt should then be put into a tub or bucket, with a small hole bored in the side level with the bottom, and covered inside with

a few twigs and a piece of coarse canvas over; the outside being closed by a wooden peg or cork; the hot water is then to be poured on, and the whole mixed by stirring for a few minutes. It should afterwards be covered over with a cloth, and set by the fire to keep warm for three hours; the peg or cork must then be removed, and the whole allowed to drain into a tub or bucket; after this, as much water should be poured on the wet grains as before, only a little hotter, and also be covered over and kept warm for two hours; this finishes what is called the mashing. As soon as the boiler is emptied the second time, the quantity of sweet wort first made should be returned to it, and boiled a quarter of an hour; two ounces of hops are then to be added, and the boiling continued for half an hour longer; the whole should then be strained through a fine sieve, to keep back the hops, and cooled as quickly as possible in shallow vessels. The second quantity should then be boiled in the same manner and with the same hops, and similarly cooled; both worts should be mixed together, and a small teacupful of yeast added; it should then ferment in the washing-tub for two or three days, being frequently skimmed to remove the fresh yeast that is formed. When the fermentation has nearly ceased, all the yeast should be skimmed off, and the beer put into the cask, which should be filled quite full; it will then ferment slightly for two or three days longer, and the bunghole should be a little tilted on one side, so as to allow the yeast to escape; when the working has entirely finished, the cask should be filled up with some of the beer retained for the purpose, tightly corked down, and it will be clear and fit to tap in a week or ten days. The beer is superior if brewed in larger quantity; but good wholesome beer can be made as directed, with the ordinary domestic utensils, without injuring them, as a sound cork readily closes the hole in the washing-tub.

This quantity of malt and hops will produce upwards of five gallons of beer, at a cost of about two shillings, the value of the grains and yeast more than covering the expenses of fuel.

Neither beer nor intoxicating liquor of any kind, such as wine or spirits, should ever be given to children or young persons. The injury that is inflicted on the young by giving them early

liking for stimulants is very great. Not only are they trained in habits leading to intemperance, but their constitutions are seriously injured even by slight doses of stimulants. If children are not encouraged to take beer and other intoxicating liquors, they grow up without acquiring any liking for them, and with much stronger bodily powers and much greater capability of enduring fatigue.

CHAPTER XII.

DIETARIES.

In the earlier editions of this work a small number of recipes were given as examples of economical cookery, but a series of 150 recipes prepared for the use of the scholars in the cookery classes of the School Board for London, having been given in "The Scholar's Handbook of Household Management,"* these are no longer required, and the space is devoted to a consideration of the dietary of children and of the labouring classes generally. Recently great attention has been paid to the character of the food of the poorer class of labourers. The Reports of the late Dr. E. Smith, the medical officer of the Privy Council, contain much valuable information on the subject.

With regard to the best dietary in infancy; during the early period of life there is no food which is equal in value to that of the parent; nor under ordinary circumstances should any other be used for the first ten months. In cases where the infant has to be wholly or partially fed, cow's milk is unquestionably the best substitute for that of the mother, and should be either wholly or in great part employed.

In early childhood milk should constitute by far the larger

* "The Scholar's Handbook of Household Management and Cookery," compiled for the School Board of London. With recipes by the teachers of the National School of Cookery. By W. P. TEGETMEIER. Macmillan and Co. 1877.

part of the food. In the second year the diet should consist almost entirely of milk and farinaceous materials, such as bread and milk, milk thickened with wheaten flour, and puddings made of milk with eggs, flour, rice, sago, tapioca, and corn flour. The milk should be new, and given without water. No starchy foods, such as arrowroot and sago, must be given made with water, since they are not perfectly digested in the absence of some nitrogenous principle, such as that supplied by milk.

The food should be given at intervals of about three hours during the day, and once during the night, or very early hour in the morning. If a child is put to sleep at 6 or 7 p.m., the time between that and the breakfast hour on the following morning is much too long; the child becomes exhausted for want of food, and this leads to stunted growth and bodily weakness. Food should be given at 6 o'clock in the morning, or as soon after as possible.

During the third year and the remaining period of childhood there should be a gradual addition of solid food, such as bread and butter, vegetables and gravy and meat, but milk should be given two or three times a day.

In all cases young children should have food given to them as soon as they get up in the morning, either bread and butter or warm or cold milk.

A child which has been well supplied with milk and farinaceous food properly cooked, has no need of meat up to four, five, or six years of age, since in the milk he has received all the elements of meat, and in a form more readily capable of digestion by the system; but on the other hand, if the milk has not been sufficient in quantity or poor in quality, the defect may be partly supplied by the use of meat.

With regard to the practice followed by many foolish persons of giving children stimulants, Dr. Smith remarks :—

Tea, coffee, spirits, or beer are not included in the list of foods to be supplied to children, as their use is positively injurious. The two former are nervous stimulants which are quite unnecessary and even injurious in childhood. All children are sensitive, but there are many with very light hair, very fair complexions, and pale, thin skins, who are unusually so, and to

such the use of tea would be very fitted to induce affections of the brain. Intoxicating liquors are so manifestly unfitted for the simplicity of taste, activity, and innocency of children, that it would be unnecessary to refer to them here if it were not that many persons, without consideration, give them to their children as an occasional luxury, and some even give beer daily. Such a course tends to the present injury of the children, and is likely to lead to a taste for drinking, which is certain to be most prejudicial in after life.

In describing the dietary of the labouring classes, we must first consider the present mode of living. There are in nearly all families four classes, each of which requires to be treated differently, viz., the infant, the young children, the wife, and the husband.

The infant should, up to a certain period, live chiefly or entirely upon its mother's milk. Many mothers are ignorant of the fact that milk is still as necessary for the nutrition of the child after it has been weaned as it was before, and they feed it with whatever food they or the elder children take. Others, however desirous they may be, are unable to obtain milk ; and others still, being obliged to work away from home, leave the babe to the care of a young child or to the want of care of a neighbour ; or if the mother be generally absent from home, she pays a fixed sum for the maintenance and care of the child to some one who has an interest in feeding it on the least expensive food. Hence, the infant is too often fed both before and after it has been weaned upon a sop made with crumbs of bread, warm water, and sugar, and in some cases a little milk is added. Bits of bread and butter, or of meat, or any other kind of food which the mother may have in her hand are added ; and not unfrequently gin or Godfrey's cordial, or some other poisonous narcotic, is administered. It should be distinctly understood that milk is essential to the health and well-being of the infant, and should be obtained at any amount of trouble. The proper quantity of milk required per day varies from two to three pints, but if that cannot be purchased it is of the greatest moment to obtain at least one pint daily. When the required quantity of milk can be had no other food is required, except perhaps a little

bread or biscuit in the second year of life ; but when all of it cannot be obtained, the quantity of milk should be mixed with water and boiled with a little fine flour which had been previously boiled or baked for six hours, and the whole sweetened with sugar ; or the milk should be boiled with oatmeal for at least half an hour, and the liquor strained through muslin, or the sweetened and hot milk and water should be poured over bread crumbs. The places are comparatively few where a little milk cannot be obtained for the infant, however it may be denied to the other members of the family ; but where it is wholly unattainable, the best food in addition to the sop is a fresh egg, made into a soft sweet custard with a little milk, or if that cannot be obtained, with a little water and corn flour ; yet with every care the dietary will be defective. When fed with this kind of food it must be with the spoon, and the food should be given every two or three hours.

For young growing children there is nothing equal to milk for food, and when new milk cannot be obtained skim milk should be used. If plenty of milk and bread is eaten they are certain to be well nourished. When skim milk can be obtained cheaply, as in most country places, no food is so economical and useful as milk-porridge made of it, and thickened with flour or oatmeal ; and also milk-pudding made with rice, sago, corn-flour, &c., and vegetables, for dinner. If skimmed milk is used, a little fat, as suet or butter, say a quarter ounce to a pint, should be added, so as to supply the amount of fat which had been taken off the milk when it was skimmed. If the quantity of milk is deficient, it is very desirable that meat or egg should be given, at least occasionally ; tea and beer are very undesirable stimulants for young children.

The wife, in many very poor families in agricultural districts, is probably the worst-fed of the household. In towns the wife fares relatively somewhat better ; for as meat in some form is obtained more frequently than by the poorest families in the country, and the members of the family take their food together at home, she obtains her share. In families where the pressure of poverty is less felt the wife is better fed ; but so long as much effort is required to obtain food for the children and the husband she remains generally the least fed.

The husband, in the poorest agricultural families, is certainly better fed than any other member of the family, for his labour being of the greatest importance, the wife feels that he must be sufficiently fed if possible, and because of the impossibility of dividing equally between himself and the other members of the family such food as he must take with him to the field.

In towns the food of the husband more nearly resembles that of the family, but with a larger share than the others. Neither he nor his wife ever indulge in the luxury of a basin of milk, and probably the whole supply of milk for the family does not exceed a quarter to a half pint daily; but they, more commonly than residents in the country, indulge in beer.

Single young men and women, and youths, who support themselves, have usually a larger absolute income than falls to the share of the different members of a family; but from the absence of knowledge or opportunity, they spend their money to less advantage and take their food with less comfort than occurs in a family. Some in towns take at least one meal daily from the cookshop, and in the cotton districts they have the opportunity of having their meals partly or wholly supplied to them from a cookshop at a small cost daily, except on Sundays.

In many parts of the country these remarks are far less applicable than was formerly the case, as the rise of the wages of agricultural labourers is more than equivalent to the increased cost of provisions.

In his suggestions for the most suitable dietary of the labouring classes, Dr. Smith remarks that—

The poor have great deficiency in cooking utensils, and thereby their modes of preparing food are very limited, and the possibility of good cooking greatly restricted.

They have in many parts, and particularly in the South-Western counties, a deficiency of fuel, when they use furze, roots, and hedge clippings. Without fuel they cannot cook, and hence it often occurs, that a hot meal cannot be obtained more than twice or thrice a week. This evil is greater in the winter season, when hot food is the more necessary. A man who can obtain hot meals at home would not seek the fireside of a public-house; and the health of the wife and children demands the use of hot food.

Farmers should aid their men to get abundance of firing, whether of wood, turf, or coal; and the rich should encourage the establishment of clubs for the obtainment of this indispensable article.

The wife has but a very limited knowledge of cookery, and this added to the fewness of the utensils, limits the variety of food which she prepares, and consequently which she purchases.

Very many families are in debt for food, and are therefore obliged to buy their food at certain shops. This in villages is often a serious evil, since the price of food is generally high, whilst the quality is not good, and those foods which are not the most commonly consumed are charged at a yet dearer rate. Here the rich may help the poor by promoting the establishment of clubs, at which certain foods may be purchased and retailed to the members at the wholesale price; or in their absence, by buying and selling to the poor at cost price such foods as oatmeal, Scotch barley, rice, peas, and American bacon.

Milk, which is so essential an article of diet, cannot, except in a few localities, be obtained in abundance and cheaply, and in many places it cannot be obtained at all. Here again the rich can help the poor. Some keep cows that they may supply the labouring classes with new milk at 1*d.* per pint, supplying at least enough for the young children and for the sick. Others give new or skim milk, again preferring the children, women, and sick persons. Others, as the Welsh farmers, give butter-milk once or twice a week. There are many farmers who have these but will not sell them, preferring to make all their new milk into butter and cheese, and to feed pigs on skim milk and butter-milk. The influence of the clerical and medical professions, as well as that of public opinion in general, should be brought to bear upon such persons.

How desirable it is that the poor should be aided to purchase a goat or a small cow where a common is near to their dwellings, or where the animals may feed in the lanes.

In some parts the enclosure of commons is an injury to the poor man. He can no longer cut furze for his fire, or keep a few geese or a pig upon the waste land. A housewife with a gander and three geese could, with an open common, rear young geese in

sufficient numbers to pay the rent of her house ; and the labourer's pig could supply a large portion of its wants before it is shut up for fattening without any cost to its owner.

When the pressure of poverty is extreme, says Dr. Smith, the poor man's family should be fed almost entirely on bread, since at its present price bread is the cheapest food of any in ordinary use, in relation to the nourishment which it affords. The first duty is to provide sufficient food to maintain health, and after that it will be right to please the palate.

The cheapest fat to eat with the bread is dripping, if it can be obtained, and next to that American bacon, costing 4*d.* or 4½*d.* per lb. The fat of mutton which is cut off the meat is often sold at 4*d.* to 5*d.* per lb., and if it be not disliked when boiled and eaten cold, is a cheap fat. Butter is the dearest fat.

Indian corn meal or maize is the cheapest food of a character similar to bread, but it has a rough and coarse flavour, and would not therefore be eaten except in extreme poverty.

Oatmeal is not now so cheap a food as wheaten flour, and therefore cannot be recommended to the very poor, except in the small quantity required to make gruel or porridge.

Household flour should be, as it is universally, preferred to both brown flour and finer flours, since it is cheaper in relation to its cost or nutriment, and does not act unduly upon the bowels. Brown bread should not form part of a poor man's dietary.

Although the cost of barley meal and rye meal is less than that of wheaten flour, the nutriment which they afford is less ; and as from their flavour they cannot be eaten pleasantly without butter or treacle, their use is not economical.

Rice and Scotch barley are valuable as affording variety, and particularly in making puddings, or rice milk, but if their cost exceed 1½*d.* or 2*d.* per lb., wheaten flour is cheaper.

Potatoes and green vegetables are of the utmost economy to the poor living in the country, since they are produced at very little cost. They also supply much nutriment, are agreeable foods, and constitute a large part of a dinner, or supper, with the addition of a little fat, when meat or bacon cannot be obtained. Potatoes are by far the best of this class of foods, and it should

be the care of the labourer to provide a large supply from his garden and potato-ground, and to so use them that when they are sound, and will keep, they may supply the wants of his family through the whole winter.

Sugar is not an economical food for the poorest persons, and should therefore be used in limited quantity, and the price should not exceed 4*d.* per lb. Treacle, when thick, and sold at 2*d.* to 3*d.* per lb., is cheaper than sugar, and is more fitted for use with puddings, bread, oatmeal, Indian corn, &c. It is not equal to fat for the children, but will please them better.

American bacon, if it can be procured in good condition, should be used; it is equal to any other in nutriment, and its cost is about half that of English bacon.

The cheap cheese which is used in Dorsetshire and South Wales is an economical food if eaten in small quantities; but at more than 6*d.* per lb. is not economical. It is, however, convenient, and helps to make a meal when meat is not to be obtained, and cooking is not possible.

A most desirable event in connexion with the dietary of the poor man is that he should take all his earnings home to his wife, learn the utter valuelessness of strong drinks, and not spend any portion of his money at the public-house; and another not less so is that the wife should have the means, the disposition, and the ability to make her home happy and cheerful, and by a supply of good, warm, and well-served food to keep her husband at home.

The model dietary for a poor labouring man and his family is milk with plenty of bread or hasty pudding for breakfast and supper, and meat or bacon with plenty of vegetables, to be accompanied by broth or a milk pudding, or bread and cheese, for dinner. The milk may be new or skimmed; and skimmed milk is made nearly equal to new milk, if it be not sour, by adding about half-an-ounce of suet to each pint when it is made into puddings, and a little more than a quarter of an ounce of butter or suet when made into porridge. In the absence of both of these butter-milk should be obtained largely, and whey should be drunk instead of water whenever it can be obtained. The allowance to a Scotch labourer at a farm is three pints of milk,

and in Ireland three pints of skimmed milk or butter-milk daily. An English labourer should have two pints per day, and his wife and children somewhat less in proportion if it were attainable. The poor in this country do not properly estimate the value of skim milk, butter-milk, and whey.

In towns where milk is dear, it may be substituted in part by cheap eggs.

Flannel helps to preserve an equal temperature over the body, a bad conductor it is also a bad conductor of wet & at the same time porous enough to allow the perspiration to escape, therefore should be worn next the skin - 1/6 to 2/- a yd.

CHAPTER XIII.

CLOTHING AND WASHING.

CLOTHING.—The circumstance of man's being destitute of natural clothing is one of the many causes which enable him, by suiting his garments to the particular climate in which he dwells, to occupy the whole earth. The use of clothing differs in different regions; in the tropics it is mainly employed to screen the skin from the intense heat of the sun's rays, and at the same time to permit a free circulation of air, and the escape of the perspiration, which is always passing off from the skin; hence we find the Eastern nations using thin, light, and loose garments, which answer these requirements. In colder climates, on the contrary, the heat of the air is so much less than that of the body, that it is necessary to prevent the escape of the natural warmth by covering it with substances that are bad conductors of heat.

In our changeable climate, great care should be taken to clothe the body effectually: for, when the skin is chilled, the blood is determined in increased and injurious quantity to the internal organs, causing colds and inflammations; and even if these serious evils do not occur, the proper action of the skin is prevented, perspiration checked, and ill-health results. In a mere pecuniary point of view, it is economical to wear sufficient clothing to keep the body comfortably warm in cold weather, as otherwise a much larger proportion of food is necessary to keep up the natural temperature. It may be stated as an important rule, that all persons should be so clothed as not to feel habitually chilly. No person who is constantly complaining of cold can be in good health.

The ordinary materials of clothing are cotton, linen, woollen, and silk.

Cotton is generally employed for under garments, for which its warmth peculiarly adapts it. Linen is not so warm, but it keeps its colour better; its first cost is much greater, and, on the whole, although it wears longer, it is not so economical as cotton. Woollen under garments are, in this variable climate, essential to health in cold weather: the warmth obtained by wearing flannel next the body, and the slight stimulating effect arising from its roughness, tend to keep up an action of the skin very beneficial to health. Sailors and fishermen, who are much exposed to wet and cold, know from experience the advantages of wearing coarse flannel next the skin. In the case of children who are in any degree delicate, its employment is extremely important; the idea that they may be rendered hardier by exposure to cold, when scantily dressed, is a very erroneous one; it is true, that many very hardy children may be seen who have been thus treated, but it should not be forgotten that more weakly ones die under the process.

The rule that "the best is the cheapest," is perhaps even more applicable to clothing than to most other articles. It is with a very mistaken idea of economy that low-priced goods are purchased; for, independent of their want of warmth and substance, the great rapidity with which they wear out generally renders them much more costly in the end.

The customs and habits of every country vary exceedingly in regard to dress, and, to avoid being singular, it is requisite, to a certain extent, to follow them, even though they are absurd and inconvenient. In our own country, for example, the tall, stiff silk hats work by men are expensive, ugly, and inconvenient, neither adapted to shade the eyes from the sun, nor to protect the head from wet, and are very unsuited to the wants of a working man.

In our present female costume, stays are the most objectionable articles. Their employment is dictated by a taste essentially false—the desire to make the waist appear unnaturally slender, and therefore deformed. The continued use of stays is defended on the absurd plea, that they are requisite to the support of the

* Cotton is a bad conductor of heat (linen less so) & is therefore warmer in winter, while in summer it is more comfortable because it allows the perspiration to escape, & absorbs it readily, while linen becomes saturated

Linen much more expensive than cotton, a good conductor of heat & absorbs perspiration very readily, therefore should not be worn next skin by those who perspire much. It becomes saturated with moisture which in drying causes a chill, the heat of the body being expended in converting the moisture into steam, and in a sudden draught of breeze, the skin becomes chilled, and colds and inflamation become frequent.

body; whereas the very weakness which they are supposed to relieve, was originally caused, and is continued, by their use. Stays are not only injurious in preventing the action of the muscles of the back, and so causing the deformities which are so much more frequent among girls than boys, but they also impede the action of the lungs, the heart, the stomach, and other internal organs of the body, and give rise to serious diseases. To growing children and young girls, whose bones are more easily compressed than those of adults, they are especially injurious.

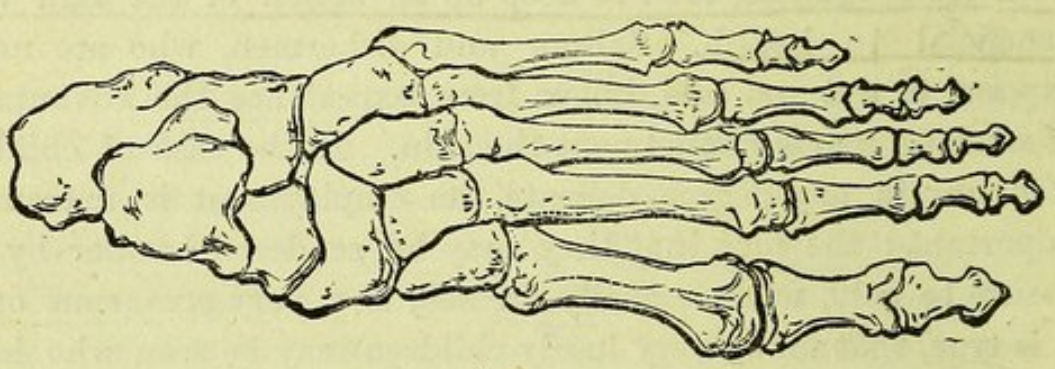


Fig. 1. Bones of left Foot.

Fig. 2. Sole of natural Foot.

Fig. 3. Sole of Foot deformed by wearing pointed shoes.

Shoes, as generally made, are also open to numerous objections; naturally, the broadest part of the foot is towards the front, and the great toe is in a straight line with the inner side, as shown in the accompanying engravings of the bones of the left foot (fig. 1), and the natural form of the foot (fig. 2). Boots and shoes are frequently made more or less pointed at the front, forcing the toes together, and producing the deformity shown in the third figure; so general is this practice, that the existence

of a natural foot in an adult who has worn shoes is exceedingly rare. The evil is a very serious one. Corns, bunions, and in some cases disease of the bones of the foot are the result of the constant unnatural pressure, and in all cases the power of easy and long-continued walking is greatly interfered with. The sole of the shoe should be made with the inner side straight, and not pointed so as to force the great toe over the adjoining toes, a deformity which lessens the power of walking to a serious extent. Shoes of this form are now in very general use with the richer classes. The shoes of the labouring classes are unfortunately made in large numbers on lasts of the old pointed shape, and it will probably be some years before the right form of shoe reaches the working classes of this country.

The high heels which are now used by some classes of women in England, are excessively injurious in their action; the weight of the body is thrown forward on the toes, which are tightly thrust into the fore part of the shoe, and all the evils before described greatly increased. In addition, a most unnatural and ungainly hobbling gait results. From their employment the power of taking healthy walking exercise is greatly lessened. High-heeled boots are much more expensive in wear than others, as the heels are invariably trodden on one side after they have been a short time in use.

In taking the measure of the foot, the plan followed on the Continent, of standing on a sheet of paper, and having a line drawn round the foot with a pencil, should be adopted; the shoe should then be made to fit the foot, instead of endeavouring to fit the foot to the shoe. Children, from the soft state of their bones, are especially liable to have their feet and toes deformed by tight, narrow shoes;—the result is a defect which lasts through life, producing, to a greater or lesser degree, lameness, and consequently inability to take active or long-continued walking exercise. The pressure of shoes is the main cause of those painful afflictions termed corns and bunions.

The wooden-soled shoes, or, as they are usually termed, clogs, used by the great bulk of the population in Lancashire, are worthy of being more generally adopted, as they keep the feet perfectly dry and warm in winter, are exceedingly cheap and

durable—a pair costing from 3*s.* to 3*s.* 6*d.*, lasting on the average twelve months : they are very easy and comfortable to walk in, even for long distances ; for out-door labour in wet weather they far surpass the ordinary shoes in dryness, comfort, and durability ; the greatest objection against their use arises from the noise they cause on stone or wooden surfaces. Unfortunately, like the boots of the labouring classes, they are generally made pointed at the toes, so force the great toe over the others.

In wet weather, india-rubber overshoes, or gutta-percha soles to the shoes, will be found to keep the feet dry and warm. For persons much exposed to wet, using leather boots and shoes, the employment of the following composition is recommended.

"Linseed oil, one gill ; spirit of turpentine, one ounce ; bees' wax, one ounce ; Burgundy pitch, half-an-ounce ; to be melted together, and rubbed into the leather, when quite dry, before the fire or in the hot sun." This composition will be found very effectual in preserving the leather from the injurious action of sea water.

Keeping the feet dry and warm is exceedingly necessary for all those persons predisposed to cold, or whose constitutions are delicate ; wearing worsted stockings in winter is, in such cases, particularly desirable.

Whilst speaking of health, it is as important to mention that the head should (especially with children) be kept cool, as that the feet should have a proper degree of warmth ; hence the plan of covering the heads of children with caps at night is not to be recommended, its tendency is to produce a determination of blood to the brain, and render the wearers much more liable to take cold when exposed, as they necessarily are, to draughts in the daytime.

WASHING.—The materials employed in washing are, *Water*, *Soap*, *Soda*, and occasionally *Pearlash*.

The properties of *water* have been treated of in a former chapter.

Soda.—The soda used in washing is manufactured by a complicated chemical process from common salt. Its appearance is that of a crystalline colourless mass ; it contains nearly one-half its weight in water ; when placed in a dry, warm situation, the

latter evaporates, and leaves the soda in the form of a white powder. Soda softens hard water by attracting the carbonic acid, when the chalk held in solution by the acid is thrown down. Soda also possesses considerable cleansing properties, loosening dirt and removing stains, and, if used in the first boiling, it renders rubbing less requisite ; for these reasons, its employment is very general, even with pure soft water.

It has, however, several disadvantages. It changes many colours in dyed articles, and, unless great care is taken to rinse the clothes thoroughly in clean water, after washing, it gives a yellow tinge to them when exposed to heat, either by ironing, or even by airing. This yellow colour is very permanent, and the soda dried in the cloth tends materially to weaken it.

Pearlash.—Pearlash is an alkaline substance, very similar to soda in its softening and cleansing properties. It is prepared from the ashes of burnt wood ; but for washing purposes it has been so completely superseded by soda, now manufactured very cheaply, that it is not necessary to dwell upon it.

Lye is obtained by pouring water on the ashes of burnt wood, and then straining, so as to obtain a clear liquid for washing. Its power of cleansing depends on the presence of a considerable quantity of pearlash, and it may be employed for the same purposes and with the same precautions as soda.

Borax.—The washerwomen on the Continent use borax as a washing powder instead of soda, in the proportion of a large handful to ten gallons of boiling water, and the saving in soap is very considerable ; for laces, cambrics, &c., a larger proportion is used. Borax, being a neutral salt, does not injure the texture of the finest fabric. It is worthy of a more extended use in this country.

Soap.—The essential ingredients in soap are soda and fat, oil or resin : the soda is rendered caustic by boiling with quick lime, but the fatty substances neutralize its corrosive action, without taking away its powers of rendering greasy or oily substances soluble in water, and capable of being easily removed by washing.

The best soap, when recently made, contains at least one-fourth of its weight of water, and the commoner kinds a much

larger quantity ; an excess of water renders the soap very soft, and causes it to dissolve rapidly when used. It is, therefore, most advantageous to buy soap of good quality, in sufficient quantity to last for some time, and keep it in a dry situation, after having cut it into pieces of the required size.

Washing Preparations.—Several preparations are sold as substitutes for soap and labour in washing. The active ingredient contained in them is soda, rendered caustic by the addition of quick lime ; they are very efficacious in cleansing, but, at the same time, of so corrosive a character, that their repeated use, even in a very diluted state, weakens materially the fibres of the cloth.

In addition to these substances, others are sometimes used in the laundry. Thus, bleaching powder, or chloride of lime,—the most powerful bleacher known,—often finds its way into these establishments ; its action is also sometimes rendered more active by the addition of a little acid to the water when any substance is to be whitened. The occasional application of bleaching powder may be requisite, but its continued action is decidedly very injurious to the strength and durability of the fabric ; and it must be borne in mind that all colours obtained from vegetable dyes, as well as many mineral ones, are destroyed by its use.

In the large laundries near London, brushes, made of vegetable fibre, are also much employed for cleaning stockings, &c., but, from the coarseness of their substance, their action, unless used with great care, is apt to be injurious to delicate fabrics.

The following hints on washing may be found useful :—

"Wash as often as convenient. Dirty clothes, put by for three or four weeks, are more difficult to clean the longer they remain dirty ; they acquire a permanent bad colour, and are apt to become mildewed and rotten.

"Remove all stains as soon as possible ; leave nothing long enough to fix itself thoroughly to the cloth ; wash out grease, gravy, and fruit stains, &c., before putting anything on one side for the wash. Fruit stains yield readily to bleaching powder,—especially if, after being put on, it is moistened with a drop of some acid, as vinegar or lemon ; but neither acids nor bleaching

powder should be used to coloured things. Inkstains should never be put into soapy or soda water or lye, as they directly become iron-moulds, but should be instantly wetted with clean water, and may be at once removed by the application of a little lemon juice or salt of lemon, or very dilute oxalic or muriatic acid, great care being taken to wash away every trace of the acid after the stain is removed.

"After making starch, cover it until required for use with a plate; otherwise it forms a useless skin on the top. To prevent starch sticking to the irons, the addition of a small piece of solid paraffin—as the end of a paraffin candle—will be found more cleanly and efficacious than tallow.

"When water has once been made to boil, the fire in the copper or grate may be very much lessened, as but little heat is required to keep it at the boiling point. There is no advantage whatever in making water boil furiously, for it is not in the slightest degree hotter than when merely simmering, as all the extra heat given to boiling water goes off in the steam, without affecting the heat of the liquid in the slightest degree.

"The shrinking and discolouring of woollen articles may be, in great part, prevented by care in washing them. They should never be washed in hard water, nor in water softened by soda, nor should they be rubbed with soap. The fibres of wool are covered with little points, all directed one way; as the woollen is rubbed, these become tangled together, and form a kind of thick felt, by which means the article is shrunk and thickened. For the same reason it is not desirable to wring woollen things. Before washing, they should be well brushed and shaken, to get rid of the dust; rain, or soft river water, should have a strong lather made in it with soap, or, if the things are very greasy, ox-gall should be added, in the proportion of half a pint to six quarts of water; then boiling water should be added to the lather, to make it as hot as it is possible to bear the hand in, and the dirty woollen should be put in, and dipped and raised repeatedly for several minutes. It should then be squeezed (not wrung) as dry as possible from the dirty, slimy liquor, and the process, if necessary, repeated with some clean lather. If the article is not very dirty, and becomes quite clean in the first

washing, the second washing may be in hot water only, without soap; and, in either case, a blue bag should be used in the last water. When gall has been used, a third water is necessary to take off the smell. When the article is finished, it should be squeezed as dry as can be, and dried as quickly as possible in the open air, if the weather is fine."

Washing (1) Sorting. Put together all articles that can be washed together without injury - Lace and light articles "cuffs, collars & white shirts - white underclothing & pinafores, table-linen, bed linen, boys' pinafores, towels, stockings, aprons, coarse clothes - flannels - coloured articles.

2. Soaking - process usefully applied to articles that are subject to hard wear & become stained in use. Garments worn next the skin, stained with perspiration at the neck, wristbands, sleeves, seams. The friction wh. these parts have to bear puts the stain in & fixes it. Rough towels and coarse aprons are likely to be marked with grease spots.
The evening before washing day the articles to be soaked should be put into warm water containing a little soda and dissolved soap, and the parts requiring it should be rubbed over with soap to soften the dirt - Water enough must be used to cover the articles. They should be slightly wrung before being put into washing water next morning, or they will make it cold. Handkerchiefs should always be soaked in plenty of cold water without soda, well stirred about and lightly wrung before washing.

3. Washing - By the first washing (each article taken in succession from soaking water, rinsed, rubbed and wrung & laid aside until the tub is empty). Tub filled with warm water, articles plunged in, and gone over carefully with soap and rubbed. (2) Washing - Clothes put in water as hot as hand can bear and again rubbed over in every part, looking for spots, and wrung out from this.

Boiling - The water in the copper must be prepared for this, a portion should be allowed to boil in this the soda, pearlash or washing powder is to be dissolved, and cold water added till the whole is only made pretty warm. The clothes are put into this and allowed to boil for ½ hour; being pressed into the water occasionally with the copper stick.

Rinsing - The articles taken from the copper are placed in a tub under a tap from wh. the water is allowed to run freely over them and away, until it comes away quite clear. Meanwhile the rinser moves the things about so that the clear water may penetrate to every part & free them from every trace of soap & soda. They are then wrung, shaken out & plunged into another tub of cold water, into which some blue has been squeezed out of a flannel bag. In this water they must be moved about in as few folds as possible, as the blue intended to neutralize the yellow tinge left by the soda will settle in patches and streaks.

Drying - Lines placed that clothes may catch light breeze - protected from south wind - Coloured things not placed in the glare of sun, which would fade them, but hung wrong side out so that accidental streaks of colour do not show. Garments should be so hung that the wet may run from the pleats.

Flannels These are quickly washed, need no boiling & require to be dried quickly. The water for washing them requires previous preparation. ½ pound soap cut in small pieces should be placed in the tub & a gallon of boiling water poured on to it. This must be well stirred until the soap is dissolved & the

CHAPTER XIV.

MANAGEMENT OF DOMESTIC ANIMALS.

COW-KEEPING.

THE following extracts from some letters on cow-keeping, published by the late Miss Martineau, are given with some additions, as containing very practical directions on the subject, and proving that it is perfectly within the scope of female management.

"My land amounts in the whole to less than two acres and a quarter; and of this, part is mere rock, and a good deal is occupied by the house and terrace, the drive, and some planted portions. * * * *

"In planning the turning up of my ground for spade cultivation, I went on the supposition of keeping only one cow; and for seven months I kept only one. But I considered the inconvenience of the cow being dry for three months out of the twelve; and that there was room in the stable for a second, and little more trouble in keeping two than one; and a pretty certain market among my neighbours for whatever butter and milk I might have to sell. So I bought a 'spring calver,' a companion to the 'autumn calver,' and we find that we very nearly maintain them both on little more than three-quarters of an acre of grass, and less than half an acre of garden. The second cow pays her way by her manure and milk. * *

"Our first consideration was the manure. It is as true with regard to our small concerns as to the greater, that 'the more manure, the more green crops; the more green crops, the more stock; the more stock, the more manure.' There are two tanks,

well flagged and cemented, and well closed, so that not a drop can ooze out. One is connected with the house, and the other with the cottage and cow-house, receiving all their draining of every kind. A barrel on wheels stands at the back door to receive all the slops, soap-suds, cabbage-water, &c., and this liquid manure is wheeled away, and applied where it is wanted. There is a compost pit at the back of the kitchen garden, and a compost heap behind some young trees at the bottom of the field. What with the clippings, and weedings, and sweepings, and nothing being wasted, the pig being kept clean, and the cow-house being swept out twice a-day, we have abundance of manure (without buying any whatever), which accounts for the abundance of our crops thus far. * * *

"Our available ground is—of pasture, three roods, twenty-eight perches; and of tilled ground, one rood, fifteen perches. There are, besides, about twenty-six perches of grass in the little plantation, orchard, and slope, which yield some fresh grass when mowed in summer. * * *

"The digging for crops was not less than two spits deep, dug straight down, and the whole was richly manured. The ground being ready our method is this:—In August we sow cabbage-seed, and by the end of September we begin to set out the young plants, about 400 per week for six weeks, to secure a succession. We set them in rows, about eighteen inches apart, and the rows a yard apart. In April and May we sow Swedes and beets, in alternate rows, between the rows of cabbages. By the time we are beginning to cut the cabbages, the turnips and beets are past the danger of the fly, and may be thinned—the removal of the cabbage letting in air and sunshine. We also keep a portion of the ground for Belgian carrots, which afford excellent cow food. We succeeded less with these this year than with our other crops, from their not being sufficiently thinned. But we had twenty-five stone of them; and four or five carrots a-day were very acceptable to the cows. By the end of March the cows can get a bite in the pasture, and the mowings of grass in the orchard, &c., are brought to them fresh. While the pasture is shut up for hay, the cabbages ripen. They weigh from 4 lbs. to 12 lbs., and each cow eats about eighteen per day. This is

their food from June to November, with such grazing as they get after our hay-making, and a handful per day of Indian meal, scalded and given with their grass. The pasture, having been well manured in the winter, and wonderfully retrieved by good care, yielded more than a ton and a half of the finest hay. This year, I think, I shall try for a second crop, as we have abundance of manure. But last year I had half the pasture hurdled off, and the cows let out for some time every day to graze ; the one half for one fortnight, and the other half the next. By the time the grass and the cabbages were done, we had laid in less than we hope to produce this year, but a fair amount of crops : a ton and a half of hay, twenty-five stone of Belgian carrots, and at least ten hundred weight of Swedes and beet. * * *"

One most valuable article of fodder is not mentioned by Miss Martineau. Namely, Italian rye grass ; it is one of the very best forage plants for dairy purposes when properly cultivated. Mr. T. Chalmers Morton, a very high practical authority, writes :— "If manured abundantly after each cutting, especially if the dressing can be washed in, another cutting of 12 to 18 tons per acre will be ready in a few weeks. As many as five heavy cuttings have been obtained from it during the season, on farms where liquid manure is used. When sufficiently ripened, it is the best possible food that can be given to cows, producing an abundant yield of excellent milk."

Miss Martineau continues :—"The average yield of my cows is about ten quarts per day each, *i.e.*, about four pounds of butter per week, besides cream for the household, and some sale of new milk. The skimmed milk is eagerly bought, being as good as I used to buy for new milk. The buttermilk improves our bread and cakes very much, and the pig has what we do not use. The cows give sixteen quarts per day for some time after calving, and are dry for about three months before. One cow calved in October, and we sold the calf (a cow calf) for a guinea at the end of a fortnight. The same cow is to calve again in September and the other in May ; and thus a continued supply of milk is provided for. We kill two pigs in a year, and, selling half each time, get our hams and as much bacon as we want for little or

nothing. What we have to buy is three barrels of Indian meal in a year, some of which we use ourselves for puddings and cakes, and which goes far towards feeding the fowls; a few traces of wheat straw after harvest (when it is cheapest), to chop and mix with the cows' boiled turnip food in winter; a few pennyworths of grain per week; and two or three loads of turnips after Christmas, and a little hay.

"The cow-house is, as I said, swept out (into the entrance of the tank) twice a day, and it is whitewashed twice a year. The cows are rubbed down daily with a curry-comb, and kept almost as sleek as horses. Both are now in much finer condition than when they came. They were rather restless for a few weeks, after first coming from the fell; but they seem now perfectly happy, and, when out in the field, they return to the stable of their own accord, to avoid rains, heat, or flies. The food in winter is each a stone of turnips three times a day, the turnips being shred and boiled with chopped straw, a little hay, a handful of salt, and a double handful of Indian meal, or somewhat more of bran. They may have, besides, to amuse themselves with, a few raw turnips and two or three handfuls of hay per day."

Miss Martineau made the following calculation as to the annual expenses and profit of each cow :—

Dr.				Cr.		
Bought food	10	0	0	Milk, &c.	30	8	4
Wages of cowkeeper	11	0	0	Calf	0	13	0
Tillage	1	10	0				
Manure purchased	1	5	0				
Utensils, cost and repair	1	5	0				
Interest on capital	1	10	0				
Yearly proportion of cost of cow	1	18	0				
Total	£28	8	0	Total	£31	1	4
				Profit	£2	13	4

Near a large town the value of the produce would be much greater, possibly even one-third more ; and where the cow is looked after by the owner or his children, the amount of cow-keeper's wages and the cost of tillage would be saved, thus raising the annual profit by the addition of 12*l*. 10*s*.

PIG-KEEPING.

The most important rules for keeping pigs are great cleanliness, confinement in a dry, warm habitation, and abundance of wholesome food. It has been ascertained by experiment that pigs cleaned with a curry-comb and brush, or washed from time to time, eat less and become fat far more rapidly than those allowed to remain uncleaned.

Pigs should be fed with great regularity four times a day. For the purpose of fattening, barley-meal and middlings are most desirable. A porker will eat four or five pecks per week ; a bacon pig upwards of a bushel.

Potatoes, given raw, are the worst possible food. The bacon of pigs so fed will lose three ounces in the pound in cooking ; but potatoes baked and roasted form an excellent diet, nearly equalling barley in making good pork.

Two tubs are usually recommended to be employed for the house-wash, barley-meal, milk, &c., that by their alternate use the food may be kept sufficiently long to become sour, it being a general opinion that pigs thrive better and fatten faster upon food that is stale. In a scientific point of view, however, it is difficult to find a satisfactory reason for this opinion ; and in the United States, where pig-feeding is carried on to a greater extent than in any other country in the world, it is regarded as an injurious prejudice, and the animals are fatted with Indian corn meal, used in the freshest possible condition.

It is rarely desirable for working men to keep breeding sows, as, except where there is a supply of skim or butter milk for the young ones, and meal in quantity for the mothers, they cannot be expected to thrive. It is far more advantageous for a labourer to buy a pig, about four months old, late in the winter, or in spring, feed it well with the refuse garden vegetables, turnips,

cabbages, &c., and allow it to graze until fatting time, when it should be well supplied with barley-meal until quite fat, and killed about Christmas. When intended for bacon it will be found preferable to burn off the hair, instead of scalding, as this hardens and tightens the skin, and renders it a better protection to the meat.

POULTRY-KEEPING.

A warm, dry, well-ventilated house is essentially necessary for poultry. If the roosting-places are cold, hens do not lay in winter; if damp, or open to the east or north winds, they are subject to severe colds, which frequently terminate in a fatal disease termed roup.

No animals appear to suffer more from the accumulation of dung or dirt than poultry; hence it is difficult to keep large numbers in health, in one place. To preserve the birds in health, the dung, which is a most valuable manure, should be removed frequently: and if a thick layer of sand, gravel, coal, or wood ashes, is placed beneath the perches, this removal may take place without the floor being tainted. The perches on which large fowls roost should be near the ground, to prevent the feet being injured by the force with which these heavy birds come to the ground.

In all situations, it is requisite, in order that fowls may be kept with profit, that they should have abundance of food; those having, however, a free run in farm-yards where threshing, &c., is going on, or ranging in stubble fields, require very little hand feeding. Barley is the grain which is usually given to them, as they like it better, and it contains less husk than oats; if the latter are used, they should be soaked in water for about twelve hours, otherwise the lighter grains are not readily eaten. Maize, wheat, or other grains, may be advantageously given for a change when cheap. Potatoes, turnips, mangold-wurzel, or parsnips, boiled or steamed, and mixed with barley-meal, or fine middlings, or sharps, are also advantageously used. In mild weather, poultry supply themselves with a large proportion of animal food, such as worms, insects, grubs, &c., &c., which conduces greatly to their laying.

In all cases, the waste house scraps, as boiled potato peelings, and pot skimmings, may be advantageously mixed with their food. A supply of fresh green vegetables, such as grass, cabbages, turnip greens, &c., is indispensable to health, and should be daily supplied when the fowls have not a free range. A little old mortar rubbish, from which the materials for the egg-shells are obtained, is also desirable ; and in order to prevent disease, it is absolutely requisite that there should be a constant supply of fresh water. Stimulating food, such as hemp-seed, peas, a large proportion of chopped meat, or tallow-chandler's greaves, is frequently employed to cause an increased production of eggs : but, sooner or later, such food always produces disease.

The expense of keeping poultry in farm and stable yards is very small ; it may, perhaps, be roughly estimated at about one-third of a penny per week each. If fowls have no other grain than what is supplied by hand, they should each have rather more than a quart of barley per week in addition to green food, house-scraps, &c. ; this would bring their cost to about three halfpence per week.

But as far as profit is concerned, it is perfectly useless to attempt to keep fowls in a small space, as they soon cease to be prolific ; and unless extreme cleanliness is observed become diseased.

Much unnecessary interference with setting hens is usually practised. A hen should be permitted to sit where she has been in the habit of laying ; a moderate number of eggs (never more than thirteen) being given her. When she comes off to feed, an unlimited supply of corn, fresh water, and a place to dust herself in, should be provided. On the same day three weeks that the eggs are placed in the nest, the chickens will generally be hatched, and all interference is most undesirable ; on the next day the hen will leave the nest, and then the chickens should be fed every two hours. For the first food, egg beaten up with about an equal quantity of milk, and then heated till it becomes a soft solid, is by far the most desirable ; this should be gradually superseded by sweet oatmeal moistened with milk or water, or by whole grits, and followed by small tail wheat, barley, &c. The removal of the chickens as they are hatched is exceedingly

injurious to them, as no artificial heat can supply the exact temperature and genial warmth of the hen; the strong healthy broods that are almost invariably produced when a hen hides her nest in a hedge, prove how little benefit is derived from any interference. The practice of cramming the chickens with peppercorns and other substances as soon as they are hatched is unnatural and injurious. For a few days the hen may be cooped to keep the chickens off the damp grass in the morning, but the sooner she is allowed to scratch for worms and insects, the more rapid will be their growth. Chickens hatched in April and May are by far the most hardy and give the least trouble in raising.

The particular variety of fowl most advantageously kept for profit in any situation depends on the relative price of eggs and chickens. Near London, or large towns, the price of large, fat chickens is high, therefore birds adapted for the table may be selected. In country districts, not readily accessible, eggs are more profitable, and good laying varieties should be kept.

For the production of eggs, no fowls are superior to the different varieties of Hamburghs. In these birds the natural instinct has been so changed by domestication, that they do not attempt to hatch their eggs, but lay continually, except at the period of moulting, and in very severe weather. The number of eggs obtained in one year varies from 140 to 200, averaging nearly 180. These fowls are very generally kept in the North of England, where they are often termed Pheasant fowls. At the poultry shows, however, they are always called Hamburghs; being described as pencilled or spangled, according to their markings; and gold, silver, or black, according to their colour. Some are entirely black; the spangled and black are superior to the pencilled varieties. They require a large range, and are not easily kept within bounds, which in some localities precludes their employment.

The common French crested farm-yard fowls, known as Houdans, are strongly to be recommended as abundant layers, very hardy, and as furnishing admirable chickens for table use, they are larger than the Hamburghs, but not equal in size to the Dorkings. Like the Hamburghs and Spanish, they rarely attempt to hatch their eggs.

The white-faced black Spanish are abundant summer layers of very large eggs, and are well adapted for town residents. Cochins and Brahmas are valuable from the freedom with which they lay in the winter, but their frequent desire to sit interferes with their egg-producing powers ; their chickens are remarkably hardy, and are very useful for home consumption, but they are not esteemed in the market,—a circumstance which renders them unprofitable to rear for sale as table fowls. For this purpose the grey Dorkings are unsurpassed, from their large size, ready capabilities of fattening, and the good qualities of the hens as sitters and nurses. They are, however, delicate when chickens, and require a dry, sandy, or chalky soil to be reared to profit. The common barn-door fowl is not to be recommended, as it neither lays a large number of eggs, nor attains to a good size for the table.

It is most profitable to obtain poultry of a good stock, and in order to prevent deterioration, the cocks should be exchanged for others of the same variety, not related to the brood. This caution is absolutely necessary, otherwise the chickens become small and unhealthy.

If eggs are only required, one cock may be allowed to twelve or even fifteen hens ; but if strong and healthy chickens are desired, the number of hens should not be more than from six to eight to each cock. The hens should not be kept beyond three or four years, as after that age they do not lay well.

The profit on poultry varies so much with the district and circumstances under which they are kept, that it is difficult to state the amount with any accuracy. If the cost of keeping a hen is taken at five shillings a-year, which is an extreme price when she has any range, and the number of eggs at 180, which is about the average number laid by the Houdans and the Hamburghs, there is a gross profit of nearly 100 per cent. on the cost of five shillings for the keep of every hen, provided the eggs are sold at twenty a shilling ; but from this profit must be deducted the first cost of the fowl, or the expense of rearing it until it has arrived at maturity.

If chickens, when fit for the table, do not produce more than one shilling and sixpence each, they will be found less profitable

than eggs. A good Dorking hen will lay seventy or eighty eggs, and rear two broods every season. If eight out of each brood are reared, and fatted at the age of three or four months in summer, and six in winter, they should produce at least two shillings each. Dorkings fat well, if cooped from a fortnight to three weeks, provided they are constantly supplied with clean fresh water, barley, and gravel, and abundantly fed three times a-day with barley-meal, or, still better, oatmeal, mixed with milk, or, if that is not to be obtained, with water.

The above calculations as to profit are not made with reference to the high prices given for fancy and ornamental fowls, but on a consideration of their usual prices as agricultural stock.

Where there is a free range, one cock and half a dozen hens can almost always be kept with profit. If there are the means of keeping a large number, it will be found most desirable to keep five or six of the best hens, with a cock not related to them apart from the rest, and to hatch their eggs only.

If it is desired to cross common fowls for the purpose of improving them as market poultry, a heavy, short-legged, grey Dorking cock is most desirable, and the bird should be exchanged for another every season.

BEE-KEEPING.

The usual mode of bee-keeping followed in this country consists in the use of bell-shaped hives or straw skeps, into which the swarms are hived on leaving the parent stock. The following year these hives are allowed to swarm, and in the autumn they are destroyed by the fumes of burning brimstone. This plan is open to many objections ; the comb in a two-year old hive is dark in colour, and contains much pollen, or bee bread ; hence the honey which is obtained from it is of very inferior quality. At the period at which the hives are burned, they contain young and fertile queens, the old queens having issued forth with the first swarms in the spring. A great improvement in the quality and quantity of the honey may be obtained by the following deviations from the common plan :—The hives, instead of being

bell-shaped, should be straight at the sides, like a pill-box, or bushel measure. The top should be flat, with a circular hole four inches in diameter left in the centre, to be closed, when not in use, by a small five-inch straw mat placed over it. The entrance into the hive should be cut out of a thick floor-board, on which the hive ought to stand, and not through the straw side. Flat-topped hives thus made are readily protected from the weather by a milkpan turned over upon them. Their advantage over the common kinds consists chiefly in the facility with which a small straw super hive, glass, or wooden box, to be filled with honeycomb, may be placed over the hole; this, however, should not be done until the weather is warm, and the bees sufficiently numerous to cluster round the entrance; if a glass is used, it must be carefully covered over with cloth and an empty hive, so as to be kept dark and warm. In these supers, pure virgin honey in comb, free from brood or bee-bread, is usually deposited; and, in favourable seasons, twenty or thirty pounds are a frequent produce from a strong, well-managed stock.

These hives offer a great improvement over the common form, as the super or top box of honeycomb, pure and free from brood, may be removed without destroying the bees, which are thus left for the next season. The *contents* of a hive so left, however, should not weigh less than about twenty pounds, otherwise the bees will be starved during the winter: if the weight is less, feeding on syrup must be had recourse to; this is readily accomplished by pouring the syrup into some empty combs, and placing them over the hole in the board, and under an empty super. The syrup will be speedily carried down into the hive by the bees.

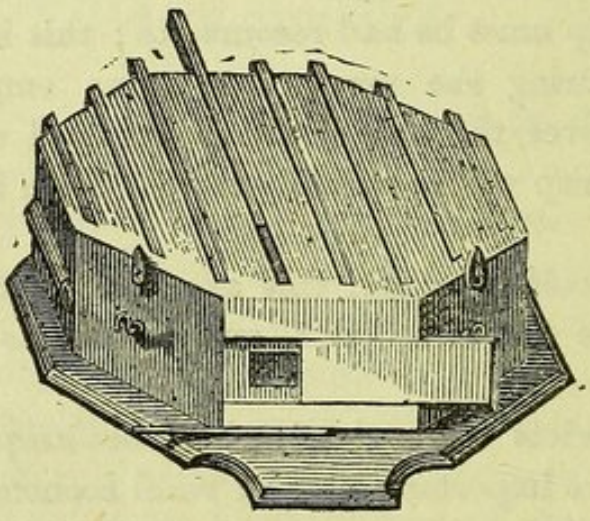
During the cold weather, this aperture should be carefully closed with the flat straw mat, and the whole hive protected from the weather.

In some districts of Scotland, where bee-keeping is regarded as a much more important part of rural economy than in England, wooden octagonal boxes are largely used, which are capable of being placed one above the other in stories, so as to increase the size of the hive to any required extent, communication being made between them by withdrawing slides in the top. The stock

hive, or principal portion, should not contain less than half a bushel or 1400 cubic inches of space. The mode of management is sufficiently simple. When the hive becomes populous in the spring or early summer, the top box is placed over the hive, and communication made between it and the lower box. An additional box is added below the stock box, to prevent the issue of a swarm, which, by the removal of a very large number of working bees, would greatly lessen the honey-gathering powers of the colony.

If a swarm of great size, weighing not less than four or five pounds, and consisting of 20,000 to 24,000 bees, is placed in a storied hive, the top box may even be put on, during the first season, as soon as the stock hive is filled with comb; and a well stored super obtained. This proceeding, however, is not practicable with ordinary-sized swarms of three pounds weight, unless two of them are joined together. There is no system of bee-keeping that yields such profitable results as this. Top boxes of pure white virgin honey, weighing from twenty to thirty pounds each, are frequently produced in good seasons, and meet with ready sale at three to four times the price of ordinary run honey.

In Ayrshire, where profitable bee-keeping is better understood than in any other county in Great Britain, these storied hives



Single Box of Ayrshire or Stewarton Hive.

are almost exclusively employed; and from the skill with which they are worked, aided by the meteorological advantages of the

district, yield the largest and best honey harvests known in the kingdom. The boxes exployed in Ayrshire are about fifteen inches in diameter by six in depth. They communicate with one another by long apertures, which may be closed with slides. Four of these boxes constitute a hive. Of these, two form the stock box for the winter. The super, or shallow top box, and the lower box, to prevent swarming, are only added during the honey-gathering season. These hives may be obtained from Mr. Eaglesham, Lainshaw Mills, Stewarton, Ayrshire, N.B., at a very moderate price.

Hives in which each comb is supported in a moveable frame are now much used, but the system can only be advantageously used by skilled and experienced bee masters.

CHAPTER XV.

DOMESTIC EXPENDITURE AND INVESTMENT OF SAVINGS.

THE necessity of keeping a correct account of income and expenditure, however limited in amount, cannot be too strongly stated; it is one great means of making, to use a homely phrase, "both ends meet," thus avoiding debt, with all its serious consequences. Another great advantage of keeping an account arises from the check that it gives to unnecessary expenditure in little matters—for it is the numerous small sums, and not the few large ones, which take by far the larger share of the income. The greater items are easily remembered and carefully considered; but the smaller ones, from their insignificance, are often overlooked.

Neither economy nor good management can be practised in a household where proper accounts are not kept; too much money is spent on certain things, leaving others which are, perhaps, even more necessary, unpurchased; or, which is still worse, obtained on credit; and this, often not done intentionally, but merely from the want of proper accounts, and consequent ignorance of the manner in which the money has been expended.

It is impossible to form estimates for domestic expenditure which would be applicable to the various districts of this country or to the different occupations of the working classes, and the ever-varying prices of provisions and clothing.

Inquiry is frequently made as to the expense of the board of a teacher and one or more pupil-teachers. In London, a teacher, with careful management, could board one pupil-teacher and her

herself at an expense of from £1 to £1 5*s.* per week for provisions only; and if a second were added, the extra expense would probably not exceed 10*s.*, or an amount varying from £1 10*s.* to £1 15*s.* per week. It would seem, therefore, that from 10*s.* to 15*s.* would be a reasonable charge for the board of one pupil-teacher in London, and from 8*s.* 6*d.* to 10*s.* in the country.

Many cheap books are published for keeping the accounts of a small family. But a printed or purchased book is not necessary; if a slate or memorandum-book is kept, and the daily expenses put down upon it as they occur, these may be entered at the end of the week into a small book; the six days' expenditure of any one article, bread, for example, being added together and put down in one sum, and so with the other articles purchased. The amount received for wages, salary, &c., should be entered weekly on the opposite page. When parties are not paid weekly it may still be useful to put down the estimated receipts for the week, by way of a check on the expenditure.

The evils of debt and the advantages of having ready money can scarcely be too often adverted to, or too much dwelt on; they lie at the very threshold of honesty and of worldly happiness. When persons are paid monthly or quarterly, they should strive earnestly to get beforehand to the extent of a month's or a quarter's pay, so as to have their wages in hand for their daily expenditure, instead of running in debt until pay-day comes; this may not be practicable for a quarter or two at first starting, but it is of the first importance that it should be steadily borne in mind, and nothing, except what is *absolutely necessary*, purchased until it is accomplished. Shopkeepers must of necessity, to preserve themselves against loss by bad debts, largely add to their charges when ready money is not paid.

Necessity for having ready-money

With reference to the subject of domestic expenses, the following extract from an address made by a capitalist, once himself a labouring man, will be read with great interest:—

"If any one intends to improve his condition, he must earn all he can, spend as little as he can, and endeavour to make what he does spend bring him and his family all the real enjoyments he can. The first saving which a working man effects

plan a person pays a small sum annually or quarterly for so many years; when this term has expired the depositor has a fixed sum for the remainder of his or her life. Thus a person aged twenty-one by paying £2 9*s*. 6*d*. each year, and continuing the same up to the age of fifty, may secure an income of £10 yearly for as long as he lives after fifty. At thirty the sum of £3 9*s*. 6d. is required to obtain the same advantage. At these rates the sum paid would be lost, should the party not attain the age at which it is agreed the annuity is to commence; but at a slightly increased annual payment, the whole money paid in is returned to the relatives, or to whomsoever it may be bequeathed, should the party die before reaching the age at which the annuity is to commence.

It is exceedingly desirable that school teachers should endeavour to secure the advantages of deferred annuities for their support when past labour; if they commence paying when young, the expenditure is very small, and in a sound office it is constantly lessened by the proportion of profits received by each assurer.

Too much care cannot be exercised in avoiding insecure offices. These may often be known by their exceedingly low rates of annual payment as compared with sound ones, and the unusual advantages which they profess to bestow.

It may be observed that the Benefit Clubs and Lodges held at public-houses are, almost without a single exception, insolvent; it is, in fact, utterly impossible, with their present rate of premiums, for them to continue permanently to meet the just claims upon their funds. As an example of the insecurity of even the best of the Benefit Societies, it may be mentioned that the Manchester Unity Lodge of Odd Fellows—one of the most respectable of the kind—some few years since consulted Mr. Finlaison, the Government Actuary, respecting the solvency of their Widow and Orphans' Fund (established twenty years since, and possessing a capital of nearly £9,000), when it was ascertained that, to secure to the parties the benefits nominally assured them, a further sum of £17,000 was required. It was further found that the contributions of the members must be doubled in order to secure to their widows the advantages the lodges profess to offer at the decease of the members.

NOTE.—The Government annuities recommended by the Committee of Council on Education for teachers are granted by the Postmaster-General, and the particulars may be obtained at the Money-order Offices. The Post-office Life Assurances are not granted for more than £100, nor are annuities granted of a greater amount than £50 per annum. Life assurances and deferred annuities may also be obtained on advantageous terms at THE NATIONAL PROVIDENT INSTITUTION, Gracechurch Street. For example, by the tables of the latter, a teacher, aged 21, by paying the sum of £1 4*s.* per quarter until she attains the age of 55, insures an annuity of £20 per annum as long as she lives beyond that age; and should she die before that time, the whole of the money paid will be returned to any person to whom she may choose to leave it. At the age of 30, the payment of £1 16*s.* 10*d.* per quarter will be required to insure the same advantages. Annuities of this class may be obtained for larger or smaller sums, or to commence at earlier or later periods of life, by proportionate payments. Deferred sums may also be secured, as in the following example :—A teacher aged 25, paying the sum of £2 14*s.* 10*d.* yearly, assures the sum of £100, to be paid to her on attaining the age of 50; the money she has paid to be returned to her representatives in case of her death occurring previous to her attaining that age. This mode of insurance is very advantageous for teachers, as the payments cease, and the sum assured is paid, when the insurer is advancing in life, and less able to continue working.

Teachers may also assure for a fixed sum to be paid on their attaining a certain age, or at death, whichever event should occur first. Thus, by the payment of 16*s.* 8*d.* quarterly, a person aged 21 may assure £100, to be paid on attaining the age of 50, or at death, should that event occur previously.

DOMESTIC MEDICINE AND SURGERY.

CHAPTER I.

GENERAL MANAGEMENT OF THE SICK-ROOM.

THE general management of the sick-room may be conveniently arranged under the heads of *air, light and warmth, furniture, cleaning, quiet, food and drink.*

AIR.—A due supply of fresh air, which is always necessary to maintain health, is doubly indispensable in sickness; indeed, there is no disease which would not be aggravated by forcing the patient to breathe a close, impure atmosphere; in all cases, therefore, means ought to be adopted to change frequently the air of the sick-room. The chimney-board (if such an unhealthy contrivance has been used) should be removed, and if the plans spoken of, under the head *ventilation*, in the second chapter, are not in use, air must be admitted by the door or windows—the means being varied to suit the season, the disease, the aspect of the house, state of the wind, &c.

LIGHT AND WARMTH.—In some cases of disease the stimulus of a bright light is objectionable; and that of a very warm room equally so; in almost all instances, the feelings of the patient in these respects are the best guide, and they may be safely trusted

when a medical man is not in attendance ; a dark gloomy room has a depressing influence on the mind, and through it on the body.

A small fire may generally be so screened as but very slightly to increase the warmth of the apartment, even in summer, whilst its action creates a draught up the chimney, and is highly beneficial in promoting the constant ventilation of the room.

FURNITURE.—Unnecessary furniture, which occupies space and prevents a free circulation of air, should be removed from a sick-room: in infectious diseases this precaution is particularly requisite. Although unnecessary furniture is an evil it is desirable to always have at hand those things which the invalid is likely to want.

CLEANING.—The strictest personal cleanliness, and the immediate removal of all offensive substances from the sick-room, are duties so obvious as scarcely to require mention. Washing or scouring the floor frequently is, however, objectionable, the dampness of the air caused by it having been found in many instances to increase the disease ; care also should be taken to avoid rendering the air damp by hanging wet clothes in the room ; sick-wards in hospitals should have oak floors bees'-waxed and polished, and walls of hard white cement.

QUIETNESS.—In a sick-chamber quietude is always desirable ; in many diseases noise and loud conversation are very detrimental, and in such cases strangers should not be admitted. On the other hand, gloominess is to be specially guarded against, and a hopeful, cheerful reliance on the power and promises of the Great Physician should always be inculcated. At the same time, it should be remarked that subdued whispering, which the patient almost invariably regards as the expression of a doubtful or unfavourable opinion respecting his case, is very objectionable. The rustling of silk garments in a sick-room is almost always annoying to the invalid ; and the inconvenience of wide or trailing dresses in a sick-chamber, must commend itself to all persons of common sense.

The power of the mind over the body is sufficiently great to determine, in many cases, the course of the disease ; a patient

seeing those around him impressed with fear, has his vital energies so depressed as materially to lessen the prospect of recovery. On the other hand, when he beholds them in cheerful hopefulness, trusting in the assurance of his medical adviser, and relying steadfastly on the overruling and all-merciful providence of God, he is in a state most favourable to promote convalescence.

Food.—There is one mistake respecting the treatment of disease which ignorant persons are very apt to make: they attach great importance to eating, and often to drinking; whereas abstinence during acute sickness is very often a most important part of the treatment. In the early stages of any disease, neither eating nor drinking should be pressed on the patient, but the directions of the medical attendant implicitly followed. It is during recovery that a liberal supply of good food is most required to restore the strength of the system.

The food desirable in sickness varies greatly in different diseases; in febrile and inflammatory attacks little is needed; the merest slops only are allowable, such as sago, tapioca, or arrowroot, made without eggs or spices; when a slightly more nutritious diet is requisite, milk and mutton broth without fat may be taken. White fish, such as soles, whiting, or flounders boiled, furnish the least stimulating variety of solid animal food. Of meats, boiled mutton and fowl may be regarded as least objectionable.

Beef-tea, which is frequently ordered for convalescents, is frequently made by boiling the meat in water; this is a very bad plan, as the fibres are hardened, and the soluble portions less readily extracted. It should be made by pouring a pint of cold or slightly warm (not boiling) water on half-a-pound of finely-cut or chopped lean beef, and then placing it in a covered earthenware vessel, by the side of the fire, or in a saucepan of boiling water for one or two hours. The whole of the soluble portions can be extracted in this manner, but not by the employment of boiling water. A small quantity of salt and two or three cloves greatly improve the flavour. Beef-tea is rather to be regarded as a stimulant than as food, in which sense it is much inferior to milk. The same remark applies equally to Liebig's essence of meat.

Plain custards made with eggs and milk, or with corn flour and milk, are particularly serviceable for persons recovering from illness ; or puddings may be prepared according to the following directions : —

Grate half-a-pound of stale bread, pour over it a pint of hot milk, and leave the mixture to soak for an hour in a covered basin, then beat it up with two eggs. Place the whole in a covered basin, just large enough to hold it, tie it over with a cloth, and boil for half-an-hour. Sugar, and a little thin paring of lemon-peel, may be added, to give a pleasant flavour.

DRINK.—In general, unless the natural taste has been perverted by previous bad habits, the desire of the patient is the best guide as to the nature and quantity of the drink required. In febrile diseases, water, toast and water, lemonade, thin barley-water, or the water in which sliced apples have been steeped, are very much relished.

Milk ought to be regarded as a food rather than as a mere drink, as it is very nutritious, and forms a solid curd in the stomach after being swallowed.

In all cases of disease, beer, wine, or spirits should be totally prohibited, unless expressly ordered by the medical attendant.

It often happens, when people are sick, that their richer neighbours supply their wants with unusual abundance ; the use of luxuries, when the patient is recovering, is, no doubt, often beneficial, but in many acute attacks, before the disease is subdued, they are frequently injurious, and the patient should not be pressed to take them.

DISINFECTING.—After the recovery of the patient from any infectious disease, the room should be purified by lime-washing the ceiling (with freshly slaked lime, not whiting), and scouring or re-papering the walls, if practicable ; the floor should be scoured with chloride of lime and water, that portion of the bedding and the clothes unable to be scalded should be loosely arranged in the room, and disinfected by placing on the floor a saucer containing an ounce of manganese, and pouring on it a large wine-glassful of spirits of salts (muriatic acid). This mixture will continue to give out a powerful disinfecting gas, termed chlorine, for several days, which, if the doors and windows are closed, will infallibly destroy any infection.

The same gas is given out slowly when saucers containing chloride of lime are exposed to the air, or it may be set free rapidly and in large quantities, by pouring any acid, as vinegar, &c., on chloride of lime ; but it must be remembered that this gas, when liberated suddenly and in abundance, is extremely irritating to the lungs.

Even the contagion of scarlet fever, the most infectious of all eruptive fevers, may be destroyed by placing a saucer of manganese and muriatic acid in every room of the infected house, and allowing them to remain twenty-four hours; during this time the bedding, rugs, clothes, &c., should be loosely hung over chairs, or so placed that they may be penetrated by the gas, and the infection effectually destroyed.

For fumigating infected rooms and their contents nothing is better than the fumes of burning sulphur. A quarter of a pound of brimstone, broken in small pieces, should be put into an iron dish (or the lid of an iron saucepan turned upside down), supported by a pair of tongs over a bucket of water as a precaution against fire in the case of accident. The chimney and other openings should be closed with pasted paper, and a shovelful of live coals put upon the brimstone. The door is then quickly shut, the crevices covered with paper and paste, and the room kept closed for five or six hours. After this a thorough cleansing should be effected ; everything washable should be washed, and all other things be cleaned by proper means.

Fumigating of clothes, &c., may be easily carried out on a small scale by burning a sufficient quantity of brimstone.

Condy's Fluid or carbolic acid may be also employed in disinfecting, as described under the head of scarlet fever, but carbolic acid has the disadvantage of leaving a very disagreeable odour, which remains for some time.

Disinfectants. (1) Fresh air - The best and cheapest obtained by open windows and a fire - (2) Hot air - 230° to 300° Fahr. Wearing apparel, bedding &c which cannot be washed, to be exposed to this heat for at least an hour. (3) Hot water - To be used freely with soap - Linen suspected of infection should be boiled. (4) Carbolic Acid - 1/- per pt. a wineglassful mixed with ½ pt. of warm water for use in night stools, sinks &c. for wetting a sheet to hang in the doorway - a wineglassful with ½ pt. of warm water for washing walls, furniture &c. Diluted with 2000 times its bulk of water

(6) Chlorine Gas - Poisonous & irritating to lungs when in excess In an unoccupied room from 2 mixt glass jugs of dilute sulphuric acid (oil of vitriol) oz 2 of chloride of lime in an earthenware saucer placed high near the window - It bleaches & is apt to cause fluid eruptions on tinted walls - It is useful for cats - For an occupied room - Put a crystal or two of chlorate of potash into a saucer of muriatic acid placed high as the gas is heavier than air.

(7) Condy's Fluid - about 2/- per pint - A tea spoonful to a pint or a wineglassful to a gallon of water for utensils sinks floors &c. For gargling, washing the hands and baths, for adding to drinking water for linen, which should be well soaked and then wrung out in clean water. If allowed to stand for a very few minutes in a solution of this strength the linen is stained - The receptacle for the linen should be of wood or earthenware not of iron - When the purple colour is lost the fluid is inert.

CHAPTER II.

(8) Green Copperas - a sulphate of iron - 4 per lb. - 1 lb strongly dissolved in one gallon of water for drains &c.

(9) Charcoal - It is beside a disinfectant, a deodoriser - a bag of charcoal may be placed over putrid sores - A coarse may also be placed over the mouths of drains, sinks &c. until the defect can be remedied a saucer containing charcoal may be placed with advantage in a sick room - (10) Dry Earth - (11) Quick Lime - 12 Chloralum - 1/- per pint.

FEVER.

Fever is a disease which varies very much under different circumstances and at different times; hence we hear of low, inflammatory, putrid, typhus, relapsing, bilious, and many other fevers; they, however, run imperceptibly into each other, and not unfrequently the same attack changes its character from one variety to another.

It is most needless to mention the great importance of having early medical advice in all such cases; but as many, from distance or other circumstances, may be unable to obtain it, the following remarks may be useful.

The first symptom of an attack of fever is generally, to use a common but very expressive term, that the patient "droops;" shivering and headache shortly follow, the pulse becomes quick, there is thirst, much heat of skin, and throbbing in the head. These symptoms may continue for some days, and are often followed by an eruption on the skin. If the disease takes an unfavourable turn, stupor and drowsiness come on; the patient becomes excessively weak, is not able to lie on his side, but rolls on his back; the tongue and teeth are covered with a black substance, delirium and death ensue. In more favourable cases the disorder "takes a turn," the symptoms subside, and the patient recovers.

When fever is attended with a great deal of debility and the

for street watering. (5) Chloride of Lime - 6 d per lb. - Kept dry - 1 lb to 1 gall of water for linen, which must not be left long in the solution before being wrung out in fresh water as it is corrosive. 2 oz to 1 gall. for furniture, for it is apt to leave dampness.

unfavourable symptoms above mentioned, it is usually termed typhus fever.

Most medical men incline to the opinion that fever is contagious, but that the contagion is very easily dissipated, and does not affect all persons subject to its influence; nevertheless, it is desirable to avoid persons coming from a district where a fever is raging, and those whose duties do not call them thither should refrain from going into infected houses or districts. So readily, however, is the contagion dissipated, that in the well-ventilated and large rooms of the rich, and in the airy wards of an hospital, fever seldom spreads. It is in the close, dark, ill-ventilated, and undrained houses of the poor that it extends with such fearful rapidity. In these cases, therefore, fever hospitals should always be strongly recommended; and all who have any intercourse with the poor should endeavour to explain to them the nature of these establishments, and remove the existing prejudices against them, pressing an early resort to them before the danger becomes imminent.

When a person is attacked with fever, or any eruptive febrile disease, he should be at once placed in as large and airy a room as possible, the directions before given for the management of the sick-room followed, remembering that the windows or door, or sometimes even both, should be constantly open; and, except in the very hottest weather, in order to cause a constant change in the air of the apartment, a small fire is advantageous. All superfluous articles of furniture, especially curtains and carpets, should be removed. The patient should be kept very quiet and very clean; the bed-linen and night-clothes should be changed frequently, and on removal they should be *instantly* plunged into hot water. Thirst should be assuaged by a free supply of simple diluents, as barley water, lemonade, toast and water, &c.; it is equally injurious and cruel to withhold the supply of cold drinks for which the patient craves; the heat of the skin may also be allayed by sponging with tepid water as frequently as desired by the patient; and the bed-clothing should be entirely regulated by his sensations—his wishes are the best guides as to its amount. Ripe fruits may be permitted, as grapes or oranges but the only nourishment allowed must be milk and farinaceous

substances. No *unnecessary* visitors should be admitted on any pretence of friendship, &c. The attendance of young persons should, if possible, be avoided, as they are more likely to take the infection than persons of mature age ; and those who are in attendance should be careful to avoid, as far as practicable, the breath of the patient. They should not remain in the room when exhausted by fatigue, nor enter it when fasting, as it is under these circumstances that contagious disorders are most readily contracted.

Whatever doubt there may be as to the contagious nature of fever, there is none as to the circumstances which render persons liable to contract the disease. Those who live in close, dirty streets and lanes, in ill-ventilated, overcrowded, badly-drained houses, on poor, unwholesome food, are the victims of the worst forms of this disease ; whilst it is scarcely known in the more airy and open habitations of the rich, unless when some defective drain or cesspool renders them unwholesome.

It matters little whether we regard the unwholesome dwellings above described as producing fever, or as merely rendering their inhabitants liable to contract it, the result is the same ; and we cannot, therefore, impress too strongly on all classes the motto, that

"Filth is the father of fever."

The treatment of fever should, in all cases, be left exclusively to the medical man. If, unfortunately, medical attendance is not immediately at hand, a mild saline aperient may be given, if necessary ; and in all severe cases it is desirable to cut off the hair ; this is a small sacrifice, as it usually falls off in violent attacks, and the benefit of removing it early is very great. Should there be headache, stupor, or delirium, evaporating lotions may be applied to the head, there is no risk in using them even quite cold. In the typhoid stage of fever, where stimulants are frequently required, no directions can be of use to unprofessional persons.

CHAPTER III.

ERUPTIVE FEVERS.

MEASLES.—Measles commences with a feverish attack, which is somewhat peculiar in its character; the eyes water and become red, the nose runs, and there are all the symptoms of a severe cold. The eruption usually appears on the fourth day, and consists of a rash, which at first appears like flea-bites; but these soon increase in size, and form patches of a horseshoe or crescent shape, appearing first on the face, and extending gradually over the body; in about four days the eruption begins to disappear, and by the seventh is generally entirely gone. The skin, however, remains rough for a considerable time, and separates in small bran-like scales.

Measles is a very infectious disorder. When it appears in a school or family it usually attacks all who have not had it previously, although it very seldom occurs twice in the same person.

In mild cases measles cannot be regarded as a dangerous disease, but there is always a tendency to inflammation of the lungs, which is indicated by difficulty of breathing, and this sometimes runs on to a fatal termination. In the simple disease but little medical treatment is required. The patient is better in bed, as in that situation it is less likely that the skin will be suddenly chilled, a circumstance which not unfrequently causes the lungs to be seriously affected; at the same time, the patient must not be kept hot, as this would increase the fever, but merely comfortably warm. Mild saline aperients may be given, if

their use is required, and, when the rash disappears before its proper time, which is a very dangerous symptom, a warm bath for ten or twenty minutes is very advantageous. Great care ought to be taken not to expose the patient to cold for some time after recovery, as inflammation of the lungs is the frequent result of such a proceeding. There is a popular prejudice in favour of the very dangerous practice of giving stimulants, such as saffron, whisky, cowslip wine, &c., to "throw out the eruption." This should be especially avoided, as the fever and tendency to inflammation are much increased by it, and fatal results not unfrequently follow. Measles sometimes prevails in a putrid or malignant form, with the worst symptoms of typhus. These cases are eminently dangerous, and call for instant medical assistance.

SCARLET FEVER.—Scarlet fever is a dangerous disease which commences with a general feverishness, shivering, and sore throat. The eruption usually appears on the second day in small red points, which rapidly run together, and the whole surface of the skin appears red.

Like measles, it seldom occurs more than once in the same person, and is therefore much more frequent among children than adults. It may be distinguished from measles by several circumstances. In measles, the disease commences with a severe cold; in scarlet fever, the throat is affected. In measles, the eruption, which is in patches, is dark, and may be compared in colour to a raspberry; in scarlet fever it extends universally, and resembles the tint of a boiled lobster. On the seventh day the eruption usually fades, and the skin scales off in scurf or sometimes in large flakes.

The more simple and milder forms of scarlet fever scarcely deserve the name of a disease; in worse cases, the throat becomes severely affected; and in the most violent form, when it is termed malignant scarlet fever, it is one of the most fatal of all diseases.

Scarlet fever not unfrequently prevails to a very fatal extent in large cities, consequently the medical officers of health have issued directions for preventing its extension. They state that it is quite possible to check scarlet fever if adequate means be taken to destroy the emanations of the sick, so that they shall

not infect the healthy. For this purpose the sick must be separated, either by putting them into rooms apart, or by sending them out to a sick house, or, which is better, by removing the healthy to another house. The infecting matter of the disease resides in the excretions of the mouth, throat, and lungs, of the bowels and kidneys, of the skin and suppurating surfaces common towards the close of the disease. Disinfection should be applied assiduously to the mouth, nose, and throat, as each case may require, by gargling, swabbing, or syringing with a teaspoonful of Condy's Fluid to a pint of water; the excreta of the bowels and kidneys should be well dosed with carbolic acid before they leave the bedside; the air of the sick-room should be occasionally freshened by dispersing Condy's Fluid (diluted as above) by means of a vapouriser, and the doorway should be hung with a sheet well sprinkled with carbolic acid, so that there may be no mixing of tainted air with that of the body of the house. It can do no harm to oil the skin during the height of the fever, but what is of real consequence is the persevering use of warm, soapy baths, as soon as the patient can take them, and through the convalescence till the skin has done peeling, and the throat and nose are healed. All handkerchiefs, towels, and linen before leaving the room should be steeped in boiling water, containing a teaspoonful of chloride of soda or of Condy's Liquid to a pint; and when the disease is over, the bedding and clothing of the patient and his attendants should be washed, all floors, walls, and ceilings, and the surface of all furniture on which infectious matter may have settled should be scraped or cleaned with a disinfectant and fumigated. Moreover, disinfecting fluids (as carbolic acid) should be poured freely after the slops from his sick-room into the closets, sinks, drains, and sewers, and into every place around the house where decaying organic matter can be harboured.

The persons attending on the sick should wear glazed or smooth dresses by preference; they should often wash their hands, especially before eating, and should mix as little as possible with the family. Fumigation should be carried out as directed under the head of Disinfecting at page 137.

Provided there is no unsuspected drain, sewer, gully, water

closet, pipe, or cistern, or other source whence the inmates receive fresh infection, scarlet fever can be and is daily arrested in private houses by the above means carried out in detail; but only by persons having space, wealth, intelligence, and the wish to save life. It is far otherwise in the crowded houses of the poor, where the healthy are mixed with the sick and even with the dead. Public measures are then necessary; these are detailed at length by the officers of health; but they concern vestries and public boards more than individuals. Every case of scarlet fever, and especially every first case, should be immediately reported to the sanitary authority. At present this is not done. It is only when death occurs that the health officers with certainty hear of the occurrence, and by that time (often a week or ten days after death) the contagion may have spread more or less extensively. It is erroneously held to be the interest of all parties to conceal their occurrence. Without early information it is impossible to put in force the provision of the Sanitary Act directing the disinfection of houses, &c., and forbidding the exposure of disinfected persons and articles.

Public day and Sunday schools in an infected district should be authoritatively closed. It should be a punishable offence to send a child to any day school, public or private, from a house or family in which fever exists. There is, however, unfortunately no power or authority to do this.

After recovery from scarlet fever, the patient for some time is by no means free from danger; there is, in all cases, a risk of permanent bad health, and, especially, of dropsy. This serious result is perhaps as frequent after mild as after severe cases, because, after favourable attacks, less care is taken to guard the patient against exposure to cold than in those which are more severe. In mild cases, the treatment is very simple. The patient should be kept in-doors, and in all but the very slightest attacks in bed. The diet should be very plain, diluting drinks freely given, and the heat and dryness of the skin allayed by sponging with tepid water; saline aperients if necessary may also be given. Even in mild cases it is of great importance that patients should not be exposed to cold or damp air for some time after their recovery.

The contagion of scarlet fever, though less certain in its effects than that of some other diseases, is much more difficult to get rid of. It remains a length of time in the furniture, clothes, apartment, &c. The best methods of obviating its recurrence have been treated under the head of *Disinfecting*. It should, however, be specially borne in mind, that the patient is liable to communicate the disease to others as long as the skin continues to scale off.

SMALL POX.—The symptoms of this fearful disease are strongly marked, and when once seen, are not likely to be mistaken for those of any other. Small pox commences with a feverishness which is often very severe, and frequently attended with pain in the back and sickness. On the third day, the eruption appears on the face, from whence it extends to the neck, trunk, and legs. The appearance at first is that of mere pimples. These gradually change their character, and become pustules filled with matter. On the eighth day, they burst, and discharge, becoming covered with a dry crust or scab. The number of pustules varies considerably, and the disease is violent in proportion. When those on the face, where they are always most abundant, are so few in number as to remain distinct, the attack may be regarded as nearly, if not quite, free from danger, but when they are numerous and run together, or become "confluent," they indicate very considerable risk ; in such case, temporary blindness is generally produced by the closure of the eyelids, from the inflammation of the skin of the face.

In confluent small pox, the great increase of fever takes place about the eighth day of the eruption, which in fatal cases causes the death of the patient.

Small pox is one of the most contagious diseases known. A person not protected against it by vaccination, or by having had the disease previously, is almost certain to acquire it by going into the chamber of the patient, or even into the house ; at the same time, it is one of the most fatal of all eruptive fevers, as in general one person in every five of those who contract it naturally, falls a victim to its virulence. This fatality, as well as the frequent total blindness, and almost universal disfigurement it occasions, render it a fearful scourge.

The treatment of small pox should in every case be entrusted to a medical man ; it is very useful to know, however, that if the feverishness that precedes the eruption appears in any persons during the prevalence of small pox in the neighbourhood, they should be vaccinated instantly, as it is not even then too late to check or greatly to ameliorate the disease.

The chamber should be kept *cool* and *well ventilated*, the diet at first should be spare and unstimulating,—no meat, beer, &c., being allowed, and cooling drinks should be given as they may be desired by the patient.

In the early part of last century, the practice of producing the disease artificially, by inserting beneath the skin some of the fluid from the pustule, was introduced from Turkey. This proceeding, which was termed "*Inoculation*," was found to give rise to the disease in a much milder form, and not more than one person in five hundred so treated died ; but the practice served to extend the pest very considerably, and many more persons died of small pox after the introduction of inoculation than before. Under the present law all persons who propagate small pox by inoculation, or who expose in any public manner, so as to endanger others, a patient labouring under the disease, are liable to imprisonment.

Towards the latter end of the last century, Dr. Jenner discovered that a peculiar eruption which affected the udder of the cow was capable of being communicated to the human body, and that persons who received it were not liable to the small pox. He further discovered that this eruption, which he termed the *Cow pox*, was capable of being communicated from one person to another by the process of "*Vaccination*."

Vaccination is usually performed as follows :—Three or four very small punctures are made in the skin of the arm with a lancet, and an ivory point, which has been brought in contact with the fluid obtained from the vesicle of a person previously vaccinated, is placed for a few seconds in the wound. About the third day after the operation, the spots become red, and on the fourth or fifth day, small pimples appear, these increase in size, and by the eighth day are from a quarter to half an inch across, having a distinct impression or pit in the centre of each. About the

ninth or tenth day, the skin becomes red round each pustule; after this they dry up, and become covered with a mahogany-coloured scale or crust: this falls off about the twentieth day, leaving a little pit marked with radiating lines and slight depressions.

It is important to notice these different changes accurately, because, unless the pustules go regularly through all the stages, the cow pox cannot be regarded as a preservative against the small pox.

Some doubts have been thrown on the efficacy of vaccination, because a few persons who have been vaccinated have taken the small pox afterwards, but when the pustules have gone through the regular stages, these cases do not occur once in many thousand times; and the small pox occurring afterwards has invariably been mild in its character.

As a proof of the efficacy of vaccination, it may be mentioned that in the whole kingdom of Denmark, where it was rigidly enforced on all persons, it entirely abolished the small pox for many years. In the British army all the soldiers are vaccinated; and in the West Indies, during twenty years, not one soldier out of 100,000 men died of small pox, although the malady frequently raged in several of the islands, carrying off thousands of the unprotected population.

It is the duty of all persons to promote the spread of vaccination. Teachers should not admit unvaccinated children into public or other schools. This regulation would entail no hardship or expense on the parents, as in all parts of the country medical men are appointed by Government to vaccinate gratuitously, and paid out of the public funds.

CHICKEN POX.—This important disease is mentioned, in order that it may not lead to needless alarm by being confounded with small pox. It is almost entirely confined to infants and very young children. The eruption consists of small blisters, and is preceded by little or no fever. It is most abundant on the upper part of the body, and it occurs also on the scalp—the face, however, which is always the most affected in small pox, usually escapes. The disease is contagious; the patient should,

therefore, be separated from other children, and the usual precautions taken. A little mild cooling aperient medicine is all the treatment required. It is readily distinguished from small pox by its more rapid development, the absence of fever, and by the vesicles wanting the central depression which is invariably present in the latter disease.

CHAPTER IV.

CONTAGIOUS SKIN DISEASES.

ITCH.—This disagreeable disease appears usually as an eruption between the roots of the fingers, or at the wrists, and in the bendings of the joints, attended with severe itching, which becomes excessive when the person affected gets warmer than usual. It is very contagious, but requires actual contact before it can be communicated from one person to another. There is reason to suppose that it depends on a very minute insect, found in the skin of patients labouring under the complaint.

Left to itself, the disease appears to continue any length of time without abatement, producing continual irritation and the itching sensation from whence it takes its name.

Fortunately, the cure is remarkably easy; flour of sulphur made into an ointment with lard in the proportion of three ounces of sulphur to half a pound of the latter, diligently rubbed in over the whole body, every evening at bed-time, very generally cures the disorder in two or three days, but unless great care be taken to purify the clothes worn by the patient, and the sheets, blankets, &c., by scalding in boiling water or disinfecting by heating in a hot-air chamber, the disease is liable to recur. In more inveterate cases, the most certain mode of cure is for the patient to remain in bed for two days and three nights, rubbing in the sulphur ointment morning and evening without washing; at the expiration of this period a warm bath will remove every trace of the ointment.

It is scarcely necessary to add, that no children affected with

this troublesome and disagreeable disease should on any account be admitted into or suffered to remain in a school. After they have been sent home, however, on account of this or any other disease, a judicious teacher will not fail to call on the parents and offer such advice as to the method of cure, treatment, &c., as her information will enable her to give ; even when medical or other suggestions may not be necessary, the expression of interest in the child will have a very beneficial effect, contributing much to the popularity and consequent usefulness of the school.

RING-WORM.—This troublesome disease usually attacks the scalps, but sometimes appears upon or extends to the forehead, face, &c. It commences with itching, and the falling off of a circular patch of hair, the affected part appears slightly red, and the remaining hairs are broken ; in severe cases, pustules form, the discharge from them drying into scabs, and the disease is extended by this discharge being applied to other parts, by scratching, &c.

Ring-worm is an exceedingly contagious disease, being readily communicated by the use of the same brushes, caps, &c. It is, unfortunately, one of the most obstinate of all the diseases to which children are subject, and one case often resists remedies which have proved effectual in others. Dr. Thompson recommends the hair to be shaved, and a lotion made of one dram of nitrate of silver dissolved in half an ounce of *diluted* nitric acid, to be applied with a brush (as it stains the fingers) to the diseased circles, and washed off in fifteen minutes, and the parts kept moist afterwards by wet lint covered with oiled silk, or gutta percha tissue.

In all cases great attention should be paid to the general health, and good wholesome nutritious diet alone given ; the hair should be cut very close or shaved, both to facilitate cleanliness and to keep the parts cool ; and to prevent, as far as possible, the disorders being communicated to others, a close-fitting linen or calico cap should be worn.

SCALD HEAD.—In those eruptive diseases of the scalp usually termed scald head from the hair falling off in irregular patches, the most important step in their treatment is the establishment of the strictest cleanliness ; the hair should be cut close, and the

head washed twice a day with soap and water. This treatment, if combined with a little alterative medicine, such as two or three grains of grey powder taken at night, with senna in the morning, will remove many of these troublesome and obstinate complaints.

A lotion made by dissolving a quarter of an ounce of the best washing soda, in a wine-bottle of water, has been found exceedingly efficacious, if applied on lint under an oiled silk, or gutta percha tissue cap, and used in addition to the above treatment. When scalp diseases do not yield to these simple remedies, recourse should be had to medical advice, as they frequently depend on constitutional causes, which are beyond the reach of any local remedy, In all such cases, the strictest attention must be paid to the diet; salt meats, and pastry, are particularly objectionable.

LICE.—In a work written more immediately for schoolmistresses, it is necessary to mention these insects, as they readily pass from one child to another, and by this means a school may become badly spoken of, and decent, cleanly people remove their children. A child known to be infested with these vermin should not be permitted to attend until they are destroyed. This may readily be done in less than a week, by cutting the hair short, cleaning it thoroughly with a small tooth comb, and by brushing and washing, rubbing in every night a small portion of white precipitate powder, to be obtained from any druggist. This powder to be brushed out on the following morning. This treatment, persevered in for three or four days, entirely eradicates lice. Due care should be taken of the white precipitate, as it is a poisonous substance. A more cleanly, but less rapid way, is to wet the hair thoroughly two or three times a-day with any strong spirit, as brandy, spirits of wine, or Eau de Cologne; this kills the living animals, and the application, if continued, will destroy any afterwards hatched.

CHAPTER V.

CROUP, COLD, OR CATARRH—HOOPING COUGH—DIARRHŒA.

CROUP.—Croup is an inflammatory disease of the wind-pipe attacking young children, especially those in their second and third years. It usually commences with a *hoarseness* and cold, the patient becomes feverish, the breathing loud and laborious, the head is thrown back, the nostrils expanded, and there is a peculiar ringing or brassy cough ; as the disorder makes progress the face becomes pale, the skin cold, and, unless relieved, the patient rapidly sinks. The attack is often exceedingly sudden, and then usually commences in the night.

Croup is not generally regarded as being in the slightest degree contagious, but a predisposition to its attacks frequently characterizes all the children in a particular family. It occurs most frequently in cold damp situations ; in such places also it has been noticed to be very common among the children of washerwomen, and that the attacks more frequently commence on Saturday night than any other, owing to the dampness produced by the weekly house washing. It is a disease of very rapid character, often causing death in thirty or forty hours ; it is therefore most important that there should be no delay in the application of remedies. In damp situations, where croup is frequent, it is desirable, on the first approach of a hoarse cold, to confine the patient to the house in a warm dry room, and to a plain, unstimulating diet, without meat. If the attack is con-

firmed, leeches may be applied to the front of the throat, one more in number than the child is years old; thus three to a child of two years of age, and so on.

The medicine which appears to have most influence over croup is tartar emetic, one grain of which should be dissolved in an ounce of water (two tablespoonfuls), and a tea or dessert spoonful given every ten minutes, until vomiting is produced; this should be repeated every two hours if requisite, and in the interval a warm bath will be found of great service.

In families where children are liable to its attacks, powders containing one grain of tartar emetic, mixed with a little white sugar, should always be kept ready for dissolving. It is a medicine which cannot be kept any length of time in solution, as it decomposes in the course of a few days.

When a warm bath cannot be obtained, large portions of hot moist bran enclosed in a thin cloth may be advantageously employed as a substitute, and if bran cannot be obtained, towels or flannels dipped in warm water and wrung nearly dry may be applied.

Croup is a disease which a private person should not hesitate to treat vigorously, inasmuch as it is of so rapid a character, that the delay of one or two hours which often elapses before medical aid can arrive, may be fatal to the sufferer.

Cold or Catarrh.—The symptoms of an ordinary cold are so well known as not to require a lengthened description; the feverishness more or less strongly marked, the thin watery acrid discharge from the nose, and the headache, being most prominent, these being often followed by a cough and sometimes by inflammation of the lungs; as its name implies, this disease is generally caused by exposure to cold, and particularly to cold and dampness conjoined. The treatment of a cold is in the first instance to excite and maintain a considerable action of the skin, in other words a profuse perspiration. This is generally attained by the administration of a teaspoonful of paregoric, or eight or ten grains of Dover powder at bedtime, aided by a warm bath, either general, or confined to the feet and legs, plenty of warm diluting, but not stimulating, drinks, and a warm bed.

In situations where a warm bath cannot be obtained, the free

action of the skin caused by the vigorous application of a flesh brush or coarse towel over the whole of the body until the entire surface is slightly reddened, will often be found effectual in restoring the balance of the circulation and removing a cold at its commencement.

Colds are best prevented by suitable clothing, such as flannel next the skin, warm dry covering to the feet, and the avoidance of exposure to night air, after leaving crowded assemblies. Those persons who are in the habit of maintaining a healthy action of the skin over the whole surface of the body by the practice of strict personal cleanliness, such as can be obtained only by a daily sponging with water, are much less liable to attacks of this character than others; expensive baths are frequently unattainable, but water, soap, and towels are always to be had.

Influenza may be described briefly as a sort of severe epidemic catarrh, very weakening in its character, particularly in those cases where the patient is not constitutionally strong. Amongst aged persons it is very dangerous, and hence should be treated by medical men only, requiring as it does not only strengthening diet, but skilful professional treatment.

Hooping Cough.—Hooping cough, sometimes termed chin cough, is a disease almost exclusively confined to children. It is very contagious; most persons contract it at an early period of their lives, and, as it seldom occurs twice in the same individual, it is rarely seen in adults. The first symptoms are those of an ordinary cold, these usually last about eight or ten days, and then follows the cough so characteristic of the disease. A child labouring under this complaint involuntarily empties the lungs as far as possible, by a succession of coughs, which very rapidly succeed each other, and between which it is unable to take breath, the fit of coughing continues until the child often appears nearly suffocated, and becomes quite dark in the face; it ends by one long drawn, deep breath, which, as it passes into the lungs, occasions the peculiar whoop, from whence the name of the disease is derived; the fit is usually repeated until a quantity of phlegm is expelled from the lungs or until sickness occurs.

In severe cases the violence of the cough is extreme, and the child clings to some object or person for support. In general,

however, the health is so little affected that in the interval between the fits of coughing, the child plays and pursues its ordinary exercises; the usual duration of the disease is from six weeks to three months. Generally, so long as it continues uncomplicated with any other diseases, hooping cough cannot be considered dangerous; unfortunately, however, inflammation of the lungs is not unfrequently its accompaniment: this shows itself by considerable feverishness and difficulty of breathing, in the intervals between the fits of coughing. Another complication of the disease is inflammation of the brain, the symptoms of which are stupor and drowsiness, sometimes attended with convulsions and squinting.

The domestic treatment of hooping cough is very simple; it is to be borne in mind that the disease will always run its course: all that can be done, therefore, is to alleviate the cough, and watch for and try to prevent the serious inflammation that sometimes accompanies it. This is done by keeping the patient on a simple diet with but little meat, and in cold weather confined to the house. If there is much phlegm, an occasional emetic of ipecacuhana is useful, and the cough may also be relieved by giving a grain of ipecacuhana three or four times a day. Inflammation of the chest or brain should be carefully watched for, and, on the first symptoms of either, recourse had to medical advice.

Diarrhœa.—Simple diarrhœa frequently gives rise to much needless alarm, being mistaken for English or Asiatic cholera; it is, however, in most cases, a salutary process, being an effort of nature to get rid of some unwholesome substance which has been taken as food. The most frequent causes of diarrhœa are raw vegetables and fruit, as cucumber, plums, &c.; meat which is in a state approaching putrefaction, or, as it is termed, "high;" shell-fish, such as mussels, crabs, &c.

In simple diarrhœa there is an absence of fever and vomiting, and there is seldom much pain. The best treatment is the administration of a dose of castor oil, either by itself, or, still better, made into an emulsion by rubbing it up with the yolk of an egg, and then mixing water gradually, this acts by expelling the irritating substances which have been taken as food, and the diarrhœa

generally ceases immediately; should it continue, however, more powerful remedies are requisite; but if these are given before the cause of the disorder is expelled, they increase the mischief to a considerable degree.

In all cases of diarrhœa the diet is of the greatest importance; farinaceous food is especially advantageous, or in case of great weakness, strong beef tea or broth, with a little well cooked rice, constitutes a very desirable diet. The custom of taking brandy or tincture of rhubarb during the attack is not desirable.

English Cholera is an aggravated form of diarrhœa, which occurs very generally in autumn; its attacks are more sudden, and are attended with vomiting, and frequently considerable pain from cramp; in severe cases, the administration of active medicines is required, and the treatment should be guided by medical advice.

The *Epidemic*, or *Asiatic Cholera*, is a disease altogether beyond domestic remedies; it is distinguished, in addition to the above symptoms, by the rapid sinking of all the vital powers. Person who live on unwholesome food, more particularly such as drink water contaminated with sewage, or rendered impure by containing any of the fluids from drains or cesspools, or those who reside in over-crowded, ill-ventilated, or badly-drained houses, are most subject to its attacks.

Asiatic cholera generally commences in diarrhœa, and it cannot be too strongly impressed on all persons, that if it is at once checked by appropriate medicines, the disease is, in the great majority of instances, arrested; it follows that in times when cholera is epidemic, it is most important to check every symptom of diarrhœa at its outset; medicines for that purpose are easily obtained, and should be kept in the house. It is on this account that a regular system of visitation from house to house is one of the most efficient means of preventing or arresting the disease, and it should always be had recourse to whenever the cholera is in the neighbourhood, or even in the country.

CHAPTER VI.

DOMESTIC SURGERY.

SCALDS AND BURNS.—The effects of these very common and frequently fatal accidents may often be much ameliorated by judicious treatment before medical assistance arrives.

When the injury is severe, the patient should at once be gently undressed and put to bed, extreme care being taken in removing the clothes from the burnt or scalded part; if they stick in the slightest degree, they should be cut without scruple, and every effort made to avoid breaking any blisters. Nothing adhering to the injured part should be forced off. Care also should be taken to keep the patient warm during the process. The subsequent treatment depends very much on whether the outer skin remains sound, or has been destroyed or broken. Under any circumstances, however, it is most important never to apply *cold* water or cold lotions to a scald or burn. The momentary relief thus given is always followed by great increase of future suffering, and the sudden chill, when the injury is severe, will in all probability prove fatal.

When the skin is unbroken, the blisters should not be opened, but be carefully covered over with lint or old linen rag, spread over with a mixture of equal parts of spirits of turpentine (camphor) and yellow basilicon. On the second day (forty-eight hours) after the accident, the blisters will have become milky, and the parts around perhaps inflamed. The former should then be snipped or pricked in several places, and the fluid gently

let out, still leaving the skin of the blister over the inflamed part. It may then be dressed with some simple ointment, as spermaceti or Turner's cerate. Scalds or burns thus treated usually do very well unless they extend over a large portion of the body, in which case internal inflammations occur, which are frequently fatal.

When the skin is broken or charred, turpentine or basilicon ointment must not be employed, but some application should be used to keep the air from the injured part; sheets of common cotton wadding, split into two, may be applied with the glazed side outwards. These absorb the discharge, and prevent the access of air. Several thicknesses may be applied one over the other, and confined, if necessary, by the slightest pressure of a bandage.

Another application of great value, which has at the same time the recommendation of being always at hand, and of requiring no skill in its use, is flour. This should be dusted on thickly with a dredger, so as to absorb the discharge, and cover the injured part completely. The application should be continued as long as any discharge appears. A crust is thus formed which cracks and permits the escape of the discharge, and, as the burn heals, it drops off piecemeal. This simple remedy is one of the most successful, and is adopted in several of the London Hospitals.

After a severe burn or scald, there is much discharge, and it is requisite, within a few days of the accident, to support the patient's strength, by nourishing diet, and some stimulants, such as a little good beer, porter, or wine. Burns and scalds are dangerous in proportion to the extent of the parts injured; a very severe burn or scald, affecting only a small part of the body, is much less dangerous than a comparatively slight one extending over a large surface, as the latter is often followed by violent and even fatal inflammation of one or more of the important internal organs.

CHILBLAINS.—Chilblains are caused by cold, which produces a slow movement of the blood in those parts of the body which are most readily chilled; as these parts become gorged with blood, a

slight inflammation follows. Chilblains are attended with much itching and smarting, especially when they become warm. They are best prevented by protecting the feet and hands from cold. Warm shoes and gloves, worsted stockings, and wash-leather socks, are very useful to those subject to chilblains. When they do occur, every endeavour should be made to restore a proper circulation, by rubbing the parts twice a day with a strong stimulating application, such as mustard liniment. In weakly constitutions, or with young children, or in cases of neglect, they are very apt to blister and break, producing unhealthy sores, difficult to heal. In this stage the use of stimulating liniments would be very injurious ; they would cause great agony, without benefiting the patient in the slightest degree. The best application to broken chilblains is a lotion made of ten grains of nitrate of silver (lunar caustic) dissolved in one ounce of rain or distilled water ; small portions of lint or soft linen should be wetted with this lotion, and applied two or three times a day. Care must be taken in using this remedy, as it stains linen indelibly, and produces a discoloration of the skin, which lasts some time ; these inconveniences are, however, more than counterbalanced by its good effect in rapidly healing these troublesome sores.

CHAPPED HANDS.—Chapped hands may be in part prevented by carefully drying the skin after washing ; and when they first occur they may be quickly cured by rubbing the hands over with lemon-juice. When the chaps have been neglected and suffered to become large, this remedy causes considerable smarting for a few moments ; if, however, as soon as the skin of the hands begins to get rough, a cut lemon is rubbed over them after washing, it does not cause pain, but produces a pleasant softness of the skin, and keeps off the evil. If this application is objected to, the following lotion may be used twice a day :—Borax, two scruples ; glycerine, half-an-ounce ; water, seven ounces.

WHITLOWS.—Whitlows are swellings occurring in the last joint of the finger or thumb, which are usually followed by the formation of matter ; they are sometimes constitutional, and at others arise from irritation around the root of the nail, caused

by a splinter, prick of a needle, or even a hang-nail or crack of the skin. When matter has been formed and has not a free opening, the pain becomes very great.

The treatment of whitlows is usually the application of simple poultices to soften the skin and nail; when there is not a free discharge, it is absolutely requisite to have the swelling opened to prevent the spread of the mischief to the hand and arm.

A whitlow frequently refuses to heal, in consequence of the irritation caused by the root of the nail; in this case the latter must be removed. As, however, this is an exceedingly painful operation, it is much better to soften the nail by poulticing, and then, as the root is entirely detached from the soft parts, to snip it away piecemeal with fine-pointed scissors, the middle and end of the nail being left still attached to the finger. The cause of irritation thus removed, healing quickly commences, and a new nail is generally formed, which, as it grows, forces off the remains of the old one.

SPRAINS.—Sprains are caused by stretching or tearing the fibrous bands which bind the bones together at the joints. These accidents are often excessively painful, and their bad effects usually last a long time. The treatment of a sprain is very simple; rest is indispensable; if the arm is injured, it must be worn in a sling, and if the leg, the patient ought to lie on a bed or sofa. A bread poultice, warm bathing, or cold evaporating lotions may be immediately applied, the patient's own feelings being in general the best guide as to the appropriate remedy. If there is much inflammation, leeches are required; when the inflammatory action has ceased, and the limb merely remains weak, the application of cold water by pumping, or pouring from a jug, is often very beneficial if continued for some time. The part may also be strengthened by rubbing with some strong liniment, or by binding it round with adhesive strapping or bandage. Exercise should be taken in the most gradual and cautious manner.

WOUNDS.—The treatment of wounds varies very much with the nature of the injury. What is called a clean cut, provided an artery has not been wounded, is best healed by stanching the bleeding, when considerable, by bringing the edges of the

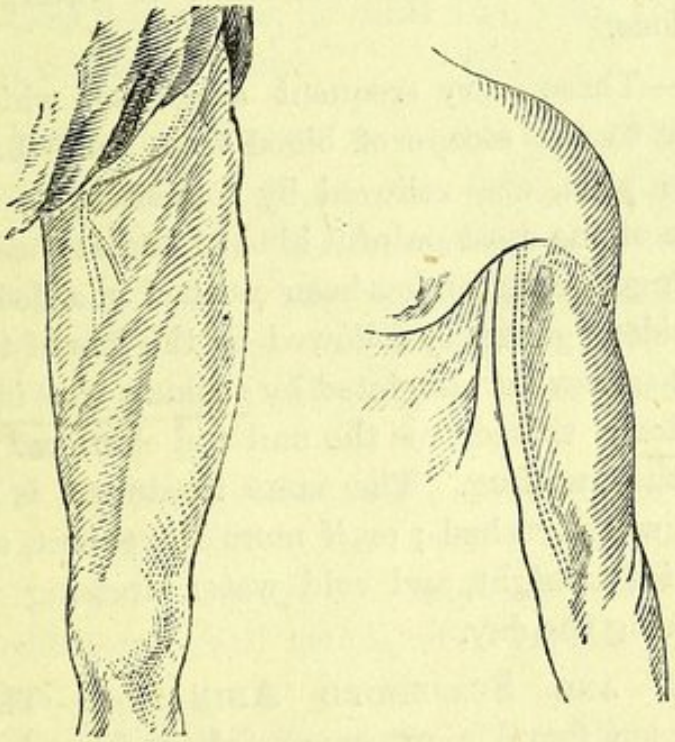
wound strictly into contact, and binding them up in the blood so as to prevent all exposure to the air. This causes the direct union of the sides of the wound, and soon effects a cure.

The Creator has bestowed on the bodies of animals a power of reparation that cannot be interfered with without injury; all that is required is to assist nature by placing the wounded parts in the best possible position for union, by the use of bandages or sticking-plaster. Putting salt or brandy into a wound is most injurious; it produces great pain and inflammation, and, in many instances, prevents the immediate union of the parts, and causes the formation of matter.

For slight cuts, and in some cases even for very considerable wounds, there can be no better plan than to tie them up in the blood by means of a strip of calico or linen; as the blood stiffens, it acts the part of a plaster, binding the wound together, and keeping out the air. In all cases where there is not much pain or throbbing, it is better to leave the strapping or bandage, whatever it may be, undisturbed for three or four days; if, however, the wound becomes painful, it is a proof that matter is forming, when the dressing, after having been softened by hot water, should be removed with great care, and a poultice or water-dressing applied.

When an artery is wounded (which may be known by the blood issuing from the wound in jets instead of a continuous stream, and by its being of a bright, florid, scarlet colour, whilst the blood from the veins is at first of a deep purple), the accident is more serious, and, as it is necessary that the cut artery should be secured by tying a ligature round it, medical advice should be at once obtained. When a large artery is wounded, the patient bleeds to death in a few minutes unless the flow of blood is stopped. This is done by pressing upon the artery at some part between the wound and the heart, so as to arrest the current. The large artery of the leg may be felt pulsating in the groin, and for some inches down the inside of the thigh. In case of a wound of that limb, the artery should be strongly pressed upon in the groin, so as to check the jets which are issuing from the wound; or a handkerchief folded into a bandage may be tied round the limb at its upper part, and tightly twisted

by means of a stick passed underneath it, until the flow of blood is arrested. If the artery of the arm is wounded, it should be pressed in the same manner. Its position is on the inner side of the arm. If the wound be in or near the armpit, the artery may be pressed by means of the thumbs, or by the handle of a door-key, applied behind the middle of the collar-bone, the pressure being directed downwards and not backwards. Should the flow of blood be thus checked, life may be preserved until medical assistance has been obtained to tie the injured artery. All persons should make themselves acquainted with the position and course of these great arteries, which are shown by the dotted lines in the following engravings of the left thigh and upper arm ; they may be readily felt in consequence of their pulsation.



Bruised or torn cuts, such as those inflicted with blunt instruments, are difficult to heal. An attempt may be made to unite them by means of plaster, as in the case of clean cuts, but it is seldom very successful ; the bruised parts are, in fact, killed, and, generally speaking, have to be thrown off before healing can take place. This process is much assisted by a bread and water poultice.

Scratches, pricks, cuts with a dirty knife, or bruised wounds, often produce swelling of the limb, great throbbing, tenderness, and general feverishness. In these cases, which, if neglected, may be serious, nothing but bread and water poultices should be applied, and a dose of castor oil or other aperient given if required. It is frequently necessary to lance wounds of this description, and in such cases medical aid should be obtained as soon as possible.

When the skin is rubbed off by a fall or any other means, particularly if gravel or dirt adheres to the wound, a good application is cold water dressing, applied by means of a piece of wet lint, covered over with oiled skin or gutta-percha tissue to prevent evaporation; should the wound not heal readily, the substitution for the water-dressing of a lotion formed of five grains of sulphate of zinc in each ounce of water, will be found very efficacious.

Bruises.—These very frequent accidents, which owe their black colour to the escape of blood from some broken vessels beneath the skin, are relieved by fomentations of warm salt water. One of the most painful kind of bruises occurs when the end of the finger or thumb has been crushed in a door or window, &c., this accident generally followed by the loss of the nail. The pain may be somewhat alleviated by soaking the injured part in very hot water; this softens the nail and skin, and permits them to yield to the swelling. The same treatment is applicable to the toe-nails when crushed; or, if more convenient, a hot poultice may be applied at night, and cold water dressing with lint and oiled silk during the day.

Drowning and Suspended Animation.—The treatment which has been found most successful in drowning and other cases of suspended animation, as suffocation from inhaling poisonous gases, hanging, &c., is that which tends to restore, as quickly as possible, the action of the lungs and process of respiration. The best means to accomplish this is by carrying out the following directions, issued by the Royal Humane Society.

DIRECTIONS FOR RESTORING THE APPARENTLY DEAD.

1.—IF FROM DROWNING OR OTHER SUFFOCATION, OR NARCOTIC POISONING.

Send immediately for Medical Assistance, Blankets, and Dry Clothing, but proceed to treat the patient instantly, securing as much fresh air as possible.

The points to be aimed at are—first, and immediately, the Restoration of Breathing; and secondly, after breathing is restored, the promotion of warmth and circulation.

The efforts to restore life must be persevered in until the arrival of Medical Assistance, or until the pulse and breathing have ceased for at least an hour.

TREATMENT TO RESTORE NATURAL BREATHING.

RULE 1.—*To maintain a Free entrance of Air into the Wind-pipe.*—Cleanse the mouth and nostrils; open the mouth; draw forward the patient's tongue, and keep it forward: an elastic band over the tongue and under the chin will answer this purpose. Remove all tight clothing from about the neck and chest.

RULE 2.—*To adjust the Patient's Position.*—Place the patient on his back on a flat surface, inclined a little from the feet upwards; raise and support the head and shoulders on a small firm cushion or folded article of dress placed under the shoulder-blades.

RULE 3.—*To Imitate the Movements of Breathing.*—Grasp the patient's arms just above the elbows, and draw the arms gently and steadily upwards, see figure 1, until they meet above the head (this is for the purpose of drawing air into the lungs); and keep the arms in that position for two seconds. Then turn down the patient's arms, and press them gently and firmly for two seconds against the sides of the chest, as shown in figure 2 (this is with the object of pressing air out of the lungs. Pressure on the breast-bone will aid this).

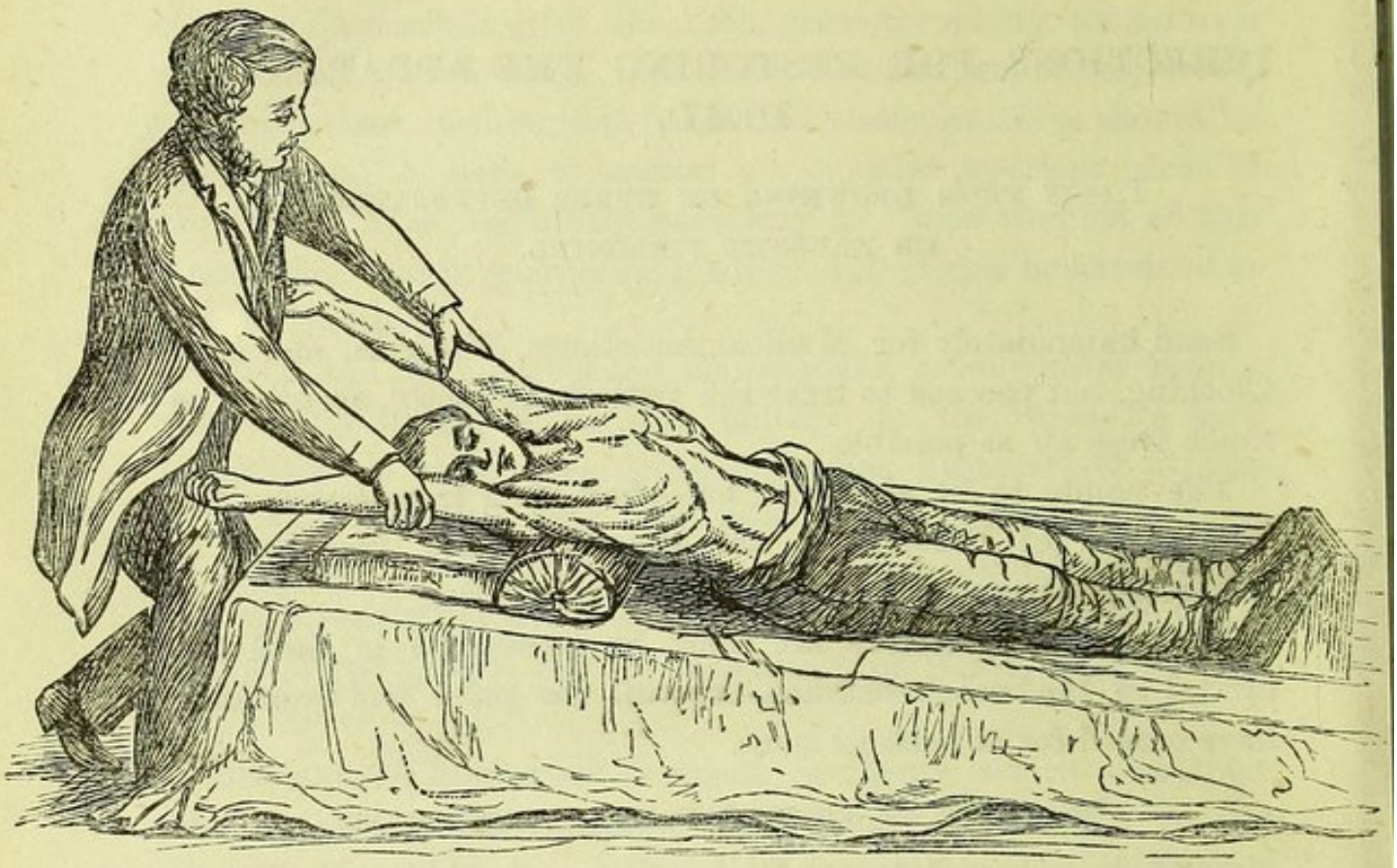


FIG. 1.

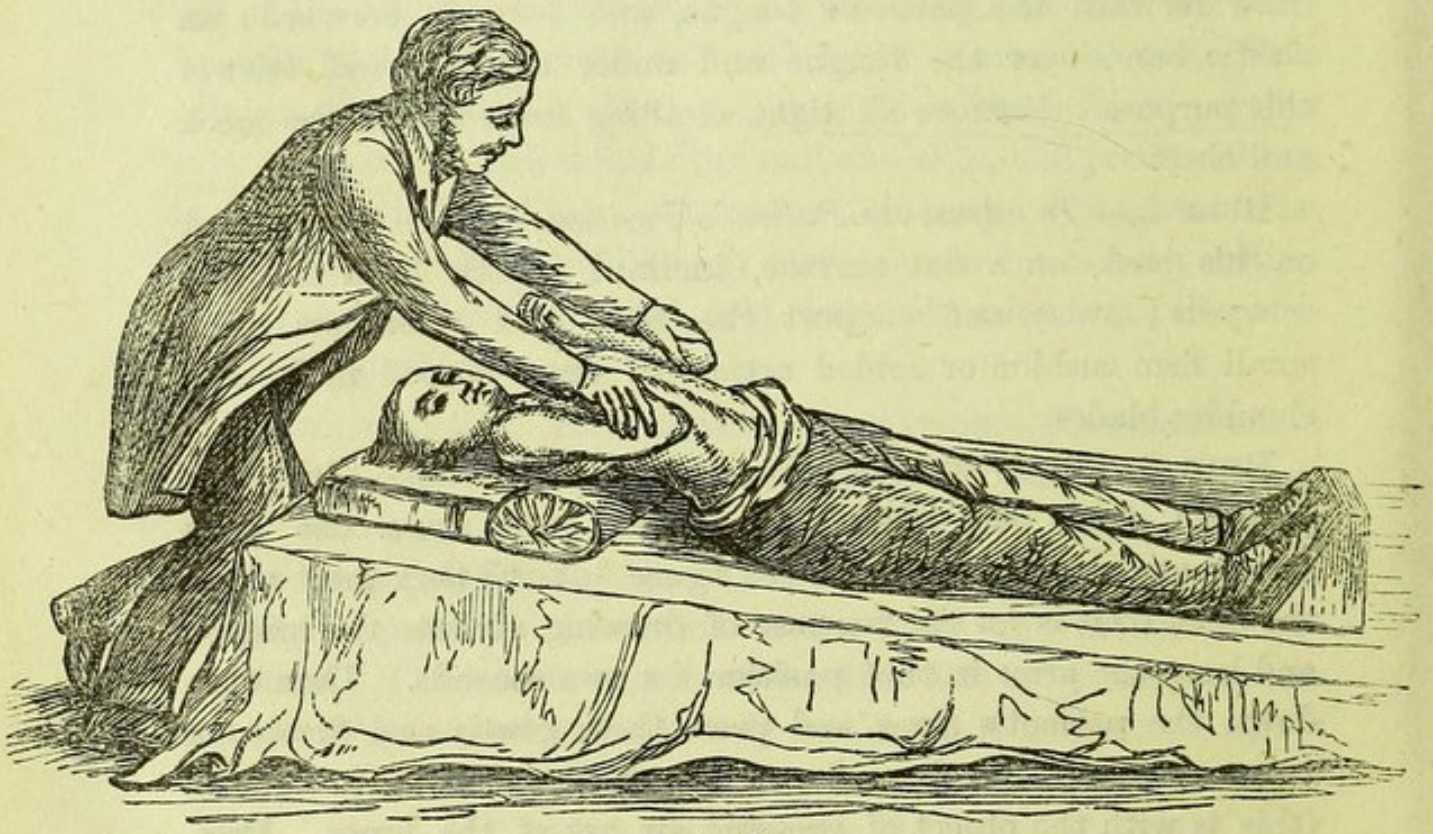


FIG. 2.

Repeat these movements alternately, deliberately, and perseveringly, fifteen times in a minute, until a spontaneous effort to respire is perceived, immediately upon which cease to imitate the movements of breathing, and proceed as directed below to induce circulation and warmth.

Should a warm bath be procurable, the body may be placed in it up to the neck, continuing to imitate the movements of breathing. Raise the body in twenty seconds in a sitting position, and dash cold water against the chest and face, and pass ammonia or smelling-salts under the nose. The patient should not be kept in the warm bath longer than five or six minutes.

To Excite Inspiration.—During the employment of the above method excite the nostrils with snuff or smelling salts, or tickle the throat with a feather. Rub the chest and face briskly, and dash cold and hot water alternately on them.

TREATMENT AFTER NATURAL BREATHING HAS BEEN RESTORED.

To induce Circulation and Warmth.—Wrap the patient in dry blankets and commence rubbing the limbs upwards, firmly and energetically. The friction must be continued under the blankets or over the dry clothing.

Promote the warmth of the body by the application of hot flannels, bottles or bladders of hot water, heated bricks, &c., to the pit of the stomach, the armpits, between the thighs, and to the soles of the feet. Warm clothing may generally be obtained from bystanders.

On the restoration of life, when the power of swallowing has returned, a teaspoonful of warm water, small quantities of wine, warm brandy and water, or coffee should be given. The patient should be kept in bed and a disposition to sleep encouraged. During reaction large mustard plasters to the chest and below the shoulders will greatly relieve the distressed breathing.

WHEN PERSONS ARE INSENSIBLE FROM INTENSE COLD.

Rub the body with snow, ice, or cold water. Restore warmth by slow degrees. In these accidents it is highly dangerous to apply heat too early.

The treatment recommended by the Society is to be persevered

in for three or four hours. It is an erroneous opinion that persons are irrecoverable because life does not soon make its appearance ; as cases have come under the notice of the Society of a successful result even after five hours' perseverance—and it is absurd to suppose that a body must not be meddled with or removed without the permission of a Coroner.

FAINTING.—When a person faints from any violent mental emotion, fatigue, or loss of blood, he should be immediately laid flat on his back. Cold water may be dashed on the face, and some stimulants, or smelling-salts, applied to the nose. As fainting depends on a partial cessation of the action of the heart, it is desirable to loosen the dress around the throat and chest ; and it is very important that the fresh air should have free access to the person affected. This cannot be accomplished if the by-standers crowd around. Only the persons absolutely required to attend the patient should be allowed to remain near a fainting person.

HYSTERICS.—Hysterical crying or laughing is a mental affection which is peculiarly liable to spread amongst girls and young women. It may in almost all cases be overcome by a strong mental effort, and is generally increased by any expression of sympathy. A very effectual mode of cure consists in dipping a towel in cold water, so as thoroughly to wet it, and striking smartly with one end of it the upper part of the chest.

CHAPTER VII.

DOMESTIC REMEDIES.

EXTERNAL APPLICATIONS.

BLISTERS.—Blisters are remedies which act by producing a violent irritation of the skin, thus causing a determination of blood from, and relieving any inflamed internal organ near which they are placed. They are usually made by spreading, without heat, a portion of blistering cerate on common sticking-plaster, leaving a narrow margin. They are generally applied at night, and left on about twelve hours, or until small blisters are seen on raising the corner; they should never be applied on young children, except under medical advice, as they are apt to produce mortification. When applied on children, they should always be taken off as soon as the part becomes decidedly red. After removing a blister, the best treatment is to snip the blister slightly, so as to allow the escape of the fluid, without removing or tearing the skin itself, and to apply spermaceti or some simple ointment, spread on lint or soft linen, renewing this as often as it becomes stiff and dry.

The application of a piece of very thin muslin between the blistering plaster and the skin is a very good plan; it does not lessen the action of the blister, but renders its removal easier and the application more cleanly.

It should be borne in mind, that blistering plaster is an exceedingly poisonous substance.

MUSTARD POULTICE.—Mustard poultices are made in various modes; some persons mix an equal proportion of oatmeal or

linseed meal with the flour of mustard; others add vinegar, with an idea of increasing its action; this latter is, however, decidedly injurious to the poultice. Mustard and water, either hot or cold, mixed as for table use, and spread upon a piece of old calico and linen, answers the purpose best, and is all that is required.

Rigollot's Mustard leaves are very efficacious, and possess the advantage of being portable and always ready for immediate use.

After a mustard poultice has been applied for a short time, varying with the thickness of the skin, from five minutes to half an hour, great redness and smarting are produced; when the irritation is considerable, the plaster should be removed, and the inflamed skin sponged with warm water, and dried with a soft cloth.

The object of applying a mustard plaster is to produce a determination of blood from any inflamed internal organ where pain is experienced, to the skin, and thus relieve the affected part. They may be applied without risk, and are always at hand; in many cases they are preferable to blistering plasters, not only on account of their more rapid action, but from the fact that they rarely produce blisters, a point of great importance, especially in the treatment of infants, in whom blisters are so difficult to heal as sometimes to prove fatal.

Mustard plasters are valuable remedies in many inflammatory diseases, especially those of children.

Turpentine Fomentations.—In many cases of internal inflammations, and severe rheumatic pains, the application of a turpentine fomentation is often of very great benefit. It is most conveniently applied by wringing a piece of flannel out of very hot water, sprinkling some spirits of turpentine on it, and at once applying it to the affected part, closely covering it over with dry flannel. Its action is more rapid and energetic than that of a mustard poultice. It should be kept on as long as it can be borne.

Bread and Water Poultices are safe domestic remedies —soon made and easily applied; seldom or never doing harm, even where they are of no benefit. They should be made with

crumbled bread and boiling water; when the bread has soaked up as much water as it will absorb, the rest is to be poured off, the pulp beaten up and spread rather less than half an inch thick on folded linen. They should be put on at a comfortable degree of warmth; and as the benefit of simple poultices depends on their keeping the diseased parts moist and warm, they should be moistened by dropping warm water upon them as they become dry, and covered with a few folds of flannel to prevent the escape of the warmth. Poultices should be changed frequently, as they become offensive after having been applied a few hours.

Linseed-meal Poultice.—Linseed-meal poultices are made by stirring some linseed meal into perfectly boiling water, and spreading it upon linen in the same manner as directed for bread poultices; they are more stimulating than bread poultices, and, when applied to a wound or sore, cause a great discharge.

Water Dressing.—The benefits of poultices may often be obtained without their inconveniences, by the use of water dressing. This is simply a piece of lint or soft rag dipped in water, applied to the affected part, and closely covered with a piece of oiled silk or gutta percha tissue, to prevent its drying. This application keeps the diseased part moist, is lighter, more cleanly, and more readily changed than a poultice.

Liniments.—Liniments are stimulating applications, which act like mustard poultices, &c., by producing a determination of blood from inflamed parts to the skin. They are also used to remove the swellings which remain after bruises and sprains. In active inflammation liniments are likely to prove injurious; and, as a general rule, it should be remembered that they are not to be applied when the rubbing, which they require, causes pain. As nearly all kinds of liniments are poisonous, it is desirable that they should be distinctly marked "Poison."

Hartshorn and Oil.—This is a good liniment for stimulating purposes. It is, however, much better if made with one part of strong liquid ammonia, and four parts of olive oil, than with hartshorn; the union of the two liquids is more complete, and no separation takes place on standing.

In sore throat, attended with enlarged tonsils, this liniment, spread on flannel, and applied to the throat, gives great relief.

Soap Liniment, or Opodeldoc, is a stimulating liniment of a milder character than the last.

Mustard Liniment is a strong, stimulating, manageable liniment. It is made by putting one ounce of the best flour of mustard into one pint of spirits of turpentine, or, what is the same thing, camphine, shaking occasionally for two or three days, and then pouring off the clear liquid for use. Rubbed on the skin, it excites first a feeling of warmth, then a slight pricking, and afterwards a positive smarting, when the rubbing should be discontinued, or the skin will be broken. For lumbago, old strains, or bruises, and in particular for *unbroken* chilblains, it is highly to be recommended.

Lotions.—Lotions are generally applied to relieve an inflamed part, by the cold produced by evaporation. It is evident, therefore, that closely covering up a part to which they are applied must prevent any beneficial action. A lotion should be employed by moistening a piece of lint or linen, placing it loosely on the part, and wetting it as often as it becomes dry. Cold water forms a very good application of this kind.

Spirit Lotions.—Spirit, from its higher volatility, produces a greater degree of cold than water; therefore a mixture made by adding a wineglassful of brandy, or other good spirit, to a pint of cold water, is often employed. Spirit of wine is preferable, as it is destitute of the peculiar odour of brandy, whisky, &c.

Vinegar Lotion.—Vinegar, being more volatile than water, is often added to cold lotions, in the proportion of one-fourth of vinegar to three-fourths of water.

Leeches.—The application of leeches, when ordered by the medical adviser, is generally left to unprofessional persons, it is therefore desirable to give some directions for their employment. Healthy leeches, which are alone of any value, are readily distinguished by their power of contracting into a firm ball when slightly rubbed between the thumb and fingers. The part to which they are to be applied should be washed with warm water, and the leeches being placed in a wineglass, or allowed to remain

in the chip-box in which they are usually forwarded, should be applied by inverting the box or glass over the place. After they have dropped off, the flow of blood may be encouraged, if required, by the application of a warm bread-and-water poultice, or by bathing with warm water.

If the flow of blood is too profuse, the best mode of checking it is by a gentle and steady pressure. When leeches are applied to very young children in the evening, the bites must be carefully watched during the night, as sometimes the bleeding continues to a serious extent. In a few peculiar constitutions the bleeding is apt to be excessive, when the assistance of a medical man should always be obtained. If it is impossible to procure this, it would be better to heat a knitting-needle, or the single prong of a fork to bright redness, and press it perpendicularly into each orifice, than to allow the patient's life to be endangered by excessive bleeding. Occasionally leeches remain on, after having filled themselves; in this case they should not be forced off, but caused to quit their hold by the application of a few grains of salt to their heads.

After having been employed, leeches remain useless for many months; the application of salt is frequently had recourse to, to cause them to disgorge the blood they have imbibed, but its action on them is so severe that they are seldom of any use afterwards. A very weak solution of sugar appears to be as efficacious without being so injurious.

INTERNAL REMEDIES.

APERIENTS.—In domestic medicine, aperients are more frequently employed than any other remedies. It may, however, be observed, that they are far too often had recourse to for slight ailments, which abstinence and regularity would soon cure; and habits are thus formed which are often injurious to the general health. Much want of judgment, also, is often shown in the selection of the particular medicine required, as well as in the dose of that selected. It will be desirable, therefore, to speak of the most common aperients somewhat in detail.

EPSOM SALTS.—This saline substance is extensively used as an aperient; it is, however, better adapted to those cases where there is a gross habit of body to reduce, than to others where a mere aperient effect is required. The usual dose—namely, one ounce—is, in the majority of cases, unnecessarily large: it should be taken in much smaller quantity, and more largely diluted than is usual.

SENNA.—Senna is another common domestic aperient. As usually prepared, by pouring *boiling* water on the leaves, it is apt to gripe severely; but this effect may be prevented by making the infusion with warm, instead of boiling water.

Senna acts rapidly and effectually, without weakening the system, and, as a general medicine, is far better than Epsom salts. The dose of an infusion, made by pouring half-a-pint of water on half-an-ounce of senna, is, for an adult, from one to two large wineglasses full. The taste of senna may be almost entirely concealed by mixing it with black tea, either with or without milk and sugar, and in this way it may readily be given to children, in doses proportional to their ages.

CASTOR OIL.—Castor oil is the least irritating of all aperients, and is, therefore, specially adapted for infants and delicate persons. The nausea it excites is an objection to its use; if, however, some milk is poured into a glass, and the inside and edges moistened with it, the castor oil may be poured into the centre, and rapidly swallowed, without adhering to the glass or to the mouth. It may also be taken in a little spirit and water or hot coffee, or rubbed up in a mortar, with some thick gum-water, or the yolk of an egg. When subjected to this latter process, it may be mixed with water, and the taste concealed by some aromatic, as nutmeg or cinnamon.

COMPOUND COLOCYNTH PILL is an active purgative, well adapted for adult use. In cases of costiveness, one or two five-grain pills may be taken at bedtime. Care should be taken to obtain it genuine, and to avoid the cheap and adulterated preparation often sold in its place, under the name of *Pill-a-Cochia.*

COMPOUND RHUBARB PILL is a less violent but very usefu and effectual vegetable aperient.

CALOMEL.—Calomel is frequently taken as an aperient, but it is uncertain in its action, and by no means a desirable remedy except in the hands of a medical man.

BLUE PILL and GREY POWDER are much milder in their aperient action than calomel. Both are useful in the highest degree, in many deranged states of the system, as bilious attacks, &c.; but their action, especially in repeated doses, is powerful, and there is no doubt but that their frequent employment by unprofessional persons leads to more evil than good. Five grains is the usual dose of blue-pill for adults, and, when taken at night, a dose of senna should be taken in the morning.

MAGNESIA is a very mild aperient, correcting, at the same time, any acidity in the stomach, and so removing heartburn. When given to young children, it is usually conjoined with rhubarb.

RHUBARB.—Rhubarb is a mild aperient, and may be given with safety to the youngest children. It should not, however, be taken habitually, as it has a tendency to render the further use of medicine requisite.

SEIDLITZ POWDERS are useful saline aperients, which may be advantageously employed in febrile states of the system. They are usually taken in the morning and in a state of effervescence, caused by mixing the two powders together in water; but in many cases, where a cooling saline is required, as in eruptive fevers, it will be found advantageous to dissolve the powders in half a pint of cold water. After the effervesence has ceased, this may be sweetened and taken at intervals during the day.

EMETICS.—Except in the case of poisoning, emetics are scarcely required in domestic medicine; those desirable in such cases are mentioned under the head of Vegetable Poisons.

NARCOTICS.—Narcotics, or medicines which produce sleep, are very undesirable for domestic use, and should never be given unless ordered by a medical man; with children especially, their action is often fatally injurious. The remedies in case of an over-dose are pointed out under the head of Opium, in the following chapter.

bright scarlet bitter juicy berries. The latter are ripe in the autumn. This plant, which is common everywhere, is not poisonous, as its name might seem to imply, and as it is frequently, but erroneously, supposed. The twigs are constantly masticated by the children in Lancashire and Westmoreland for the sake of the sweet taste which follows the bitter flavour.

Hemlock.—Hemlock is readily distinguished from the numerous umbelliferous plants growing wild in this country (of which the parsley and carrots are examples) by its smooth *spotted* stem; the *dark shining colour of its lower leaves*, which are much divided; and by its *peculiarly disagreeable mouse-like odour* when bruised. It is violently poisonous, rapidly producing delirium and death. The treatment to be adopted is the instant employment of an active emetic.

Water Hemlock and Water Parsley.—These two umbelliferous plants have frequently proved fatal to children, and even to adults, from their large fleshy roots being mistaken for parsnips. The symptoms are somewhat similar to those produced by hemlock. It is desirable that children should be cautioned against eating any wild roots which appear like parsnips, more especially those growing in damp, watery situations.

Fool's Parsley.—Another umbelliferous plant, very common in gardens and hedgerows. The leaves closely resemble those of common parsley, and are occasionally employed in mistake for them, producing poisonous effects. The taste of the leaves is disagreeable, and very different from that of parsley.

Foxglove.—Foxglove is a common ornamental plant in gardens, and grows wild in many parts of this country. The leaves are an exceedingly fatal poison, producing great debility, sometimes with vomiting and purging, followed by cold sweats and death. If the poison has not been rejected, an emetic should be given, and the faintness counteracted by brandy and sal volatile, in doses of half a teaspoonful of each in water.

Monkshood.—Monkshood is another common garden flower which is very poisonous, a small portion of the leaves proving fatal. It generally produces nausea and vomiting, followed by convulsions and death. There is no antidote to its action, nor can any treatment be recommended likely to prove successful. If

vomiting has not occurred, an emetic should instantly be given, to get rid of that portion of the poison remaining in the stomach. The plant should never be grown in gardens to which children have access. Its roots have also proved fatal when eaten in mistake for horseradish, although it is difficult to imagine how such an error could be made, as they have not much similarity of appearance, and none of taste.

Laburnum.—The small seeds of this well-known ornamental tree are exceedingly poisonous. They fall in abundance in the autumn, and have often proved fatal to children, who, attracted by their shining appearance and bean-like taste, have eaten them. They produce severe pain, usually attended with violent vomiting. Should not the latter effect occur, the immediate administration of an emetic of sulphate of zinc or mustard should be had recourse to.

Common Laurel.—The leaves of the common laurel are powerfully poisonous, depressing all the energies of the body, and producing death in a very short space of time. When bruised they give out a smell resembling that of bitter almonds or the kernels of stone fruit. As in other cases, the poison may be removed by an emetic, and the depression counteracted by stimulants, such as brandy and water or sal volatile.

Yew.—The leaves and berries of the common yew are poisonous, and have produced many fatal accidents. The berries, which are ripe in autumn, consist of a pulpy cup containing a single seed. Their beautiful translucent waxy appearance and sweetish taste lead to their being eaten by children. The poisonous principle is believed to be contained in the seed.

Common Arum.—This plant, which is known also by the names of Cuckoo Pint, Wake Robin, Lords and Ladies, &c., is an irritating poison, and fatal accidents have frequently occurred from the leaves having been eaten.

ANIMAL POISONS.—*Bite of a Mad Dog.*—In the case of a dog known to be mad, not an instant should be lost in destroying, or, what is still better, removing the poison by completely cutting out the bitten part. If, from the situation of the bite, this is impracticable, it may be destroyed by burning ; a piece of pointed stout wire, such as a knitting needle, or one prong of a carving

fork, the other being broken off, should be heated to whiteness, and the wound completely destroyed. The pain of this application is much lessened if the wire is made as hot as possible. Iron heated to whiteness destroys the nerves of a part instantly, and so prevents all sensation. If these remedies appear too severe, it should be borne in mind that there is no remedy known for hydrophobia, and that the most fearful of all deaths is only to be prevented by these means.

The symptoms of madness in the dog itself are generally misapprehended, being supposed to consist chiefly of a fear of water, whereas the disease is chiefly characterized in the earlier stages by a peculiar expression of countenance, sudden moroseness, snappishness if disturbed. Dogs suffering under canine madness have no dread of water, but generally an urgent desire for drink. They do not attack human beings unless interfered with ; but usually bite other dogs. Swallowing is, however, sometimes prevented by paralysis ; but there is not one in a thousand that does not seek water. The evils arising from ignorance of this fact are, that dogs incapable from any cause of drinking or swallowing are supposed to be mad, and persons who have been bitten by them suffer unnecessary dread for many months ; and that dogs really rabid have been regarded as not affected because of their drinking freely, and persons bitten by them have neglected the only means capable of preserving life, namely, excision or actual destruction by the use of a white-hot cautery.

When a dog has bitten any person, it is frequently ordered to be destroyed at once. This is a most erroneous proceeding, as it leaves the person bitten under the dread of hydrophobia for months. The dog should be chained up, and supplied with food and water, when a few days will prove whether it is suffering from canine madness or not. The disease in the dog is not more prevalent during hot weather ; an ignorant prejudice, which has been extended by the recent police regulations in London.

Adder or Viper Bites.—The Adder or Viper is the only poisonous reptile in these islands. The newt, or eft, toad, slow-worm, and common snake, which are by some ignorantly supposed to be venomous, being all perfectly harmless. The bite of an adder is usually followed by great pain, extending up the wounded

limb, and very considerable swelling; the patient suffers also from great depression and faintness. In very weak constitutions an adder-bite has proved fatal when no remedies have been at hand. When a person is bitten at a distance from any habitation, it is advisable to tie a string tightly around the limb above the wound; this prevents, to a great degree, the absorption of the poison; or the wound may be sucked with perfect safety, provided the operator has not cracked lips or a sore in the mouth. The best application to the wound is salad oil, gently rubbed in; and the faintness of the system must be remedied by small doses of brandy or any other spirit and water, frequently repeated and continued until the patient has recovered from the great depression produced by the poison.

Stings of Bees, Wasps, and Hornets.—The defensive stings with which these insects are furnished at the extremity of their bodies, when used, conveys a portion of poison into the wound. The pain produced is very great, and the swelling frequently considerable; sometimes the sting is left in the wound, and increases the irritation.

In all cases it is necessary to extract any portion of the sting that may be left behind; afterwards, a drop of solution of pure potash (the Liquor Potassæ of the druggist) may be applied with the point of a needle. The blue-bag used in washing is often applied for the same purpose; its efficacy depends most probably on the alkali of the soap it contains. The bites of all insects, as gnats, harvest-bugs, &c., may be similarly treated.

MINERAL POISONS.—The mineral poisons most likely to be taken, either accidentally or otherwise, are the stronger acids, arsenic, and phosphorus.

Acids.—The acids used in the arts, or for domestic purposes, are sometimes accidentally taken. Sulphuric acid, or oil of vitriol, from being employed in cleaning copper and other articles, often falls in the way of children. It is, when undiluted, a colourless, heavy, oily-looking liquid, which is corrosive in the highest degree; a very small quantity, taken in a pure state, causes death; it should not be kept for domestic use unless in a very diluted state.

Nitric acid, or aqua fortis, and Muriatic acid, or spirits of salts

both of which are used in the arts, are occasionally taken, and are violently corrosive.

Oxalic acid, in a pure state, is a white solid, closely resembling Epsom salts in appearance, for which it is unfortunately sometimes mistaken ; it is, however, readily distinguished by its intensely sour taste. When dissolved, it is used in cleaning boot-tops and other white leathern articles. If swallowed, its corrosive effects are similar to those of other acids.

The action of acids on the throat and stomach, when in a highly concentrated state, is so violent and rapid, that no antidotes are able to prevent death ; but in a more diluted state their corrosive properties may be neutralized in time to prevent a fatal termination. In all cases, water, which acts by diluting, and so lessening the corrosive properties, should be *instantly* given, and no time should be lost in administering antidotes of an alkaline nature, as these are capable of neutralizing entirely the properties of the acids. Soap, thinly scraped and mixed with water, or powdered whiting, are usually at hand ; chalk, magnesia, or carbonate of soda are also equally effiacious, and that remedy should be given which can be obtained with the least delay. Life has been saved by instantly administering the white-wash scraped off the walls and ceiling, and rubbed up with water. As all the substances above mentioned are in themselves perfectly harmless, there is no injury in giving them in considerable quantities.

Arsenic.—Arsenic is often used by farmers for steeping seed wheat, to prevent its being attacked by insects. When pure, it is a white powder ; but is now always mixed with soot or some colouring substance before it is sold, to prevent its being used designedly as a poison, or taken by accident. There is no known antidote to this most fatal poison, and the immediate administration of an emetic, provided vomiting has not ensued from the action of the poison itself, is the only means to be recommended.

Phosphorus.—This substance, in a pure state, is not likely to be taken as a poison ; but it enters largely into the composition of Congreve or Lucifer matches, and in this form has, in several instances, proved fatal to children who have sucked them. There is no known antidote to phosphorus, and an immediate emetic is therefore to be given.

APPENDIX.

THE following suggestions respecting the cheapest and best kinds of food for those persons who are very poor, is taken, by permission of the Author, from Dr. Edward Smith's "Practical Dietary." London: Walton and Maberly.

THE CHEAPEST AND BEST KINDS OF FOOD.

BREAD AND FLOUR.

Select households or seconds bread or flour.

Do not eat bread when it is new, but keep bakers' bread one day, and home-made bread three days, before it is eaten.

Do not keep it too dry, but cover it up in an earthenware pan. When it has become dry, make it into puddings, or add it to broth.

Bake at home if you have an oven and firing.

A labourer should eat daily nearly 2lb., the wife and growing boys above ten years of age, 1¼lb. to 1½lb., and every child as much as it desires. Eat it slowly.

If you are very poor, spend nearly all your money on bread.

MILK.

New milk is better food than skim milk.

Skim milk is a cheaper food than new milk, and when used for a pudding you may make it as good as new milk by adding a little suet (say ¼oz. or ½oz. to each pint).

Make it into hot porridge, with flour, or oatmeal, or rice and bread, and add a little salt; and, by way of change, use a little allspice.

Make puddings with it and rice, &c.; and when you make a baked or boiled flour pudding, use skim milk instead of water, if you can get it.

When it is a little sour do not boil it, but warm it, and add some kind of spice and bread. If you add a little lime-water to it, it will become less sour.

Bread and milk-porridge make the best breakfast and supper for husband, wife, and children.

Butter milk is a very good and cheap food.

Warm and spice it in cold weather.

Whey is food, and is a much better drink than water or beer.

Get as much of it as you can, and particularly if you cannot obtain milk.

Every member of the family should, if possible, have two pints of new milk, skim milk, or butter milk daily.

With plenty of bread and milk, there will probably be health and strength, and no doctor's bills.

PEAS.

Use split peas, or, if you buy whole peas, sieve out the skins (when you cook them) before you give the food to the children.

Cook them well.

Make them into soup with meat, or bacon, or with the liquor from meat, bacon, or broken bones, or with a little dripping or other fat, and add a little flour and fresh vegetables, if you have them. Flavour the soup with salt, pepper, and such dried herbs as thyme, mint, marjoram, and rosemary. Do not make it too thick. Eat it when quite hot.

Make them into pudding by boiling them well in meat or bacon liquor, season with pepper and salt; or in water, with fat and seasoning. With plenty of fat and bread they will make a good dinner.

If you bake your bread at home, add sometimes 1lb. of pea-meal to the stone of flour, and it will make a more nutritious bread.

They are very strong food for both grown people and children, and should be eaten once or twice a week all the year round.

INDIAN CORN MEAL.

Make it into—1st. Hasty pudding, by sprinkling it into boiling water and boiling it for a short time. Eat it with milk, treacle, sugar, or butter.

2nd. Cakes, by stirring it well in hot water or skim milk, and then baking it in the frying-pan, or Dutch oven, or upon the hot hearth; or spread upon a board and lay near to the fire. Eat them hot with milk, butter or treacle.

3rd. Puddings, with milk, fat, and spice.

GARDEN VEGETABLES.

Potatoes are the best of all garden vegetables.

When they are grown by the labourers they cost only the rent of the land, manure, and seed, and are therefore very cheap food; but when they are bought they are a very dear food—much dearer than flour.

Get half an acre of potato ground, if you can, in the garden or field, and plant it chiefly with potatoes, so as to have enough to supply your family through the winter and to feed a pig.

You will thus save bread and gain bacon.

Obtain good seed, and have both early and late potatoes.

Do not eat potatoes extravagantly when they are young and plentiful, and when, with the warm weather and harvest, you are pretty well off; but keep a proper quantity for the winter (if they are not diseased), when you will have less money to buy bread, and will want more fuel and clothing.

Do not peel them before boiling, unless you have a pig to eat the peel, but boil them first and peel them as you eat them.

Carrots and parsnips are very good vegetables, and should be grown plentifully, or bought from your employer at the wholesale price.

They are not cheap when bought retail.

Besides making a dish of vegetables, they are very useful in making soup, and to eat with boiled meat or bacon.

Do not cover your garden ground with much cabbage, as it is not equal to potato as food; but there should be some to eat in the spring before potatoes come in.

It gives but little nourishment, and bread is almost as much required with as without it, but it makes a relishing dish when boiled or fried with bacon or fat.

Do not grow many peas and beans unless you have plenty of both ground and potatoes.

Have a little celery, parsley, and other pot herbs, with mint, thyme, and rosemary for dried herbs, and grow as much fruit as you require.

Above all things, grow enough potatoes.

THE PIG.

Keep a pig if it be at all possible to get food for it. If it should cost you nearly its value you will have saved the money, and have it then for use; but if you manage it well you will gain money by it.

Buy it at ten to twelve weeks old, and feed it on the small potatoes, potato peels, and other waste from the house, and on the spare cabbage and cabbage stalks and roots from the garden.

If you can let it run on a common it will eat the acorns and roots, and find nearly all its food. Gather all the acorns you can for it.

Half an acre of potato land will grow enough potatoes for yourselves, and also for your pig until you put it up for feeding.

Whilst growing, give it a little mill stuff at a cost of 6*d.* to 1*s.* weekly, and also a few crushed beans sometimes. The manure will pay for this food.

When you have put it up for feeding, give it about two stones of meal weekly, besides the other food. A mixture of two stones of barley-meal and one stone of pea-meal is the best food; but it costs more than sharps and barley-meal.

When you have your potato crop and have bought a young pig, the extra expense will be 6*d.* to 1*s.* per week for about twenty weeks, and 3*s.* a week for eight or ten weeks, and you will have a pig weighing fourteen to sixteen stones, and worth from 5*l.* to 6*l.* Its share of the potatoes will cost you in rent and seed 20*s.* to 30*s.*, and the meal 40*s.* to 50*s.*, and you will gain 30*s.* to 2*l.*

MEAT.

The cheapest butcher's meat is cow's cheek, sheep's head, liver, ox heart, and sometimes pig's head.

Boil the head and cheek, and with the liquor make broth, with garden vegetables and a little oatmeal at one time, and barley, rice, or peas at another. Flavour it with dried herbs.

Do not make the broth too salt, and do not give the children too much of it at once.

Keep the liquor, without adding anything to it but salt, in a well-scalded pan in a cool place, to prevent its becoming sour, and do not make more at one time than can be eaten in about three days.

Eat a little meat every day, and do not eat nearly all of it on Saturday night and Sunday.

Liver should be cut into thin slices and boiled or fried with bacon. Cook it well, but not with a hot fire, and do not make it dry and hard. See that it looks healthy.

Make the liquor into broth, or fry potatoes or cabbage with the gravy.

Heart should be roasted whole, and on the following days cut it into thin slices and warm it up in a little warm water and seasoning it in the oven or frying-pan; or cut it at first into slices and fry it.

The low-priced fat pieces, as the brisket and thin flank, are not really cheap, but when bought they should be boiled, and the liquor be made into broth. Do not buy them when salted, except very rarely.

The cheapest cuts of meat are from the thick flank and round.

The neck part of beef is tough, and must be gently boiled or stewed.

If you like fat meat, buy breasts of mutton.

If you can buy a joint at once, the cheapest are legs of pork and the aitch-bone of beef (if it is well cut). Make broth from the bone of the latter, a stew or pudding from the thin side, and roast the remainder, or roast the whole, at once.

Do not usually buy young pickled pork, sausages, or black puddings.

If you can clean tripe and cow-heel, buy them occasionally. Clean and cook them, and use the broth.

Buy or beg uncooked bones for broth.

The cheapest bacon is American bacon.

Buy the part about the shoulder, and boil it. Make pea soup from the liquor.

Do not buy the expensive parts of English and Irish bacon unless you can afford it. If you can buy a large quantity at a time, the cheapest piece is the top end of the flitch, including two ribs, called the "fore end."

FATS.

Obtain as much dripping as possible from your richer neighbours, or buy it at the shop when its price does not exceed 7*d.* per lb.

If you can buy the fat which butchers cut off the loin and neck of mutton at 5*d.* per lb., do so, and melt it down, or cut it into bits and add it to puddings, or fry the vegetables with it.

Use the fat of American bacon for the same purposes.

Do not buy much butter or lard.

Fresh butter is a very dear food.

There are very cheap kinds of butter sold at 7*d.* to 10*d.* per lb., and if the flavour is not very good, they are more economical than fresh butter at 1*s.* 4*d.* and 1*s.* 6*d.* per lb., and if you are poor, should be preferred. Buy only a little at a time, as it may not keep well.

Fats of some kind are most necessary to health, and particularly for growing children and youths who cannot obtain sufficient new milk.

TEA.

Tea is a very dear food.

When made very weak it is only useful from the warm water, sugar, and milk which it contains ; yet 1 oz. of tea costs as much as twelve pints of skim milk in Devonshire.

If you are very poor, do not buy any tea, but spend your money in bread and skim milk.

If you are less poor, drink tea only rarely, as on Sundays or special occasions.

The husband, wife, and children, all need better food than tea.

Never take tea without real food, as bread ; and never regard tea as food.

When you cannot obtain sufficient milk, and must drink tea, let it be weak, and add as much milk as you can to it ; but it is then better to make broth for breakfast and dinner.

BY THE SAME AUTHOR.—PRICE ONE SHILLING.

THE HANDBOOK OF HOUSEHOLD MANAGEMENT AND COOKERY.

Compiled at the request of the School Board for London.

BY W. B. TEGETMEIER.

London : Macmillan and Co. 1877.

THIS work was written at the request of the School Board for London as a Scholar's Hand-book on the general principles on which the processes of cookery and the sanitary management of a home depend. The Appendix contains a series of 150 recipes, arranged in Twenty Lessons for Schools, as given in the Board Schools by the Teachers of the National School of Cookery.

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