HELPS TO HEALTH:

THE HABITATION, THE NURSERY, THE SCHOOL-ROOM, AND THE PERSON,

WITH A CHAPTER ON

PLEASURE AND HEALTH RESORTS

BY

HENRY C. BURDETT,

FOUNDER OF THE HOME HOSPITALS ASSOCIATION FOR PAYING PATIENTS.

AUTHOR OF "PAY HOSPITALS OF THE WORLD;" "HOSPITALS AND THE STATE;" "COTTAGE HOSPITALS, GENERAL, FEVER AND CONVALESCENT, WITH FIFTY BEDS AND UNDER;" "THE RELATIVE MORTALITY OF LARGE AND SMALL HOSPITALS;" "HOSPITALS WITH FIFTY BEDS AND UPWARDS, THEIR ORIGIN, CONSTRUCTION, AND MANAGEMENT," "HINTS IN SICKNESS," ETC., ETC.

WITH NINETEEN ILLUSTRATIONS

LONDON

KEGAN PAUL, TRENCH & CO., 1 PATERNOSTER SQUARE

1885

"Go, little book, God send thee good passage;
And specially let this be thy prayere,
Unto them all that thee will read or hear,
Where thou art wrong, after their help to call,
Thee to correct in any part or all."

Chaucer.

CONTENTS.

CHAPTER VIII.—THE INTERIOR ARRANGEMENTS OF THE HOUSE.

HAPTER IX.—VENTILATION, WARMING, AND LIGHTING.

CHAPTER X.—MATTE IN THE WRONG PLACE.

CHAPTER XI.—HEALTH RESORTS.

CHAPTER XII.—SANITARY POWERS AND DUTIES OF THE CITIZEN.

CHAPTER XIII.--URBAN SANITARY OFFICIALS.

APPENDIX.

INTRODUCTION.

ONLY a few words appear to be necessary in introducing this little book to the public. In the course of a pretty long experience in a variety of capacities, it has often happened to the author to require some plain and simple handbook in which the main principles of hygiene could be found, unencumbered with the technicalities by which professed sanitarians too often obscure their meaning. Nor, despite the flood of literature upon the subject of health, which has been provoked by the recent International Exhibition at South Kensington, has the admitted desideratum been quite met of a comprehensive and yet easily understandable text-book on the general laws of personal and public health.

It may scarcely be credited, but it is none the less undoubtedly a fact, that no book yet published contains, in a handy form, the information which an ordinary person can desire to know about health and all that affects it. The aim of this book, therefore, is to give, with sufficient amplitude, but in the fewest possible words, precise information concerning matters which affect the health and comfort of every class, from childhood to old age. The classification and arrangement of the various subjects treated have been carefully thought out, and, for further help to the reader, an exhaustive index has been added. It is believed that anyone who desires to know what he can do to promote his own and his family's health, as well as that of his neighbour, will find that this,

the second volume of the "Help Series," contains just the kind of information he requires, in the briefest and simplest language. At any rate this has been the aim of its author, and if experience proves that this object has been attained, he will be more than satisfied. To be useful, interesting, and reliable is the mission which this volume is published to fulfil.

In the compilation of the present work, the author has enjoyed the co-operation of several friends, experts in their different departments. Amongst these willing helpers he desires especially to name Mr G. H. Percival, M.B. Lond., Senior Surgeon to the Northampton General Infirmary, who has contributed many of the medical details which appear in the course of the book; Mr Keith D. Young, Architect to the London Fever Hospital, who has written upon matters dealing with the structure and internal fittings of houses; Surgeon-General Moore, C.S.I., who has collected together many interesting and valuable particulars on the subject of Health Resorts; and Surgeon-Major Billings, M.D., of the United States Army, from whose published utterances most of the information concerning ventilation and steam and hot-water heating has been derived.

It remains only to add that the author's object has been throughout to make the book as concise and practical as possible, and that any suggestions for improvement will be at all times gratefully welcomed by him.

The Lodge, Porchester Square,
London, W.

CHAPTER I.

THE NURSERY.

THIS part of the work is intended to deal only with such points as may conduce to the health and well-being of the child without reference to illness, which has no proper place in this book. At the very commencement we are met with the difficulty that it is very easy indeed to say what ought to be, but in many cases impossible to carry out the advice given. Thus, taking as a model the most recent work on home hygiene that has appeared, it might be said:—"The day-room should be a quiet cheerful room apart . . . with double doors . . . a sunny aspect, large low windows, a cheerful prospect, and possibly a separate entrance or ready means of going out of doors. The bed-rooms near together, and near to the chief family room, should make a system of their own, with clothes-room or nurse's-room, dressing-room, bath-room, and closet or scullery attached. A separate staircase is always a convenience, &c., &c." Or again, quoting from another recent work:—"Gas lights should never be admitted into a nursery or play room. . . . The typical light would be the incandescent electric light of Edison." The writer, however, acknowledges the impracticability of his plan, and allows for the present the use of *Colza* oil or candles. Surely there is too much nonsense talked about these things now-a-days. Has any one ever entered a nursery which would fulfil all the above requirements? The best arrangements should certainly be indicated, but it ought further to be shown how far

the different details were essential, and what modifications could be permitted to suit the numerous and varied circumstances of each case. Throughout this work such is the object sought to be attained, and it is hoped that the various recommendations may be found practicable, useful, and efficient, whilst not comprising in any respect the essential laws of hygiene.

Arrangement of the Nurseries.—The old division into day and night nursery is still the best and most practicable. They should be within easy access of each other, and preferably with a passage between them to admit of their total separation for the purpose of efficient alternate ventilation. For many reasons the top floor is the most convenient for these rooms. They are then away from the kitchen and from the occupants of the ground floor, and the noise inseparable from healthy children is more distant from the business part of the house. A north aspect must be avoided, but for the night nursery an aspect due south is not altogether desirable, as in summer-time—when the children go to bed in the middle of the day—the room is apt to get very hot and uncomfortable. A small gate with a fastening should protect the head of the stairs. A bath-room, separate closets, &c., may be added, but cannot be regarded as essential, especially as the great majority even of recently built houses are not provided with the luxury of a bath-room.

Floors.—Polished floors are out of question in the nursery; they will occasion frequent tumbles, and the noise from the children's play will be at times unbearable. Linoleum is about the best covering, though it is expensive. It has, however, the great advantage of being easily cleaned. Pieces of carpet and hearthrugs are dangerous, and at all times harbour dust and dirt.

Walls.—For many reasons it is desirable that the walls of the night nursery should be simply coloured. The colouring

is so easily renewed every year, and is so inexpensive that the room can be thoroughly purified after any outbreak of infectious disease without much call on the pocket. If a simple colour is thought too plain, it may be varied by a light colour above and a dark one below, with a stencil plate picked out in colour between the two. This is rather more expensive, but looks very tasteful. For the day nursery there are so many good ideas at the present day that only a few of the best can be noted. It may be premised that no paint and no paper should be used except it is varnished.

(1.) The upper part of the wall may be coloured, and a dado of scraps may be pasted on the wall below and then sized and varnished. Some use only coloured scraps, whilst many cut out the pictures from the illustrated papers. These form an endless source of amusement and instruction to the children. (2.) Or the upper part may be painted and varnished with the same dado. (3.) Very good nursery papers are now sold, the pattern in which consists of small squares, and each square has in it an illustration of some nursery rhyme or well-known child's picture. These, sized and varnished, are very amusing. (4.) The walls of the day nursery may be coloured as the night nursery with stencil pattern, &c., or paint may be used in the same way and then varnished. *Two* coats of paint with two coats of varnish will last for years, and may be periodically cleaned with carbolic acid and water. One word about the ceiling. This is invariably whitewashed; if coloured with French grey, or a good blue, however, it looks much better, and is less fatiguing to the eye. The doors, cupboard-doors, skirting-boards, and the like, may be painted and varnished. They are generally very tame and uninteresting. The following arrangement has been under the writer's notice, and is a vast improvement to a room. The upper small panels of the doors and cupboards were filled in with oleographs and gilt-beading

round the edge of the panel. The larger panels had large Japanese pictures cut so as to just fill the panel. They are very inexpensive, may be pasted on by the lady of the house in a very short time, and aid greatly to brighten the nursery. As to pictures for the walls, those out of the Christmas numbers of the various illustrated papers are much the most amusing for children. The ordinary black and gold frames are the nicest, and are as inexpensive as any. Where all papers are varnished, there will be no danger from the unlooked-for choice of an arsenical wall paper, and this, except the paper is tested, is the only safeguard. Contrary to the general opinion, the colour is no criterion, for arsenic enters into the composition of a large percentage of all wall papers of the present day.

Choice of Colours for the Walls.—In colouring the walls and ceilings of a nursery much must be left to individual taste; and too close an adherence to the principles of the decorator's art need not be insisted on. At the same time it is desirable that no very glaring defiance of the laws of colour should be permitted. Early impressions are often lasting. There is not one of us, who can let memory take him back to his childhood days, who does not recall the pleasing or terrible ideas which were associated with some object seen in our nursery or playroom. Perhaps it was the graceful lines and correct proportions of some old cabinet, sent to the nursery or attic because it was not good enough for any other room, that we still think of with pleasure. Or it may be the curious specimens of carving on the four-post bedstead, which our young minds converted into the horrible faces of a tormenting fiend, as we opened our eyes in the early dawn. Let, therefore, the surroundings of the developing intellect be always true, and in such things truth is almost synonymous with beauty.

We have already said the ceilings of nurseries ought to be

coloured blue or French grey in preference to white, which latter is of all colours or no-colours the worst for the purpose, and should be universally discarded. The difference which this one thing will make to the appearance, and comfort, and beauty of a room is almost incredible, and when once adopted there is no likelihood of its being abandoned. A blue-green ceiling nearly always looks well, and it will be a further improvement, especially when there is no cornice, to have a paper margin, a few inches wide, having a ground colour of a slightly darker shade than the ceiling, and running through it a floral or classical design with various shades of brown, red, secondary green, and blue. Paper centre-pieces can now be got for a few shillings each, and they give a look of completeness and finish to the ceiling, being often as decorative as the plaster "ornaments and enrichments" are ugly. It is well to choose one having buff and gold among its colours, and primary red in very small quantities.

It will be asked, "But what will harmonize with this ceiling?" One of the best and simplest wall colourings would be a light orange, and for the woodwork, an Indian-red picked out with black; or preferably a dado of dark Indian-red, with doors and shutters of bronze green. A cream ceiling with pale turquoise wall and orange-red dado go well together, especially if the woodwork be dark olive-green. A dark blue dado with pale salmon wall and rather light blue ceiling does not look amiss, although somewhat common. The dado should be enriched with maroon-brown and yellow, and the ceiling ought to have a white or cream stencil pattern around the margin, with a very narrow line of vermilion on the white. A Venetian-red dado with a band of tertiary olive on which is a stencil pattern of lighter olive, blue and red, with the rest of the wall a tertiary olive of a greenish tint, would be another combination, and in

this case the ceiling had better be papered, a pattern being chosen in which orange and gold are somewhat prominent.

Should there be a cornice in the room it may be picked out with the three primary colours. If the blue look too blue it has been recommended, as the space in the moulding cannot possibly be increased, to modify the effect by putting more orange in the yellow, and more scarlet in the red. So if the yellow seem too prominent, alter the red to crimson, and give the blue a slightly purplish tinge. The primary colours must always be separated by a line of white, and we should remember that when a light and a dark colour are placed together, the light appears lighter and the dark darker.

Below the cornice a very pretty and cheap frieze about fifteen or twenty inches deep may be made with stripes of one of the nursery papers already referred to. A great variety of these papers can be had almost anywhere, and there should be no difficulty in choosing one to harmonize with the rest of the room. From the lower edge of the frieze border the pictures ought to be hung so that the cords are not seen interfering with the design of the frieze, whatever it may be. This treatment of the upper part of the wall has the advantage of presenting a pleasing variety, at the same time that it leaves the lower part to be finished in plain paint or distemper admitting of frequent renewal, a course often necessary for reasons we have already named.

The above are only a few of the more simple methods of treating the walls and ceilings of our nurseries, and the expense of any of them is very trifling. Unfortunately the great majority of house-painters have no notion whatever of choosing or arranging the shades of colour for a room, and consequently not a little trouble has to be incurred by those who employ them. It is, however, time well spent. There can be no better investment than the time we bestow on

anything that conduces to the happiness or comfort of "the children."

Ventilation and Warming.—These matters in their general relations are more fully dealt with in a subsequent chapter (IX.); but the following details could scarcely be omitted from a chapter which deals exhaustively with points affecting health in the nursery. Ventilation and warming must be considered together, as the one depends to a very great extent on the other. The windows and chimneys must be looked upon as the chief sources for the change of air in a room. The windows should always reach to the ceiling, and if they do not do so, Sheringham valves opening inwards should be inserted just under the ceiling, with an Arnott's or Boyle's valve opening into the chimney flue, or another Sheringham valve in the opposite outside wall. It is at the top of the room that all the heated foul air accumulates from gas-burners, &c., and great care should be taken in ventilating this part. An open fireplace only is admissible for the warming of the nursery; its use as a ventilator is too great to allow of its abolition. It may be usefully combined with a warm air-chamber and flues; and, in fact, some such system should always be followed in building new nurseries. The true principle to follow is to admit fresh warm air instead of cold into a room, thus obviating some of the numerous causes of draught. Other accessory sources of ventilation may be added at the fancy of the individual, such as vertical tubes, a ventilator in the centre of the ceiling leading to the outside air, or the simple and common plan of nailing a piece of wood under the bottom window sash, so that it does not quite shut, which allows a stream of air to enter, directed upwards between the two sashes.

Cubic Space.—As regards the amount of cubic space that should be allowed for each child, it has been put by some authors as high as 800 cubic feet. This, however, in practice

is found to be far too high, though, of course, where new nurseries are being built, and space is unlimited, there will be a great advantage in this allowance. Dr. Parkes informs us that the cubic space allowed for soldiers is 600 cubic feet, and he allows for children 2000 cubic feet of air per head per hour, as against 3000 for adults, leaving it to be inferred that 400 cubic feet of space should be allowed for each child. If possible, this should be insisted upon, but there can be no doubt that many nurseries are much more cramped even than this. Amongst the lower classes, in cases of overcrowding, magistrates refuse to convict unless the air space is less than 200 cubic feet for adults. The London School Board allow only 130 to 117 cubic feet for each child, but this is decidedly too low, and dangerous to health. Taking, then, 400 cubic feet as necessary for children, and 600 for an adult, a room 16 feet long, 10 wide, and 9 feet high will suffice for a nurse and two children. When the children are out for their walk let the windows be thrown open top and bottom, and shut shortly before their return. The bedroom window should never be quite shut at the top, except in very cold weather; in fact, some people insist on their children sleeping with it open even in winter. It is a great mistake to imagine that night air is dangerous to children. As a matter of fact, in towns the night air is the purest.

Lighting.—In spite of numerous objections, gas is the common way in the present day of lighting rooms, and, notwithstanding all that may be said against this system, it will probably still be used. The fact is, that there are so many advantages in using gas that they quite outweigh its disadvantages, and, with proper precautions, it does no harm. It is convenient, always ready for immediate use, out of reach of the children, and not liable to be pulled over by them and upset (as in the case of lamps and candles). There are now, too, so many plans for carrying off the products of combustion

that gas is practically harmless. The most simple plan is to have a large bell glass over the globe, which opens at the top into a short, wide tube, leading into the chimney. This small apparatus can be fitted into any chimney for the trifling sum of 15s., and answers admirably. In this arrangement the gas must be placed over or near the fireplace. If it is desired to have it in the centre of the room, however, there are now numerous arrangements for carrying off the products of combustion by a flue through the ceiling, the gas being burnt in a globe communicating with this flue, so that no difficulty should arise in practically rendering gas harmless for nurseries. In country houses it is a case of Hobson's choice, and lamps or candles must be used. In the event of the former being chosen, Colza oil should be preferred to paraffin on account of the absence of smell and of its non-inflammability.

Furniture.—There should be no useless curtains and bed-hangings to obstruct the air, and cupboards built into recesses in the walls are preferable to chests of drawers, as they do not harbour dust and dirt. There should be no unnecessary cupboards, but, as far as practicable, clothes, linen, &c., should be stored in a separate room. This must depend greatly on the size of the house and the number of children. Things used daily are most conveniently kept close at hand. Practically, cupboards will be required for clothes, linen, and a certain amount of crockery; a separate one should be provided for the children's playthings, and a small locked one for the safe keeping of poisonous or dangerous articles, as medicines, knives, &c. A high fender fastened by a hook to the sides of the fireplace is necessary to protect from burning, but the children should be taught never to throw things on the fire. The bedsteads and cots should be made of iron, and those cots are to be preferred in which the sides are made of close work, not bars. Children often get their arms or feet

through the bars, and, in their ignorance of how to release themselves, may give their joints a serious twist or sprain. There must be a table in the day nursery for meals, with a drawer in the centre for the tablecloth. When the child first sits up to meals, the ordinary cane-bottomed chair with a high seat and a stick to prevent it from falling, may be used. As it gets older, the choice of a good chair is more important. It should be high and straight at the back, with a narrow seat, so that the spine may be supported, and the child may not sit in a heap with its spine curved. The mattresses must be made of horse hair. When sheets are used, calico ones are to be preferred, as they are warmer and less expensive than linen. For keeping the infant's food hot when it requires feeding in the night, the following is a very simple plan:—When the nurse retires for the night she boils the milk and puts it into the bottle—previously made quite hot; the bottle is then corked, wrapped in thick brown paper, and then in a flannel folded several times, both the flannel and the paper being previously warmed. This is then put at the head of the nurse's bed, under the pillow, when it is ready for use immediately, and will keep hot for at least six hours. Other means of heating the food at night are (1) by means of a bracket over the gas-burner in a small saucepan; (2) if there is no gas, by means of one of the small spirit-lamp tins known as Etnas. There must be a separate cot for each child, and, for the purposes of ventilation, there must be an open chimney in the night nursery, always kept open, even when there is no fire.

Other articles of furniture call for no comment.

Playthings.—These should be harmless, should tend to secure proper exercise for the child, and should combine instruction with amusement as the child gets older. Under the first head all the common tin toys now made, and all playthings

painted with bright and dangerous colours, which children are apt to suck, must be condemned. Wooden bricks, wooden and india-rubber animals, and dolls, are safe. To secure exercise, balls, hoops, the French boat, the rocking horse, tricycle horse, a swing, and the like, are recommended. Picture alphabets, puzzles, and things which help to instruct the child after the Kindergarten system, can with advantage be gradually and almost imperceptibly added.

General Directions.—Regularity is the first principle to be strictly followed in the nursery. This is especially the case with feeding, but applies to other details. The child may be made almost an automaton in this respect, looking for and enjoying its regular routine of life, and flourishing greatly thereby if it is arranged on a proper system. On the other hand, if a child is accustomed to take its meals at irregular times, or to have tit-bits of divers sorts between meals, it will be continually expecting such luxuries, and will fret if they be not forthcoming, whilst the regular meals will be neglected. The same rule applies to walks and amusements. Children should be taught to play with and amuse each other, and not continually to look to their elders to provide them with games. If the weather is bad, so that they cannot get out of doors, they will become fretful and require some extra amusement: otherwise a well brought up child will amuse itself for hours with the most trifling toys, whilst another under the same circumstances will be a nuisance to itself and all about it. So, again, it is necessary to insist that the nurse shall not argue with and contradict her charges. It is astonishing how easy it is to lead and divert the attention of a child, and this plan must always be followed or permanent injury will be done to its temper. Unless a nurse possesses this necessary tact she is worse than useless, and should be at once dismissed.

Cleanliness in the nursery is another point to be insisted

upon. All dirty and soiled linen must be at once removed. On no account should any washing of dirty clothes and drying at the nursery fire be permitted, though unfortunately it is frequently seen. The floors must be regularly and thoroughly cleaned, and any bath-water or slops spilt on the floor should be immediately wiped away. The authority of the nurse must at all times be upheld, and the child must not be allowed to appeal to its mother in the hope of getting something just forbidden by the nurse. A good nurse ensures the respect and good management of her charges without any trouble. A nurse without tact and discretion causes constant appeals to the higher authority from both sides.

Sleep.—Children vary so much as regards their capacity for sleep that it is almost impossible to lay down strict rules for them. For the first few months of life they sleep and eat alternately, if in a healthy state, waking only at regular times for their meals. If a child is fretful and cries, waking frequently, it is a sign that something is wrong. Either the food does not agree with it, its dress is uncomfortable, or it has kicked itself into an awkward position. It is a mistake, however, and one usually made, to imagine that every time a child cries it is hungry. Often the reverse is the case, yet no sooner does the poor child cry than it is immediately crammed with more food, and its sufferings are then increased tenfold. As children get older and begin to take more notice, they will as a rule wake early in the morning, when they must be washed and dressed, and afterwards be fed. They will then often go to sleep after this, to them, somewhat fatiguing process for one or two hours, when they must be taken out for a walk. On their return from the walk, they are again fed, and they will then sleep for another two hours or longer. After they are a year old the mid-day sleep should still be encouraged, and continued as long as the child shows any in-

clination for it. It is mostly a question of habit, and can generally be kept on till the child is four or five years old. When out of doors a very young infant almost invariably sleeps, but when old enough to take to a perambulator, such habits should not be encouraged. When the child discontinues its mid-day sleep, it should have twelve hours rest at night. One hears occasionally of infants that never seem to sleep and yet do not suffer much in health, though they render life a torment to all around them. In these cases mismanagement is probably at the root of the evil. The child is either improperly fed or not fed at regular intervals, or perhaps suffers from some ailment unknown to the parents. If a doctor were consulted he would no doubt be able to relieve much of this misery.

Exercise.—When may a child be first taken out of doors? If in the summer time, it may safely be taken out about fourteen days after birth, care being taken that it is warmly clothed, but in the winter more discretion must be used. There is even at the present time a great deal of foolish prejudice on this subject. It is disgusting and repulsive to imagine the horrible way in which mothers are often made to spend their lives for the first month after their confinement. A change for the better has certainly been made in their diet, but it is still believed by many that fresh air is poisonous to lying-in women, and with the baby they are made to pass the days in a room hermetically sealed against the entrance of fresh air, with a roaring fire to amplify their torture. In this unwholesome atmosphere the poor infant spends the first months of its life, and when coddled to the state of an exotic plant, with a poor, pale face from want of air, it is totally unfitted to withstand any cold breeze. It is quite time that a crusade was waged against these senseless and dangerous notions. The causes of almost all children's diseases at the present day are want of air and want of proper

food. If any one will try the plan of sending out their children regularly from fourteen days old, except in very bad weather, they will find them grow up much stronger, much less liable to colds, and proof against bronchitis and many other diseases of the lungs and air passages to which children are so subject.

In one house we shall find the room well ventilated, the window opened daily, and the child out for a walk whenever the weather is at all practicable, whilst in another, under the sway of some antique monthly nurse, fresh air will be looked upon as a poison, and every horrible and uncomfortable measure will be taken to prevent the imaginary bugbear, "cold." It is quite time that medical men educated their patients out of these unhealthy notions, and declined to play second fiddle to an ignorant monthly nurse. Twice a-day are the proper and orthodox times for an infant to be carried out. Soon after it is six months' old it may be taken in a perambulator, well propped up with cushions, and when it is old enough to walk it should be taken out for a short run. As it gets still older and can give up the perambulator, it should be encouraged to run with a ball or hoop. A comfortable perambulator with a head to keep off the sun's rays, bicycle wheels and indiarubber tyres is the best. Those in which the child lies down are not to be recommended. The position is not comfortable when the child hears noises, and wishes to see what is going on around it, and the glare from the sky in summer is very distressing to the eyes and may permanently injure them. Unless it is raining hard, children should seldom be kept indoors for a whole day. Even in our English climate the days in a year when a child need be kept entirely indoors are exceedingly few. If the weather is very cold they must not be kept out so long, but there seems some provision in children by which they do not feel the cold nearly so keenly as a grown-up person, even though out of doors, and

not at the time warming themselves by exercise. The proper hour for the first walk is, if fine, very soon after breakfast. At least one walk in the day is thus secured, even should the weather change. The second walk in winter must be after an early dinner, and before the afternoon sun ceases to warm the atmosphere, and the damp begins to rise. In summer they should have an early tea, and go out in the cool of the evening. In the country, with a large garden, they may play out of doors most of the day in summer. Should a child be fat and heavy, it must not be encouraged to walk too soon, but exercise soon reduces some of its superfluous fat. When children are unable on account of the weather to get out of doors, they must, during some part of the day, be brought downstairs to another room whilst their nursery is thoroughly aired.

Baths and Bathing.—Contrary to what might be expected, a healthy child enjoys its bath, and often cries when removed from it. If a child does not take to its bath, it is generally because of the careless way in which it is administered. Care should especially be taken when washing the head. If water is swilled over its face so that it gets into the eyes and nose, the child will soon take a distaste to the bath. The head should be first well sponged, and then the body may have water dashed over it. Great care must be taken not to frighten the child. As regards the temperature of the bath, theoretically the thermometer should always be used, but in practice the nurse can judge by the hand. This is quite a sufficient guide, for the bath should never be hot: a tepid bath is the warmest that need be used even for a new-born child. In the summer time it will soon take a bath quite cold, and enjoy it. In the winter, of course, the chill must be taken off the water. When also from ill-health or want of reaction the cold or tepid bath seems to disagree with a child, it must be made warmer. The bath

should always be given in a warm room, and in winter the child should be dried and wiped near the fire. The child should always be bathed in the morning before it is dressed, and if there is plenty of assistance, another bath may be given at night. But where there are many children, and this is impracticable, it may be sponged over in the evening before it is put to bed.

The wiping should always be thoroughly performed with a soft linen towel, the friction promoting reaction. Soap must be used to remove oily and sebaceous matter excreted by the skin glands, and to keep the pores of the skin open. The common irritating kinds must, however, be rejected for the better forms of toilet soap. The so-called antiseptic soaps, especially terebene and sanitas, are very good forms. When the body has been well dried it is customary to dust the flexures of the joints with violet powder or fuller's earth. This is very necessary in the case of a fat child, where the folds of skin lie one over the other, and by the incessant rubbing and necessary confinement of perspiration a very obstinate kind of eczema is often caused. When there seems any tendency to this, the folds of skin should be washed two or three times a-day with oatmeal and warm water. Considering the tendency to adulterate violet powder, it is better to use well powdered starch, but lately powdered boracic acid has been introduced for these purposes under the name of "sanitary rose powder," and this form is far preferable to the others, as boracic acid is perfectly unirritating, and is one of the best antiseptics.

Teething.—Order of teething (first set of teeth):—

Between	4th	and 7th	months,	. 2 lower incisors.
„	8th	„ 10th	„	. 4 upper incisors.
„	12th	„ 15th	„	. { 2 upper first molars. 2 lower lateral incisors. 2 lower first molars.

Between 18th and 24th months,	2 lower canines. 2 upper canines.
„ 30th „ 36th „	2 last lower molars. 2 last upper molars.

Order of second set of teeth :—

About 7th year, . .	4 anterior molars.
„ 8th „ . .	4 central incisors.
„ 9th „ . .	4 lateral incisors.
„ 10th „ . .	4 anterior bicuspids.
„ 11th „ . .	4 posterior bicuspids.
„ 12th „ to 12½, .	4 canines.
„ 12½ „ to 14th, .	4 posterior molars.
„ 18th „ and upwards,	4 wisdom teeth.

The names of the teeth in order from before backwards on each side of the middle line are incisors, canines, bicuspids, molars. The period of dentition in infants is always an anxious one. At the best they are fretful and irritable, difficult to amuse, feverish, with little appetite, and almost constantly dribbling. To this is often added some more severe symptom, varying in different children, and occurring at the cutting of each series of teeth. Thus one child will have the symptoms of a regular catarrh or even of a mild bronchitis at these times, another an attack of diarrhœa, another an eruption of eczema, and another in whom the nervous system seems in a most irritable state, a series of convulsions. If excessive, these symptoms will demand the care of a doctor, but if slight more attention must be given to the ordinary rules of hygiene at these times, such as a rather lighter diet, attention to the bowels, care to prevent cold and the like.

Diseases of Children. — The causes of death in children are chiefly convulsions, diseases of the lungs, diarrhœa, and the acute infectious fevers. Convulsions are often

set up by some source of irritation in the system—improper food or clothing, or teething, whilst a convulsion may be the commencement of a serious illness, as one of the infectious fevers. It is never wise to neglect these, and medical advice must be sought. Diseases of the lungs are usually brought on from a system of over-coddling. If the rules given in another part of this chapter are carried out, there will be little danger from such maladies. Let the child always have plenty of fresh out-door exercise, mostly in spite of the weather, and let him be bathed daily in water as cold as he can conveniently bear it. Diarrhœa depends chiefly on the food and the state of health of the child. The feeding of infants is a most complex subject when they are at all out of health, and a doctor's advice must be sought in these cases. What will suit one child at these times will often make another very much worse, and it will take all the ingenuity of the best doctor to contrive a suitable diet for the child at some of these times. But above all things the commencement of a diarrhœa should not be neglected. It is from allowing it to run on that it becomes so unmanageable, and many a child has been lost from the mistaken notion of the nurse that a little purging is good for the child. Therefore, should the stools be too frequent, watery, much changed in colour, or very offensive, do not lose any time unless they improve in asking the aid of the doctor. Indirectly, diarrhœa may often be prevented by seeing that the opposite condition of constipation does not exist. Let the remedies for this condition, however, be limited to a little fluid magnesia, glycerine, or syrup of senna, and if these do not answer get further advice before using stronger remedies.

With regard to the acute infectious fevers, let no parent think that it is necessary for his children to have them, and that the sooner they have them and get them over the better. A mild attack in one child may develop a fatal attack in

another, and it is wicked to trifle with human life in this way. It is necessary to emphasise this caution, because of late years these fevers seem to have developed milder types, and it is certain they are not so severe as in former years. In the case, then, of an outbreak of one of these disorders —measles or scarlatina for example—let all measures be taken to strictly isolate the healthy from the sick. This is the chief and almost sole secret of preventing their spread. To enter into the minutiæ of these measures is not the province of this book, and we must refer to books devoted to the treatment of the sick for such details. One other disease, however, requires a passing word—typhoid or enteric fever. It is more prevalent in children than is generally supposed, and often escapes recognition. This is essentially a dirt disease, having its origin in foul air, foul water, and want of proper drains and sanitary arrangements. A separate bath-room and closet attached to the nursery is not altogether an unmixed blessing; in fact, every separate communication with a drain must in these days be looked on with suspicion, however well trapped it may appear to be. An ordinary bath in the nursery, which can be taken away and emptied down a drain in another part of the house, is a much safer arrangement, and on no account should any slop drains communicate with the nurseries. The drinking water and milk supply must also receive attention; but longer reference will be made to these in other parts of this work, to which they more properly belong.

Vaccination and Re-vaccination.—Vaccination should be performed between the second and third months, before the period of teething has commenced. The details of its performance must necessarily be left to the doctor, but every parent should insist on having four places made, and the supply of calf lymph is now so abundant that if he has any feeling in the matter he may insist on its being used. The

precautions with regard to the performance of vaccination are, however, so strict—thanks to the regulations of the Local Government Board—that very little danger of erysipelas or other skin disease is likely to arise. At any rate, all conceivable precautions are taken against such dangers. In every book on health the following table, compiled by Mr Marson, ought to have a place, especially as at the present day there is in some quarters a great outcry against vaccination. It shows the rate of mortality in cases of small-pox treated at the Small-Pox Hospital over a long series of years.

Classification.	No. of deaths per cent.
Unvaccinated, ...	35·
Stated to have been vaccinated, but no cicatrix,	23·57
Vaccinated—	
Having one cicatrix, . . .	7·73
Having two cicatices, . . .	4·70
Having three cicatrices, . . .	1·95
Having four or more, . . .	·55
Having previously had small-pox, . .	19·

This table ought to convince any reasonable being as to the good effect of vaccination, and also as to the necessity of a sufficient number of well-defined cicatrices.

With regard to re-vaccination, this trifling operation should be performed at fourteen to sixteen years of age. If quite unsuccessful, it should be again performed till, if possible, some result is obtained. The result as a rule is not so good as in primary vaccination, and sometimes it occasions a great deal more inflammation tending to the erysipelatous type. Re-vaccination may be said to practically give a complete immunity against death from small-pox, and to render even an attack of that disease exceedingly rare.

In a few quarters there is a prejudice against allowing

lymph to be taken from the arm. This is absurd, as the child cannot suffer at all from it, and if universal it would render the performance of the operation almost impossible. The prejudice seems to have arisen in the idea that it takes some peculiar virtue from the child, which is a most ignorant notion. It may, however, have also arisen from the fact that after the eighth day (when the lymph is taken), the arm gets still more inflamed, and this is put down to the fact of lymph having been taken; but in any case the arm is naturally more inflamed about the tenth day. No lymph is taken for vaccination purposes from cases of re-vaccination.

Dress in the Nursery.—Writers on this subject have mostly dealt with it from a pessimist point of view. Everything about the infant's dress is wrong from beginning to end, yet as a rule they suggest no change, and if they do they go to the other extreme, and advise such outlandish garments that no one will wear them. All these writings have not done much good, so it may be as well to examine the present arrangement of clothing, and see if by some means and additions it cannot be made to answer its purpose. But at the outset, what are the essential points in dress? First, it should keep the body warm in all parts; secondly, it should be fastened in such a manner that all tight bands may be unnecessary; thirdly, it should allow free escape of perspiration, by which any excess of temperature is avoided.

Ranking dress fabrics in their order as regards warmth, they stand thus—furs, wool, silk, cotton, linen. The first placed, however, are permissible only in very cold climates, and are not healthy, as they keep in the perspiration, and therefore do not conform to our third essential of healthy dress.

What is the present dress of an infant? First, a small shirt of very fine linen, a binder of flannel wound several

times round the abdomen and chest, a loosely fitting flannel gown, and over all an elaborately worked cotton dress. There are few objections to this, and with care it is as serviceable as any proposed in its stead. The linen vest serves to protect the tender skin from the chafing of the flannel. The flannel binder helps to keep the upper part of the body warm without disturbing the arrangement of the clothes in that part every time the napkin has to be changed. It also serves to support those parts which certainly at this time of life do require support, it helps to mitigate the pressure of the strings and bands of the upper garments, and if it is not put on tightly, but with care and judgment, there is not the least objection to its use. A long flannel gown with sleeves is a *sine quâ non.* Napkins must be used and frequently changed. All waterproofs over them must be strictly forbidden, or many troublesome skin eruptions will appear; but a square of flannel instead of the waterproof will aid in protecting the other garments.

The worked dress is for ornament, and to this some exception must be taken. It is generally too long and too tightly fitting, with too many strings. If made to reach one foot lower than the child's feet, instead of three, or perhaps sometimes more, it might be made to look just as pretty, and would be more serviceable for the many manipulations required by infants at this age. The sleeves are generally so tight and difficult to get on that it is a wonder the child's arm is not often dislocated in the struggle. They could easily be made loose, when they would also allow more free movement to the child's arms, so necessary for it at this time. A band round the waist is doubtfully permissible, but all strings round the neck should certainly be abolished.

When the child goes out of doors a number of ligatures are put round its neck, to keep on a thick hood and to tie in place a thick woollen cloak. This might be

modified with great advantage. A woollen cap might be made to fit the head, and a cloak made loosely to button down the front, with wide sleeves, would be much preferable. As, however, children generally sleep when out of doors, a thick shawl wrapped well round them is more simple than anything else. It is at about the third month, when the child goes into short clothes, that the prejudice of fashion comes into full play. All the above garments are then changed for short ones, not reasonably shorter, but the very shortest that can well be imagined. The arms are left entirely bare as regards clothing, so are the shoulders and neck, whilst the lower part of the body as high as the waist is absolutely naked. Certainly for some months longer a napkin is worn, but not for the purpose of warmth, and when that is abolished a thin pair of drawers is substituted, also destitute of any property of warmth. The first part of this absurd dress may be rectified by putting a knitted woollen jacket with long sleeves under the frock, and many sensible people now use these for their children. When out of doors, too, thick woollen gaiters are put over the legs and thighs, but some such permanent arrangement for indoor wear is desirable.

Little more need be said regarding dress in the nursery. It is this sudden change to a semi-nude condition that is most reprehensible. As the child gets older its garments are gradually adapted to those of its elders, and they tend to get warmer and to cover more of the body rather than the reverse. The clothing of grown-up people is considered under its proper head.

Cleanliness in Clothing.—As far as possible, garments must be made of materials that will wash, and strict care should be taken to change them as frequently as necessary. Napkins should never be dried and then again used without being washed. No soda should be used for washing infants' clothes, but plenty of soap. Strict attention should be paid to the

airing of the clothes, so that they may be perfectly free from damp before being used.

Diet of Children.—This is an exceedingly large and varied subject, and one which admits of so many subdivisions that it is not at all easy to arrange them. It will perhaps be best to take the different diets suitable at different ages, under somewhat varying conditions, and then to refer to other details connected with this subject.

Diet from Birth to One Month old.—The child should, at this period, be nursed, if possible, by the mother. For the first twenty-four hours, and perhaps longer, there will be no milk secreted, but the child will not suffer in any way. On no account let the nurse give it a nasty mess of butter and sugar, and certainly not castor oil. The first milk secreted has a purgative action, and is quite sufficient. At first the child will require feeding every two hours, but an attempt should be made even directly after birth to induce the child to wake less frequently during the night. Children are creatures of habit, and it will not take long to teach them to wake only every four hours in the night. Some people advise that the child should be removed from its mother after its last meal at 11 P.M., and taken to the nurse's room. It must then be taught to take no more milk till 5 or 6 A.M., thus ensuring at least six hours' sleep for the mother. This is seldom practicable, though the mother in most cases should try to take more rest than is the rule. Much harm is done by the constant suckling during the night to which most women unwisely submit, with the worst results to both mother and child. During this month the quantity taken by a child at each meal is about two ounces, which is the quantity usually secreted by one breast. For the first month at any rate, there will in almost all cases, if suckling is carried on, be sufficient milk for the child without resort to anything further. But if the child is brought up by

hand, one regular plan must be commenced from the first, and should that not succeed another must be tried.

There is first the question of a wet-nurse. This, though theoretically the best, is not much followed now-a-days, and there are many difficulties and objections connected with it. It is not at all easy to be sure of the exact state of health and habits of the wet-nurse, but if a thoroughly reliable person is known with a child of as nearly as possible the same age, this plan should certainly have a trial. Failing this, the milk of some other animal may be tried, and though asses' and goats' milk have their advantages, yet they are procurable for the many with so much difficulty that they need hardly be considered, and we may look on cow's milk as the only substitute for the mother's milk. To render cow's milk as nearly as possible equal to human milk, it must be diluted and have sugar added to it in the proportion of half a teaspoonful to two ounces, or a moderate wine-glassful. There is no advantage in using sugar of milk as some advise—ordinary white sugar is preferable.

The objection to cow's milk is that it is liable to coagulate in thick curds, thus upsetting the stomach and bowels. This may be remedied by several expedients. (1) The milk may be boiled, which causes the curd to separate in a more flaky state. (2) It may have lime-water added to it instead of water, which has the same effect. (3) Condensed milk may be used, which from the processes it has undergone more resembles boiled milk. One or other of these processes may first be tried, and if unsuccessful the other can be substituted. If lime-water be added, it must at first be in equal proportions with the milk. The milk must always be new, or if it has been skimmed, cream must be added to it. The objection to condensed milk is the large amount of cane sugar it contains, and which has been added to preserve it. This renders it liable to cause flatulence in the stomach from its

proneness to ferment, and to promote excessive fatness in the child.* A milk called the First Swiss Alpine Milk is now advertised, which is simply milk evaporated down without the addition of any substance whatever; on the addition of two parts of water its composition is identical with fresh cow's milk. An artificial human milk and peptonized milk are manufactured and sold by the Aylesbury Dairy Company. These three varieties of milk certainly deserve trial in any case where there is difficulty in bringing up the child by hand.

Artificial Human Milk.—So many children suffer from the effects of being deprived of their natural food, owing to the inability of the mother to supply it, that the following substitute may prove of interest and value. In his "Experimental Researches in Pure, Applied, and Physical Chemistry," Dr Frankland describes a method by which a liquid of the same composition as human milk can be easily prepared from cow's milk. This liquid is stated by Dr Frankland to have not only saved the life of one of his own children, but to have proved itself of service in many similar cases in which young infants have been deprived of their proper nourishment. Allow one-third of a pint of new milk to stand for about twelve hours, remove the cream, and add to it two-thirds of a pint of new milk, as fresh from the cow as possible. Into the one-third of a pint of the blue milk left after the abstraction of the cream, put a piece of rennet, about one inch square, set the vessel in warm water until the milk is fully curdled, an operation requiring from five to fifteen minutes, according to the activity of the rennet, which should be removed as soon as the curdling commences, and put into

* Dr Cheadle asserts that condensed milk generally disagrees with children because it is given insufficiently diluted. The proportions he recommends are 1 part of condensed milk at first to 30 or 40 parts of water gradually increased till at six months the proportions are 1 to 10.

an egg-cup for use on subsequent occasions, as it may be employed daily for a month or two. Break up the curd repeatedly, and carefully separate the whole of the whey, which should then be rapidly heated to boiling in a small tin pan placed over a spirit lamp or gas, when a further quantity of casein separates, which must be removed by straining through muslin. Now dissolve 110 grains of powdered milk-sugar in the hot whey, and mix it with the two-thirds of a pint of new milk, to which the cream from the other third of a pint was added, as already described. The artificial milk should be used within twelve hours of its preparation, and it is almost needless to add that all the vessels employed in its manufacture and administration should be kept scrupulously clean.

Diet from One to Six Months old.—If suckled, the child will gradually take more at each meal, and will be able to go longer between the meals. First every three hours, then at four months every four hours should suffice, and after four months, feeding at night should certainly be discontinued. The last meal should be given at about 11 P.M., and then if properly educated the child will last till from 6 to 7 A.M. By this means the mother's rest and health may be assured.

If the mother's milk be poor and scanty, so that the child does not seem to thrive on it, or from any other reason, the mother should nurse the child night and morning only, and at other times one of the varieties of milk recommended for a child brought up by hand should be substituted. It is quite a mistaken and an exploded notion that the two kinds of milk—human and cow's—will not agree if used together in this way.

When a child is entirely brought up by hand, the proportion of the milk must be increased. At three months one-third lime-water may be used, and at four months one-fourth. At the same time the quantity may be gradually

increased from 2 oz. at one month to 4 oz. at three months, and from four months and upwards 6 oz. may be given. The time between the meals may also be increased as advised, for a child that is nursed.

Diet from Six Months to Twelve Months of age.—If still nursed regularly, one meal of some other food might now be introduced. Each doctor has his particular favourite. Let us confess to a liking for one of the malted foods. Liebig's —usually known as Savory & Moore's — food for infants, Allen & Hanbury's malted farinaceous food, and Mellin's food, are very good. One of the former as a rule is preferable, since the latter is so easily digested that mothers declare it does not satisfy their children; but for a delicate child this will prove an advantage. All these foods must be made with milk, and about one-third of a teaspoonful of the food is sufficient for a commencement. Others advise with milk a teaspoonful of thoroughly baked or boiled entire wheat flour, or a teaspoonful of oatmeal if there be constipation, or a scalded German rusk, or Robb's biscuit. At six months, five meals a day will suffice, and they may be thus apportioned—7 A.M., 10.30 A.M., 2 P.M., 5.30 P.M., 11 P.M. For a child partially suckled, one or two meals a day of one of these foods may be given, according to circumstances, with milk at the other meals.

A child entirely brought up by hand may at this age begin with one or two meals of one of the above foods, and gradually increase till it takes one or other of them, varied, if necessary, at each meal. Towards the age of ten months one of the following will form a good mid-day meal for a child, or they may be given alternately:—The yolk of an egg beaten up in a small breakfast cup of milk, a German rusk in a good teacupful of beef tea.

Diet from One to Two Years old.—From the age of six months the period of weaning should be commenced, with the

one meal of food as previously advised. A very varied list of suitable foods is given above, and by the judicious alternation of these, so as not to disgust the child, the time for leaving off suckling altogether will be reached. Thus from one meal the child may advance to two, then three, until weaning is arrived at. This plan will be more comfortable and healthy both for mother and child. The age at which the child should be altogether weaned must, to a certain extent, depend on the strength and state of health of the child, but as this book deals only with healthy children, the time may be laid down at from ten to twelve months of age, and preferably as near the former age as possible. Any suckling after the child is one year old must be emphatically condemned. After this age, if suckling be continued, the health of the mother will deteriorate, she will get weak and thin, suffer from neuralgia, headache, and great debility. As a consequence her milk will become thin and poor, the child will then suffer, begin to be cross and fretful, and the seed of future disease will be sown. Yet how common it is to hear women say that the child is so ill they cannot wean him at present, and how hard it is to convince them that the child is suffering only from the very process in which they wish to persevere! They mistake cause and effect with often disastrous results.

The age of twelve months brings us to the time when the child is weaned, and the three subdivisions we have been previously obliged to make are now merged in one—the child in future will be brought up by ordinary feeding. The meals may be given at the same hours, save that the 5.30 meal may be given a little later, and the later meal gradually discontinued by only giving a drink of milk. This will leave four meals a day. These may consist of bread and milk or oatmeal, rusk and beef tea, sago pudding with egg, potatoes and good gravy, getting on as the child approaches the age of two years

to bread and butter, an egg occasionally, minced meat and gravy, other light puddings for dinner, with always plenty of milk to drink. In a healthy child, at eighteen months the malted farinaceous food may entirely be abolished, though up to that age one meal a day may be advisable for some children. It is not advisable in a healthy child to try the vast variety of patent foods now so greatly advertised. The foods necessary to help a child through the first year of its life have been explained, and it is now safer to begin ordinary food, the composition of which is known, rather than to run the risk of disturbing its digestion with unknown mixtures.

The diet after the age of two years is necessarily much the same. Meat finely minced may be given daily, and vegetables may gradually be added to the diet, till at three years the child gets its treat of coming down to dine with its parents on Sundays or grand occasions, and its diet is thus gradually assimilated to theirs. It is needless to trace the child through any more years; what remains to be added may be included in our general remarks on this subject.

General Remarks on Food.—The above diets will prove very useful, but they require in parts some explanation, and what has been said must not be taken too literally. It is for this reason that so many diets have been given, to suit the idiosyncrasies of each child as far as possible. Thus one child will prefer a milk and farinaceous diet, another a meat diet, whilst with many the beef tea and rusk is a very great favourite, and it is difficult to get them to take to any other. On the whole, a meat diet of some kind once a day should be urged after the age of ten months. The farinaceous and malted farinaceous foods all contain too little of the nitrogen so necessary to a growing child, which deficiency is best supplied by some meat diet. In all cases such foods should be made with milk, which to a certain extent repairs that loss.

There is also great need for the supply of phosphates to a growing child; these exist in oatmeal, maize, and the entire wheat flour, but not in ordinary flour, hence the entire wheat flour is always to be preferred As the child approaches the age of three years it should be taught to take at times thin cocoa made with milk, or oatmeal porridge with perhaps a little treacle in it, for breakfast.

It now becomes necessary to tread debatable ground, and to consider a few doubtful foods. For example, pastry.—This, from its mixture of fatty matter with flour, only enables the digesting fluids to act on it with difficulty; it must be put down as not at all easy of digestion, and should only be given as a treat to elder children in good health. Sweets.—There is an intense craving in all children for sweets. This is a natural desire, as they are at this age certainly easily digested, and physiologically there are very good reasons for giving them to children. The harm is in giving them in such quantities that they spoil their meals. Fruit.—In summer time, fruit freshly picked and eaten at once is much enjoyed, it helps to quench thirst, and tends to prevent constipation. Fruit bought in shops that may have been kept several days, and is often only half ripe when gathered, should never be given; it is the ill effects of such fruit as this which has caused fruit to be too prematurely forbidden for children. Apples and similar hard fruits should only be given after being baked or stewed, whilst, of course, the idiosyncrasy by which some children cannot digest fruit must not be overlooked. Raw vegetables, as celery, radishes, and lettuces, are not good. Sponge cake is very light and wholesome—currants, however, in all forms are very indigestible, and all children are better without them. Wines or spirits must on no account be given to healthy children, but it is marvellous what a good effect alcohol has in some disorders of childhood. Infants in the first few months of life are dreadfully troubled with flatulence. The best and most easily obtainable remedy is a few drops of

brandy slightly diluted with water; it is far more serviceable than any other remedy. No other cases need be here quoted; this book deals with healthy children, and the diet of sick children is more fully considered in the companion work.*

Times of Meals.—These have been given with great detail, so that it is needless to recapitulate them; but if there is one thing to be emphasised more than another it is regularity. Irregularity, promiscuous meals, and feeding the child whenever it cries, are at the bottom of almost all the ills of childhood, and it would matter much less as to the diet of the child if the meals were given at such regular times that they could be digested with ease. How can a meal be digested if poured into a stomach already overladen with food, a condition which is already causing the child to scream from the pain of indigestion? Yet such irregularities largely prevail, and it cannot be wondered that children suffer so frequently and so seriously from stomach ailments. The child very soon becomes a regular machine if brought up properly, taking its food at regular times, and thriving thereon. If brought up irregularly it becomes very soon a nuisance to itself and all about it. The rule should be to give food only at stated times during the day, and to so largely increase the intervals at night after the first month that the mother may be able to take that rest which is so essential to her. These times have been already apportioned, and, from great experience in their use, we are thoroughly convinced that no one need look on them and treat them as absurd or Quixotic. Those who try them honestly will find that they conduce to health and good spirits in the mother—health, growth, and good temper in the child.

Cleanliness in Feeding, &c.—Milk, the natural nourishment of the child at first, is so liable to decomposition, especially in hot weather, that this forms a great drawback to its use. It should be received in vessels that have been well scalded, and

* "Hints in Sickness: Where to Go and What to Do."

kept in as cool a place as possible. The addition of lime-water obviates to a certain extent this tendency to decomposition by neutralizing the acid products of fermentation. It is useless now to write against the universal feeding-bottle, although the old-fashioned straight one was much the best. The present one with its complicated tubing is very difficult to thoroughly cleanse, and if cleanliness is not secured, permanent mischief is very soon caused to the child. The bottle should be scalded after every occasion of using, and the tubing thoroughly cleaned with hot water and a little soda. It should then be put in an open window to dry and thoroughly sweeten.

Other General Rules.—If the mother nurses her child let her be careful to live regularly, and to pay strict attention to all the ordinary rules of hygiene that conduce to good health. Let her live on good plain nourishing diet, take regular exercise, avoid over-excitement of all kinds; but above all, she must arrange to take the child at its accustomed times. Let her beware of acid fruits, strong purgatives, and other things likely to upset the child's digestion. If she suffers from debility, faintness, neuralgia, or other symptoms, let her consult the doctor as to the weaning of her child. Let her not feed the child if it comes downstairs irregularly, with anything that may be at hand. If the child suffers from diarrhœa, at once call in the doctor, and do not give the child medicine and continue the diet which is probably at fault. There is too much belief in medicine amongst some people at the cost of common sense. A good doctor is more useful in indicating what should be the diet of a child in a complex case than in prescribing medicine which is frequently unnecessary.

To give diet tables throughout the different ages would take up much space, and for the first few months of infancy would be a simple repetition of what has already been said. It is from the age of six months to about three years that most harm is done by a bad system of feeding. This subject

may be advantageously concluded by a list of a few serviceable diet tables during that period.

Six Months. (If nursed.)

1. About 6.30 A.M. Nursed.
2. „ 10 „ Nursed.
3. „ 1.30 P.M. One of the malted foods, beginning with one-third of a teaspoonful, gradually increasing to a teaspoonful in a bottle full of milk.
4. „ 5 P.M. Nursed.
5. „ 10.30 P.M. Nursed.

At this age the child ought to do without anything during the night.

(If brought up by hand.)

1. About 6.30 A.M. Malted food and milk as above.
2. „ 10 „ Milk (nearly a bottle full).
3. „ 1.30 P.M. German rusk scalded in teacupful of milk.
4. „ 5 P.M. Milk, as No. 2.
5. „ 10.30 P.M. Malted food.

Nine Months. (If nursed.)

1. About 6.30 A.M. Nursed.
2. „ 10 „ Malted food (one teaspoonful) in a bottle full of milk.
3. „ 1.30 P.M. Nursed.
4. „ 5 „ Malted food, scalded rusk, or teaspoonful of baked flour in milk.
5. „ 10.30 P.M. Nursed.

(If brought up by hand.)

1. About 6.30 A.M. Malted food or baked flour and milk.
2. „ 10 „ Bottle of milk.
3. „ 1.30 P.M. German rusk in teacupful of beef tea.
4. „ 5 „ Bottle of milk.
5. „ 10.30 „ Malted food and milk.

(As a change with the preceding.)

1. About 6.30 A.M. Oatmeal or German rusk and milk.
2. „ 10 „ Bottle of milk.
3. „ 1.30 P.M. The yolk of an egg in bottle full of milk.
4. „ 5 „ Bottle of milk.
5. „ 10.30 „ Malted food or baked flour and milk.

One Year Old.

The number of meals should have been gradually increased, so that the child is at this age quite weaned. If the child wakes early, give it at 6.30 or 7 A.M. a bottle of milk and malted food or baked flour.

8.30 A.M. Bread and milk or oatmeal.
11 „ Drink of milk and biscuit if necessary.
1.30 P.M. Beef tea and rusk, sago pudding if desired.
5.30 „ Bread and butter, milk.
10.30 „ Drink of milk if necessary.

(As a change.)

8.30 A.M. An egg, bread and butter, milk.
11 „ As before.
1.30 P.M. Well mashed potatoes and gravy, and light pudding.
5.30 „ German rusk or bread and milk.
10.30 „ As before.

Children vary very much at this age. Some will take quite this amount of nourishment, others will take only three meals a day and yet thrive well on them, nor will they take what they dislike. One child will be very fond of its beef tea or gravy, and refuse light pudding, and *vice versâ*. Allowance must, of course, be made for these tastes.

About Two Years.

Breakfast 8 A.M. Bread and butter, an egg, milk.
or Bread and milk.
or Oatmeal with perhaps treacle.

A drink of milk with a biscuit on going or returning from a walk, according to the time.

Dinner 1.30 P.M. Minced meat, potatoes, bread crumbs, gravy, with light pudding.
or Rusk and beef tea with pudding.
or Egg, bread and butter, milk.

Tea 6 P.M. Bread and butter, milk.
or Bread and milk.

These diets should be made to alternate as much as possible.

Mr John Ruskin, in a characteristic deliverance on the subject of nurseries, thus sums up the points which need to be borne in mind with respect to them. In a letter to a correspondent, dated the 23rd November 1881, he says :—

"I have never written a pamphlet on nurseries: first, because I never write about anything except what I know more of than most other people; secondly, because nothing much matters in a nursery—except the mother, the nurse, and the air. So far as I have notions or guess in the matter myself, beyond the perfection of those three necessary elements, I should say the rougher and plainer everything the better—no lace to cradle cap, hardest possible bed, and simplest possible food according to age, and floor and walls of the cleanablest. All education to beauty is, first in the beauty of gentle human faces round a child; secondly, in the fields, fields meaning grass, water, beasts, flowers, and sky. Without these no man can be educated humanly. He may be made a calculating machine, a walking dictionary, a painter of dead bodies, a twangler or scratcher on keys or catgut, a discoverer of new forms of worms in mud; but a properly so-called human being—never. Pictures are, I believe, of no use whatever by themselves. If the child has other things right, round it and given to it—its garden, its cat, and its window to the sky and stars—in time, pictures of flowers and beasts, and things in Heaven and heavenly earth may be useful to it. But see first that its realities are heavenly."

CHAPTER II.

THE SCHOOL.

THE subject of education generally, including that much-vexed question of over-pressure, is far too large a one to be discussed in these pages; but the proper principles of education may nevertheless be profitably set forth in them. A child brought up at home should have its education so gradually commenced and blended with amusement that it will be difficult to say exactly when education does commence. Thus from pictures it will learn the different kinds of animals, birds, and fishes, with their nature and uses, from alphabetical blocks it will get an idea of its letters, and so on till, at about four years of age, it may enter a Kindergarten school, where the same principles are still more developed. As to whether this system is to be continued at home, or carried on at one of the special schools, must depend on circumstances.

After the child attains the age of eight years, the question of home lessons or a day school will come up for consideration. Home lessons, if they can be managed, are preferable. The child will be under the more watchful care of its parents. If fatigued or out of sorts, as will often happen at this age, the lessons can be more easily intermitted than is possible in the stricter classes of a school. The child will be more out of reach of children badly brought up, who may set it a bad example, against which it is almost impossible to put a child on its guard at this early age.

When the child attains the age of twelve to fourteen years, according to whether it is quick or slow in learning,

a boarding school may, with more prospect of success, be allowed. A boy must, sooner or later, be cut off from his mother's apron strings, and be launched into the world. It is better that this should be done when he can be under the superintendence and watchful care of a good master, than that he should begin his life away from home without discipline after, perhaps, a long course of home spoiling. A wise parent will not send his children to school without warning them that they must meet bad companions, and putting them on their guard and on their honour against evil associations. The choice of a school to which a boy of this age should be sent must be determined, to a great extent, by the bent of the boy's mind, and the profession which he is destined to enter. As to the relative merits of a large or small school, the latter is certainly to be preferred, unless there are separate boarding-homes in the large school, where the boy can be under the immediate eye of a tutor, who will admonish him at once if he is observed to choose bad companions or to be getting into bad habits.

Girls up to the age of twelve years are shorter and weigh less than boys of twelve years, but they then suddenly shoot beyond boys, till the age of seventeen or eighteen is reached, after which the old position is restored. During these six years girls make almost all their development, which is spread over a much wider period in the case of boys. This fact alone should teach the lesson that growing girls must not be forced in their education to the extent of boys. It is needless to enter further into this subject, except to add that everything tends to show that girls during this period, if they are to remain healthy and strong, must have great care taken of them, and must be given rest and kind attention at times when they seem to flag.

School Hours.—A very young child cannot keep its attention fixed on one subject for more than fifteen minutes, and

an elder child in much the same proportion. Hence the necessity that exists for varying the lessons, and for passing quickly in the case of young children from one subject to another. If, in the case of elder children, a three hours' course of lessons is necessary, there must be a considerable interlude, or the child's attention cannot be secured, and little of the lesson will remain permanently fixed in the mind. For very young children an hour at a time is quite sufficient, and even then the lessons must be varied. Not more than the number of hours given in the following table must be devoted to school daily at the different ages :—

4 years and upwards, .	2 hours.
Below 10 years, . .	3 to 3½ hours.
Below 12 years, . .	4 to 4½ hours.
From 12 to 17 years, .	Not more than 6 hours.

No lessons should be conducted when the child is tired or out of health. The studies then require more concentration of thought, and are more harmful to the child. Thus morning studies are the best, and evening studies should never be given to young children. So, again, studies after a good meal, as an early dinner, when the child is apt to feel sleepy and is unable to fix its attention, are fatiguing. If they must then be carried on, those of a manual character, such as writing or drawing, should be selected.

Dress.—Much the same rules will apply as in the case of ordinary dress. For boys, when playing games that entail much running and exertion, it is essential that flannel should be worn, and these garments should be changed at the close of the game. It is not wise for boys to sit in clothes damp with perspiration, or in wet boots. Boys, also, should not wear a strap round their waist, as so many are in the habit of doing. The dress of girls falls into much the same category as that of women, described on pages 58 to 64. We need only

say here that the harm of most of the dress fashions of the present day is much intensified in the case of young and growing girls.

Food.—This at schools varies very much. As a rule it is plentiful, but there is too much sameness about it, and the cooking is too frequently of the worst. It is always a difficult task to supply a large number with hot dishes, but sufficient trouble is hardly taken in the matter, and then the pupils grumble and leave their food. There are generally three meals given in a day, with at some schools a piece of bread and cheese for supper. Two of the meals, however, breakfast and tea, consist almost always of identical ingredients, bread and butter and milk or tea, so that with the exception of dinner the meals are the same day after day. This might be obviated by a little management. Every school ought to have a dairy attached to it, or to have one within supplying distance, and eggs for breakfast, or bacon, or a little fish to a class at a time successively, would help to vary the motonony of the diet. Jam and marmalade might occasionally be given for tea also. The question of beer or alcoholic drinks in schools should not be entertained save for a delicate child or on a doctor's certificate. Plenty of time should be allowed for a meal, and the practice of allowing the food to be bolted or eaten very quickly should be discountenanced. So also reading at meals should not be permitted. It encourages the practice of bolting the food so that the pupil may get on with his reading in peace. A child that eats well may generally be considered in good health, so that any loss of appetite should be noticed and made an object of enquiry. Studies before breakfast on an empty stomach are not advisable. There is plenty of time in the day for any amount of study likely to be permanently useful, but if before breakfast study is thought necessary, a cup of warm milk should be taken immediately after rising.

Play.—A certain amount of play and exercise is absolutely necessary to keep a child in health, and boys should not be allowed to shirk their play by stopping indoors in play-hours. It is also a very bad rule that punishment should trench on the play hours, yet in many schools it is made to do so. Half an hour's drill of some kind between the two parts of the morning lessons may be made to intervene with advantage. This leads us to speak of gymnastics, which on the continent are taught as a separate branch, and are made to play an important part in education. As a rule no lesson is hated so much by English schoolboys as the drill lesson. This is because it is handed over to some regimental sergeant who does nothing to make it interesting, and who treats the lads as if they were raw recruits who must go through the dull, monotonous routine without a trace of shirking. If, however, this lesson were entrusted to a competent teacher who explained the objects of the different movements, and made the boys take an interest in their lesson, and if he gradually advanced them by a fresh lesson each day, explaining it as he went on, drill would lose its dulness, and be a source of interest and pleasure. Parallel bars, the swing, and horizontal bar, ought to be erected in every play-ground, and the boys should be encouraged in their use during play hours. In the matter of boys' games our English sports are so good in developing not only the muscular vigour of the boys, but also their habits of pluck and self-reliance, that they must all be encouraged. At football and hockey the boy must be taught to take his knocks with good temper, and an occasional accident need not make us cry out against such games; they have done and are doing much to make English boys become reliant men. Swimming should be a part of the education of all boys, and to make it popular as well as a means of safety, no boy should be allowed to boat until he can swim. Swimming in clothes should also be practised. Cricket calls

for no praise from us. Fives, racquets, quoits, where means permit, are all good. Paper chases in the winter months may be encouraged, but an eye must be had to the weaker boys lest they overdo it. Much more liberty is now allowed to boys than was the case in former days, and with very good results. They are now allowed on half holidays to go about almost where they like as long as they behave themselves, such privilege being stopped as a punishment. This liberty is very seldom abused, and the plan on every ground is to be commended.

But how different is the case with girls! What exercise do these poor creatures get? A walk once or twice a-day two-and-two, and, as a great relaxation, a mild course of drill instruction—a remedy often worse than the disease. Space will not permit us to enlarge on the thorough wickedness of this course of treatment in every way. It stunts and enfeebles the body, enervates the mind, and renders the moral nature of girls listless and morose, if nothing worse. Swimming, skating, lawn tennis, badminton, and other games of a like nature, and even cricket, ought to be encouraged and insisted upon in girls' schools.

Sleep should be allowed for according to the following table:—

Up to 12 years old, . .	10 hours.
14 to 15 years old, . .	9½ ,,
17 to 20 ,, . .	9 ,,
Over 20 ,, . .	8 ,,

The first hour's sleep is the most intense, and after that the intensity gradually diminishes. The dormitories should be large, and the cubic space, if anything, should be greater than in the day rooms. They must be used only at night, and should always have an open chimney. The windows must be open throughout the day at the top and bottom. Large dormitories are in every way better and more healthy than

small single ones. Each individual should have a separate bed, if only on the score of health and decency.

Eyesight. — There is no doubt that the eyesight of every child should be tested before it is sent to school. Many children are scolded and punished for stupidity and perverseness, when in reality the eyesight is at fault. But even this safeguard would be insufficient without periodical examinations, since it is at school that many affections of the eye are developed. This arises from too close and prolonged attention to minute objects, especially in delicate children or in children out of health. It may also be caused from insufficient light or the light falling on the book or slate in an improper direction, or from improperly made desks and benches. Thus in Germany, where so much more school-work is done than in Egland, it is found that one in ten of all children are short-sighted, and also that the youngest classes have the fewest and the oldest the most short-sighted individuals amongst them. This proves that the tissues of the eye will not bear the strain of too much close work. A short-sighted eye is one in which the diameter of the eye from the front to the rear is too great. This fault may be remedied by wearing suitable concave glasses. In all cases, however, before taking to glasses, the eye should be properly tested by an oculist, and the child should not have glasses given to it at haphazard, or more harm than good may be done. The remedies for short sight are—(1) Suitable glasses. (2) Shorter hours of work. Not too prolonged attention, but rest from books at frequent intervals. No work when the child feels sleepy or tired, as greater effort is then required. (3) Attention to the health of the child.

The opposite condition to short sight is far sight, in which the diameter of the eye is too small from front to rear. In this condition children can see distant objects clearly, but near objects require an effort. This effort after a time be-

comes to a certain extent difficult to maintain, so that the letters seem to run into each other and the child cannot see clearly, whilst, if the attention must still be continued, headache and other nervous symptoms will arise. It is this form of sight disorder that almost always causes a child to squint, and in England there is no doubt that it is far more common than near sight. The remedy will be appropriate glasses, which must be the reverse of those used for near sight, or *convex*. A more rare form of disorder is known as astigmatism, in which all the lines in a certain direction appear blurred or indistinct, so that the child can only very slowly make out letters and characters. This is a very complex form to distinguish, and requires glasses of peculiar make, so that skilled assistance must be sought.

It is right to warn teachers that many forms of eye inflammation and inflammation of the eyelids are of a contagious nature, so that great care must be taken in providing separate towels, and in wiping away all discharges with pieces of rag, which should be immediately burnt.

School Desks and Seats.—A great deal depends upon these being of the right description. If unsuitable they tend to develope numerous complaints—myopia or short sight, of which we have already spoken; spinal curvature, from sitting in an improper and cramped position; congestion of the head and headache, when the desk is too low, from hanging down the head constantly; dyspepsia and flat chest, from the compression of the chest or abdomen against the desk. Thus the desks should be of different sizes, and there should be no changing places, but each child should keep to his own proper desk. A foot rest is necessary in the case of small children. Liebreich gives the following rules as to the make of these articles:—"No boy should read with the book nearer than from 10 to 12 inches. The desk should be raised as an inclined plane, 20° for writing, 40° for reading. The edge of

the desk or table should be perpendicular to that of the seat, and the top of the back of the seat should be one inch lower than the edge of the table for boys, and one inch higher than the edge of the table for girls." A child should not be allowed to write in an awkward posture, but should on first entering school be taught the way in which it ought to sit for writing and reading.

Schoolroom.—The form of the schoolroom should be oblong. The windows should be on the left, and high up. Its length should be such that the writing on a blackboard can be easily seen—*i.e.* not more than 30 to 35 feet. Width must be proportioned to the height of the windows: thus, if the window reaches to a height of 14 feet, it must not be wider than 24 feet. The height should be limited to 13 or 14 feet. The windows should be to the left of the desks, which must be arranged parallel with the short sides. If windows are both on the right and left a double set of shadows are thrown, which is very trying. The worst light of all is light from the front. The walls should be of such a material that they may be easily cleaned or washed. Wainscotting is very good for the lower part of the walls. The cubic space cannot well be too great. At least 400 or 500 cubic feet per head should be allowed. The allowance of the London School Board is far too small, and is dangerous to health. Particular attention must be paid to the ventilation, which is discussed more at length in another part of the work. As the windows will all be on one side of the room, provision must be made for adequate cross ventilation on the other side by means of Sheringham valves and Tobin's tubes. Provision should be made in winter for supplying warm air to the schoolroom, so that the temperature can be maintained at from 65° to 68°.

Medical Hints.—Children in weak health should never be sent to school till after passing a medical examination. The state of the heart and eyes should receive particular attention.

Some schools now require every pupil to bring after each term a medical certificate stating that he or she is free from any infectious disease, and has not been exposed to infection. This is a very salutary rule. A periodical inspection by a medical man at intervals during the term is also strongly advisable. By this means the first sign of failing is often detected, and any future injury to the health avoided. The means of prevention to be used in cases of infectious disease is fully considered in the companion work, "Hints in Sickness; Where to Go and What to Do."

Evils of Cramming.—This is the epoch of competitive examinations, when every appointment is made by them, and every school tries to pass the largest possible number of its scholars in the highest grades. Examinations of this kind involve an immense amount of cramming, which is nothing but another term for over-study, and they are really the worst possible mode of furthering education. The ill effects of the system are not far to seek or to imagine. Of some on the eyesight mention has already been made. In like manner to the eye, the brain gets congested from too close application, and headache, more or less constant, is the result. This is usually the first warning, and should receive attention at the hands of a capable master. From neglect of proper play and out-door exercise, the general health begins to suffer. The boy gets pale and thin, is often said to grow beyond his strength; he loses his appetite, neglects his meals, gets fretful and anxious as to the place he shall take at the examination. His mind then, or first perhaps his moral nature, becomes involved; he is irritable, cross, and sullen, constantly brooding over his books; his sleep becomes short and unrefreshing, he wanders in it and talks about his books and lessons till at last a feverish state may be set up in which he entirely breaks down, and has perforce to give up work,—though often not before some serious injury is caused. In the case of girls, cramming

should never be allowed, neither should competitive examinations. Reasons have already been given for discountenancing these in their case, and it is only necessary to add that from the high development of their emotional nature, mischief is prone to occur far sooner than in the case of boys, and also to prove of a more intractable character.

CHAPTER III.

CARE OF THE PERSON.

Necessity for Cleanliness.—During life the surface of the superficial skin is continually being thrown off in the shape of minute scales. By washing and rubbing, these are regularly removed, but if these processes are not efficiently carried out, the greasy matter also poured out by the skin-glands glues them into an oily kind of material, which again attracts dust and dirt, and forms an unhealthy layer on the surface of the skin. This acts injuriously in several ways. It closes up the pores of the skin, limiting the escape of perspiration, and preventing the proper action of the skin as an excretory organ. As there is no doubt that the skin gives out carbonic acid largely, this important function will obviously be interfered with. The skin then becomes irritated from the decomposition of this unhealthy material. Being unable to carry out its work of purification, more labour is thrown on the lungs and kidneys, which may lay the foundation of disease in these parts. It is possible also that the germs of disease find a resting-place on this dirty surface, and may then be absorbed into the system.

Soap.—This is a compound made from soda and fats or oils, which is readily soluble in water. Its use is to dissolve the greasy matter poured out by the skin-glands, and with it the layer of dirt, to which allusion has just been made. It will not mix well with all waters. Soft and distilled waters are best, as well as being less irritating to the skin. With very hard water, soap will not mix at all well, as it combines with the lime to form an insoluble salt till all the lime

is deposited. This class of waters should first be well boiled; a good deal of the lime they contain is thus thrown down, and they are made softer. A good soap should not contain too much alkali, or it will be very irritating to the skin—it should only have enough to saponify the fat.

The fat from which it is made should be pure and good, and it should not contain colouring or perfuming material that is likely to be of an irritating character. Many of the common soaps contain too much alkali, and are too irritating to be of any use for washing the skin, but the toilet soaps from good makers are reliable. As regards the medicated soaps so much in vogue at the present day, it is doubtful whether any of them contain sufficient of the disinfectant agent to be certainly of use in that capacity. They are, however, very useful and serviceable kinds for ordinary use. Soft soap is made with potash instead of soda, and is too alkaline to be used, except for scrubbing and domestic purposes.

Cosmetics.—Used generally to conceal some skin eruption or supposed excess of colour; in other cases to impart colour where, according to the vagrant fancy of the female mind, it is supposed to be lacking. It need hardly be said that their use can never be advised. Some of them, but only a few, are composed of lead, mercury, bismuth, or other materials that act more or less injuriously on the skin. Even if they are in themselves harmless, they block up the orifices of the skin-glands, and prevent the healthy action of the skin, leading sooner or later to permanent disfigurement. The practice of using belladonna for the eyes is likely to lead ultimately to serious impairment of vision.

Baths—*Varieties.*—

Cold Bath, . .	Below 80° F.
Tepid Bath, . .	About 90° F.
Warm Bath, . .	95° to 100° F.
Hot Bath, . .	100° to 105° F.

Cold Bath.—On first entering a cold bath a sensation of chilliness is felt, which is the most uncomfortable part of the bath. This sensation is caused by the action of the cold water, which causes the skin and its blood-vessels to contract, so that the blood is forced back, as it were, into the internal and deeper parts of the body, and the internal organs become temporarily overfilled with blood. This stimulates the nervous system, the breathing becomes quicker and deeper, the heart beats more vigorously, and, as a consequence, this warm blood is sent back to the skin with increased force. This is known as the stage of reaction, and the bath should not be prolonged so that the next stage of what may be called depression is reached, in which the blood, becoming chilled again and again at the surface, is unable to keep up its temperature, and permanent chilliness, with other depressing effects, which last for some time, will ensue. The stage of reaction is best increased by friction with a rough towel, when a most pleasurable glow of warmth will spread over the whole body. This glow may be taken as the test of whether the cold bath is doing good or harm to the individual. If it does not ensue sufficiently, the water should be slightly warmed. Sometimes there is no glow, but the powers of reaction seem quite unequal to the task imposed on them, and the cold bath produces only its depressing effects—as sense of chilliness, blue face, numbed or "dead" fingers, and the like. This is a proof that the person cannot stand a cold bath, but that it does him harm rather than good. For such an one standing with the feet in warm water and sponging the body quickly with cold water may be tried, followed by friction with a rough towel. In summer, when very cold water would prove most delightful, it is often difficult to get the water cold enough, whilst in winter the water is in reality always too cold. A good many people, young and with strong powers of reaction, boast that they break the ice to have their morn-

ing tub, but it is doubtful whether this does not do them harm ultimately, and as they get older they certainly should not indulge in such hard usage. The proper temperature of a cold bath may be laid down as that at which water in summer usually stands. For winter the temperature of the bath should be made up to, or even slightly higher than this, by the addition of hot water. It should be remembered also that water is a much better conductor of heat than air, so that though the water may be slightly warmer than the air, yet on this account it will feel colder. A bathe in running water will make the body very much colder than in still water, as fresh cold water is constantly being brought in contact with the skin.

Time for using the Cold Bath.—Learned but impractical writers lay it down that about 11 A.M. is the proper time for indulging in the cold bath. They say that it must not be taken when the body is fatigued by a long fast, as before breakfast, neither must it be taken directly after a meal. This is all very well, but to a business or professional man it means no bath at all. The most convenient time in every respect is when getting up in the morning, and, whatever may be said to the contrary, that will be the time chosen, so we will simply say that to a healthy robust man, with proper precautions taken, a cold bath at that time will be a most agreeable and healthy luxury.

Rules and Precautions in using the Cold Bath.—The duration of the bath must not exceed the period of reaction. This is variable with each individual according to his state of health and idiosyncrasy, and each one should fix the time he may remain in the bath according as his feelings when he leaves it are pleasurable or the reverse.

If in any person there is no well-defined stage of reaction, such person must not continue the use of a cold bath, but try one of the substitutes recommended above.

A cold bath should not be taken when the body is in a state of profuse perspiration, as serious results have happened from the sudden check to this process. Nor, on the other hand, must it be taken after much exercise, and the body has passed the perspiratory stage, when a cold stage of depression often ensues. If taken then there will, as may be readily understood, be very little or no reaction. The bath should be taken when the body is comfortably warm.

If the bath is taken directly after a full meal, it is apt to interfere with the process of digestion. To carry out this process the stomach is for a time in a state of congestion, but if a cold bath is taken the blood will be attracted to the skin during the reaction stage, and symptoms of indigestion will ensue.

A good sudden plunge into the bath is best for those who can stand it, otherwise the whole body should be quickly immersed.

A cold bath should not be indulged in by persons suffering from heart disease, or from chronic disease of any of the internal organs of the body, except by medical advice. In the first case, the rush inwards of the blood, as it were, to the internal organs, caused by the shock, may lead to an immediately fatal result. The weakened heart may prove unequal to the strain, or the temporary congestion of any affected internal organ may produce permanent injurious results.

There can be little doubt that the daily use of the cold bath, renders persons susceptible to colds much less liable to their influence, and less likely to be injuriously affected by sudden changes of temperature.

Warm and Tepid Baths.—Are taken chiefly for the purpose of cleanliness, or after a hard day's work, when the muscles are fatigued from over-exertion. They cause a feeling of warmth to the body, and make the heart beat more quickly. They at the same time increase the flow of blood towards the

surface of the body, and cause the glands of the skin to act more powerfully, whilst they remove any impediments at the outlet of the pores, so that the perspiration can freely escape. Whilst these glands are in such a state of activity, it is very essential that their action should not be retarded in any way so care must be taken to prevent chilliness. Hence these baths are best taken at night, when the individual can at once retire to rest; and as they are very conducive to sleep, everything tends to point out that this is the most natural time to take them. It is necessary to remember that from the relaxing nature of these baths, persons with weak hearts or suffering from debility may faint in them, so that care and caution should be exercised in their use by such persons.

Hot Baths.—These are powerful stimulants, and should be seldom used except under medical advice. They are very serviceable, however, in cutting short a cold, or preventing a threatened cold, if immediately after them the patient retires to a warm bed and envelopes himself in blankets, thus promoting free perspiration.

Douche Bath,—Shower Bath,—Needle Bath.—All modifications of each other. They consist essentially of a stream of hot or cold water directed to a part or the whole of the body. Chiefly used as curative agents. The cold shower bath is the only one in at all general use, and it is gradually dying out. The shock it causes to the system is greater than the cold bath, and it should only be used by the strongest and most robust. Many persons use it directly after the warm bath to close the pores of the skin, and to prevent any ill effect from exposure to cold if they are obliged to face it immediately after a warm bath. Its use in this case is rational and beneficial.

Vapour Bath,—Hot Air Bath,—Turkish Bath,—Russian Bath.—Of these the Turkish bath may be taken as the type. The bather first enters the tepidarium—a room at the

temperature of 115° F., — and remains till perspiration breaks out, when he proceeds to the calidarium, or hottest room (temp. 130° to 140° F.), and remains till the perspiration pours down him. He is then shampooed by an attendant, and afterwards soaped and sponged in another less heated room. This is followed by a cool shower bath or plunge in cold water, after which he is rubbed dry, and rests on a couch some little time before leaving. The process lasts from one to three hours, and is modified to suit different cases. In the Russian bath a steam room instead of a dry hot-air room is used. The Turkish bath is quite unequalled in removing all dirt and impurity from the skin, and it is good as an occasional stimulant of the vital processes; but care must be used in taking it, and the bather must be guided by his sensations and the advice of the skilled attendants. Weakly persons, or those with a weak heart or liable to apoplexy, should not take it, neither should it be taken soon after or before eating. Moreover, the various processes must not be undergone too rapidly, from the danger of too rapid heating or not sufficient cooling.

Other Baths.—It is needless to enter into any description of these. They are used only in certain diseases of the system or of the skin, and their name is legion,—as the mineral water baths, the alkaline, the acid, sand baths, fine baths, and so forth.

Sea Bathing.—Almost all that has been said on the subject of the cold bath will apply to sea bathing; a few differences, however, require notice. Thus, when in the sea, the first chill will follow as in a cold bath, but in this case the bather usually undergoes a considerable amount of exercise,—jumping, swimming, and otherwise moving about. This promotes a period of reaction or comparative warmth, but after a time it is succeeded by a feeling of chilliness, with blueness of the lips and finger-nails. Directly this is perceived, the bathing

must be discontinued, or other more severe symptoms of depression of the circulation will ensue, as chattering of the teeth, shrivelling of the skin of the fingers, and the like. Salt water acts more as a stimulant to the skin than fresh water; consequently sea bathing may be indulged in as a rule for a longer period of time than the cold bath. No definite rule can be laid down, but the practice of bathing several times a day must be declared unhealthy and dangerous. It is a great tax on the powers of endurance of the individual, which only the strongest can sustain. For the same reason, the season of bathing must for most persons be limited to the months of June to September.

It is well to immerse the whole body as quickly as possible. The plunge of a good swimmer is a desirable object of attainment. The time for sea bathing must very often depend on the tides. The best time is about eleven A.M., but there is no particular charm about this hour, as some try to imagine. The rules laid down for the use of cold baths should be strictly followed out. Swimming in salt water, from the greater density of the water, is much more easy than in fresh water, but there are many precautions that must be taken, or sea bathing for a novice is a very dangerous amusement. Thus, if the tide is running out, the swimmer on trying to return may not be able to make headway against it. If there is a heavy surf, he may, unless a very good swimmer, lose his presence of mind or become exhausted. He must try to ascertain the existence of any strong currents running along the shore which may prevent his reaching land before his strength is exhausted. At all watering-places, however, there should be men appointed, in boats close at hand, to afford help in cases of emergency.

For children, sea bathing is very beneficial in many cases: their skins react well after a bath. They should never, however, be plunged into the surf by the robust old hags peculiar

to the sea-side, as the noise and tumult of the surf terrifies them. They should be allowed first to paddle about, then to run in a little further and further, until they get used to the sea and delight in it. If a child does not like a sea-bath, but is terrified by it, on no account press him; and if the stage of reaction is not well marked, the bathing must be discontinued. If a child bathe, the body and head ought always to be immersed, and a good rubbing down with a rough towel must be given when the bathing is finished. Elderly people, and people suffering from any disease, should only bathe under medical advice.

Fresh water bathing differs so slightly from sea bathing as to require no separate notice.

Bath-room.—A bath-room with a sufficient supply of hot and cold water is now considered a much more essential adjunct of a house than it was in our forefathers' time. Yet even to-day amongst the middle classes bath-rooms are not common. When one has to be adapted in a house the best must be made of circumstances. But in building a new house, the addition of a well-ventilated bath-room should be insisted on. It is a common plan to put the bath-room and closet together, but this is not at all safe. At any rate extra precautions must then be taken with the system of drainage, or the heat from the hot bath-room will tend to draw the sewer-air towards that room and to force any imperfect trap.

Public Baths.—These ought to be far more common in England than they now are. Anyone who walks along the banks of an English river in summer will note the numbers of men and boys who delight in their bath, which if a source of enjoyment to themselves, is often one of embarrassment to the pedestrian. Every large town should have its swimming bath provided by the public authorities, with facilities for raising the temperature of its water in winter, so that cleanliness may not be limited to the summer months. The

encouragement of the art of swimming alone will save many a life. But what of the public facilities enjoyed by women and girls for bathing? The lower classes have no means of bathing at home, and their opportunities for effectual ablution of their persons are of the slightest. This is a subject which from every point of view demands consideration, and if a small part of the money now wasted in other ways were devoted to the cleanliness of the lower classes, there would be a far more healthy state of the system and a better tone of morality amongst them.

The Hair.—This probably suffers very often from too much brushing. Most people have an idea that the head cannot be brushed too hard nor too often. This is a mistake. Hard brushing may remove the scurf from the hair, but it at the same time greatly stimulates the skin of the head, and causes increased production of scurf. Again the skin of the head, as of other parts of the body, is kept moist by an oily secretion, and it is the deficiency of this secretion that causes the head to become dry and "scurfy." If the head is washed too often with soap this secretion is removed, and the scalp becomes dry and scaly; so that a little vaseline, pomade, or wash containing glycerine should be afterwards rubbed into the roots of the hair. White of egg instead of soap is a very good thing to use for washing the head. Pomades consist of an oily or fatty matter scented with various sweet smelling oils. They should only be used very moderately. Much of the baldness of the present day is due to the style of hat, which presses tightly on the head and interferes with the circulation of blood through the vessels. The hair dyes in common use are of two kinds—(1) to darken, (2) to lighten the colour of the hair. Those of the first class almost always contain some salt of lead, and their use is very dangerous; cases of lead poisoning have been known to occur from their use. A few consist of some silver salt, and these are not so dangerous. The second

class usually consist of a solution of peroxide of hydrogen; this also is not dangerous, but the use of all dyes should be discouraged. It is probably useless to write against any mode of dressing ladies' hair, as fashion rather than healthiness will prevail in most female minds.

Essentials of Clothing.—The temperature of a healthy body is 98·4° F., and this temperature varies very slightly so long as a person keeps in health. Any rise of temperature beyond one degree from this point is a sure sign of ill health. Nor does this temperature vary even with the season: it is the same in summer and winter. In summer it is kept down by the perspiration excited, which evaporating from the surface of the body abstracts heat from the body for the purpose of carrying on such evaporation. In winter it is raised by extra clothes and fires, and in default of those by the heat given off in the various chemical changes carried on within the body, always more active during the winter. This explains why more food can be taken in winter than summer, the extra supply being required for combustion within the body to keep up the temperature. This is not a physiological work, so that it is not practicable to go into fuller details on these matters; it is necessary, however, to explain in a few words the principles of proper clothing.

The body loses heat in several ways:—(1) By radiation, as it is called; that is to say, every heated body gives off a certain amount of heat to a colder body near it, as a fire or red hot piece of iron gives off a feeling of heat to the hand brought near to it. (2) By the process of evaporation of which we have just spoken, and which is chiefly in activity during hot weather. (3) By conduction or convection—the direct conveyance of heat to particles of air in immediate contact with it. Clothing, then, is to protect us from outside influences: in winter to protect us from the cold —to prevent the loss of heat in the three ways named—

in summer to prevent the direct action of the sun on our bodies, and to save us from chill which is liable to occur from the often abrupt transitions of temperature during a summer's day.

One word as to "hardening." How far is this advisable? Certainly many individuals carry it too far, whilst others go to the other extreme. The process of hardening consists in getting the nerves of the skin so accustomed to cold air, that—as in the cold bath—there is not such violent influx of the blood from the skin to the internal organs, and these organs get used to tolerate such influx without congestion following. On the other hand, by coddling, the surface is so unused to sudden change that it acts most violently, there is a large influx to the internal organs, and with serious effect, congestion or inflammation being apt to arise. While a certain amount of hardening may do good, it must be remembered that to keep up the heat of the body in winter without a due supply of clothes involves a great expenditure of nerve force, from the increased combustion processes required in the body to keep up the temperature, and it is injurious for a man engaged in brain work or the like to exhaust his powers unnecessarily.

Clothing, Materials used for.—*Wool, Merino, Flannel.*—All modifications of each other. Wool is the best non-conducting material, and should be used for all underclothing. It prevents better than any other the loss of heat from the body, and it allows free ventilation and evaporation. The great objection to its use is its irritating action on the skin, which many people cannot bear. This may be avoided by wearing it over a light muslin under-vest, or by having it lined with silk. There are so many kinds of merino vests made now, however, that almost every one can wear at least the lighter sorts next the skin, with other flannel material over if necessary. In summer, as in winter, probably a light merino

vest is best, helping in this case to keep out the heat of the sun, and also allowing of free evaporation, whilst if the temperature suddenly changes, as it frequently does at night, it forms at once a good protector against the sudden chill so often felt from such change. In rowing, cricket, and other violent exercise, clothing of this description is the only kind permissible, as it protects the body from the chill occasioned when the exercise is discontinued and the skin is freely perspiring.

Silk.—Ranks next to wool as regards warmth and porosity. The great objection to its use is the expense. For comfort in winter nothing would equal, in the writer's opinion, an under-vest of silk next the skin, with a light merino one over it if necessary. Silk is much softer and less irritating than flannel or merino. It would be very useful for summer wear.

Cotton and Linen.—Calico is made of cotton. Cotton is not suitable for warmth, and linen is a still better conductor of heat. Neither of these are advisable for underclothing, except over wool or silk. Their use is rather on the side of the ornamental, and they are worn more for the sake of appearance than of comfort.

Fur Clothing.—Ranks with wool as regards its bad conducting powers, but it is not suitable for underclothing. It may be worn as an external covering, and its use for this purpose in the shape of overcoats and mantles, is universal in cold countries. It does not, however, allow of free evaporation like wool, but if its use is limited as indicated, little harm will result. Fur is also a good protection against wet, its properties being such that it keeps the rain-drops on its surface.

Impermeable Clothing.—Mackintosh and leather. These protect the body from wet, and also from very cold, cutting winds. Their use, however, is not conducive to health, for whilst they keep out the wet they also shut it in, and do not allow the free evaporation of perspiration from the surface of

the body. They cause, if worn for some time, a feeling of great heat and oppression, but the ventilated Mackintosh minimises these evils.

Colour of Clothes.—This is to a certain extent a matter of some importance. Thus, white absorbs comparatively little heat, yellow and pink come next, and black absorbs most. In summer it is not so much the texture of a garment that is of importance as the colour. This is the reason why white and the more brightly-coloured materials are chosen in summer and the darker ones in winter.

Shape, &c., of Clothing.—Under this head must be noticed some of the abuses of the modern style of dress. This is an oft told tale, but fashion leads the way, and everyone follows. The essentials of proper clothing are—(1) that it should be light; (2) that it should cover equally all parts of the body except the hands and face; (3) that it should fit comfortably so as not to interfere with the functions of any part of the body. Let us comment on a few articles which sin greatly against these essentials.

The Corset.—This, with its tight lacing, is a known evil. It is useless to say that it is necessary, for it is quite certain that women are as well able to do without it as men are. The evils caused by this article of dress arise from the compression and displacement of the various organs by the pressure exerted on them. Thus the lungs and heart are compressed, causing breathlessness on exertion, palpitation, and other symptoms. The stomach and liver are dislocated, giving rise to dyspepsia and all its attendant evils, resulting sooner or later in actual disease.

Boots.—These, if too tight, cause corns, bunions, and ingrowth of the toe-nail; on the other hand, if too loosely fitting they cause corns from friction. Boots with pointed toes squeeze the toes together, and act particularly on the first toe, causing it to bend across the others, and often lead-

ing to a species of dislocation at the ball of that toe. If improperly made with no arch to support the sole of the foot, that part gives way and the foot becomes flattened, leading to great pain in walking, distortion, and knock knee. The high heeled boots of the present day raise the heel and relax the muscles of the calf, so that from non-use they waste away and give rise to a species of lameness.

Garters.—A fruitful source of varicose veins of the leg. Their use is quite unnecessary, and now, it is hoped, uncommon; suspenders have rightly taken their place.

Petticoats.—These exert too great a pressure on the hips and the surrounding organs of the body. It is probable that the tight stays of the present day are useful to a great extent in forming a more marked hip on which to hang this great weight of material. Be this as it may, the weight should as much as possible be borne on the shoulders, or attached by buttons to a "bodice."

Comforters.—Are useless and harmful to a healthy person. The face and throat do not require protection if other parts of the body are warmly clothed. Sailors, for example, wear their clothing so that the throat and also the upper part of the chest are quite exposed to the weather.

Poisonous Colours in Clothing.—Many coloured articles have been known to produce severe symptoms, and these are chiefly due to the presence of arsenic. It is a mistake to suppose that only green articles contain arsenic; many of the various aniline dyes of the present day contain a large amount of that substance. Poisonous colours produce on the skin first a rash composed of a number of small blisters, which afterwards become sores. Their effect on the general health is to produce headache, loss of appetite, feverishness, smarting and running of the eyes, all which symptoms cease on leaving off the obnoxious garment.

Infection.—The liability of clothes to convey infection

must be remembered, and care must accordingly be taken. The clothes of any one who has suffered from an infectious disease, unless they have been removed from all contact with the sufferer, are better burnt. At any rate, they must not be again used till they have been thoroughly disinfected. It is to be feared that tailors and others are not sufficiently careful as to the supervision they give over their workpeople, especially when the work is done at the homes of the latter, and that this is often one of the ways in which infectious diseases are spread.

General Rules in Clothing.—Underclothing must be understood to include the chest, arms, and legs, as things to be covered with warm clothing. Too often these parts are left entirely unprotected.

Tightly stretched garments allow more heat to pass through than loose ones; there should always be a space between garments.

Flannel requires long soaking to make it wet; linen and cotton soon become air-tight by wetting. Thus a wet linen shirt feels colder, and is liable to give cold sooner than a flannel one.

A person who has become heated in a hot room should not leave it immediately for the cold air without some extra protection, or until he has become cooler.

Our clothing must vary according to the activity of our work. A business man seated at his desk, and taking little exercise, requires more clothing than one who is constantly engaged in active work.

The "full dress" of ladies, without much precaution, is very dangerous, and leads often to serious results. To expose the chest and arms of a delicate girl who, as a rule, is very warmly clothed, to the chilling air of winter, is most foolish and reprehensible. After dancing in this costume the cloak should be immediately put on, and it is very dangerous to expose the body thus heated by exercise to sudden change in

a conservatory or much colder room. Yet this is a practice a great deal too much in vogue.

Do not be in too great hurry to assume extra wraps for winter, but having once taken to them, be very careful not to leave them off till mild weather is quite established.

Do not continue in wet garments an instant longer than is necessary, and be especially careful not to sit in wet boots when it can be avoided.

A change from heavy to lighter garments should take place first in the upper garments, the under-clothing being still of the warmest description.

The very old and very young feel changes of temperature more than adults. Special care should be taken to provide them with woollen underclothing, and to keep them in warm, well-ventilated rooms.

The night-dress in this country is generally insufficient for children and old people; it should at any rate be made of flannel.

It is, let us hope, hardly necessary to remark that cleanliness and dryness are the two essentials as regards clothing. To put on clothing that has been charged continuously day by day with perspiration and other excretions from the skin is a most unhealthy practice. Clothing should be frequently changed, and more especially the woollen underclothing. This unfortunately is less frequently changed, as a rule, than the linen garments, for it is one of the drawbacks to woollen clothing that it does not show the dirt to the same extent as linen and calico.

The Ear.—The canal of the ear secretes what is known as ear-wax, which serves many useful purposes; and great harm is often done to the ear by cleanly people in their anxiety to remove this wax. If left alone, as this epidermis is thrown off outwards, it will gradually drop out of itself, and only that part just inside the orifice should be carefully wiped

away. Nor is it easy to get the part of the wax more inside the ear out of it. What is usually done is to force the wax farther back into the ear, where it forms a hard plug, which leads, in a time, to deafness, if it does not set up inflammation and other evils. Hence the employment of all instruments and so-called "aurilaves" is very harmful.

The use of warm sweet oil or glycerine to the ear as ear drops is not always harmless. The oil, unless syringed away after a short time, will become rancid and irritating, and the glycerine must be diluted with water, or it also is of an irritating nature.

Itching of the ear is often caused by the incessant removal of ear-wax, which keeps the canal moist. Syringing with warm water will relieve it, and a little warm oil may be used to replace the wax till it can be reformed, but it must be syringed away daily and fresh used. On no account should pins, knitting needles, and other things be used to scratch the interior of the canal when there is itching: they set up manifold evils.

If some foreign body get into the ear canal, try to remove it by gentle syringing, but do no more or you will drive it further into the ear, and probably render its removal, even by a medical man, impossible.

The common practice of wearing cotton wool in the ear is to be avoided; it should, at any rate, be never worn indoors, and only out of doors when the ear seems very sensitive to cold. In prolonged bathing, however, it is often useful by preventing entrance of cold water into the ear, whilst in sea-bathing it will also prevent the shocks of strong waves on the tympanum, which have been followed occasionally by troublesome effects.

Sudden noises or blows on the ear are dangerous, and have caused permanent deafness by rupturing the drum of the ear. Continuous loud noises also, like the constant roar of

machinery, seem often to have, after a time, a bad effect on the nerves, and to cause partial deafness. It is well for a person exposed to such noises to wear a little cotton wool in the ears whilst so exposed.

Care should be taken to prevent catching cold in the ears. It is impossible to point out every way in which this may be caused. Sitting in the draught of a railway carriage, and too much swabbing with cold water are fertile causes of cold in the ears.

In children, eczema behind the ears is often caused by too tightly binding them against the head with the strings of the cap. This part of the skin is very tender and delicate. It should be carefully washed, then well dried and powdered.

The Eye.—The care of the eyesight is chiefly involved in the knowledge of how and when to use spectacles. For a proper explanation of these details, a little insight must be obtained into some points of the physiology of the eye. These may, however, be treated very simply without going into those minutiæ and technicalities that tend only to obscure the unprofessional person. The essential parts of every eye may be considered as the retina on which the object of external bodies is thrown, and which, by means of its peculiar properties, is enabled to analyze those bodies, and a lens which shall bring these external bodies to a focus on the retina. It follows as a matter of course that the rays thrown on the retina by the lens must be brought to an exact focus on the retina, or their image will be indistinct, just as when a magnifying glass is used, unless the lens is at such a distance from the object observed as corresponds to the strength of the glass, the object appears quite indistinct. Therefore since objects which are at varying distances from the eye throw their rays (as they are called) at different angles on the eye, there must be some provision in the eye by which these rays shall all come to an exact focus on the retina.

Accordingly, we find in the eye a muscle known as the ciliary muscle, which by its contraction can alter the shape of the lens, causing it to become more convex, so that the rays, according to their angle, are instinctively by this muscle brought to an exact focus. These three components—the retina, lens, and ciliary muscles, are then the essentials of healthy vision, and by understanding their different properties we may be enabled to comprehend those matters that require to be rectified when the eye is in such an abnormal state as to require glasses. The healthy eye is one in which rays from distant objects (parallel rays) are brought by the lens to an exact focus on the retina, and the ciliary muscle is in such a state that it is able to alter the shape of the lens, so that rays from nearer objects may also come to an exact focus on the retina.

Presbyopia, or old sight.—The first change from a healthy state occurs as a consequence of old age. The parts of the eye are healthy, but from the increased density of the lens substance which occurs in old age, the ciliary muscle is unable to sufficiently change the form of the lens. Hence small objects cannot be seen distinctly, and things near at hand become confused. Old people, therefore, when reading complain that the type is not so clear and easily read as formerly. This condition is remedied by the use of convex glasses, which help the failing power of the ciliary muscle to increase the convexity of the lens. Care must, however, be taken not to use too strong glasses. Many people find that magnifying glasses still further aid them, and desire to use them. These, however, will, if their use be long continued, permanently injure the sight, and those spectacles only should be used which just correct the want of power of the ciliary muscle. As age increases, stronger glasses may from time to time be required.

Hypermetropia, or long sight.—Here the diameter of the

eye from before backwards is too short, so that parallel rays when the eye is at rest are not brought to a focus on the retina, but behind it. Hence the ciliary muscle has always to act even for distant objects, whilst for near objects it has to act very powerfully, almost in a state of spasm, to bring the divergent rays to a focus. This condition is remedied by increasing the convexity of the lens in wearing a suitable convex-glass, which brings the rays more forward on to the retina. The symptoms of this condition are, first, a sense of fatigue and pressure in the eye from any close work on account of the strong prolonged contraction of the ciliary muscle, then the objects become misty, and may fade away altogether. If continued, headache, dizziness, and mental confusion will follow, and in time become permanent.

Myopia, or short sight. —In this affection the diameter of the eye from before backwards is too great. Hence parallel rays are brought to a focus in front of the retina, and only very divergent rays—as from bodies held very near to the eye—are brought to a focus on the retina. This state is remedied by using an appropriate concave glass, which renders parallel rays divergent, so that they come to a focus farther off and on the retina. Short sight is recognised by the distance at which the book is held. This should never be less than 10 to 12 inches; if it is, glasses should at once be used. In the chapter relating to the "School," mention has already been made of the bad effects of too much education in producing this affection: it is very dangerous, and tends to greatly and permanently impair the eyesight unless recognised and remedied in time.

Other more rare affections of the eye, as astigmatism, hardly call for remark here, as their recognition is difficult, except by a skilled oculist.

Squint.—This in ninety-nine cases out of a hundred is due to hypermetropia, and is a sure sign that the child requires

glasses. The tales as to the origin of a squint from copying another person, and the like, are almost invariably apocryphal. A squint should always receive attention, as if long developed, the child learns to see with one eye only, and the sight of the squinting eye becomes much impaired, if it is not eventually lost.

Spectacles.—These should be chosen under the advice of a skilled oculist, not haphazard. They are usually made of crown or flint glass. Some are made of rock crystal, when they are known as pebbles, but they are not superior to the glass. When spectacles are used only to protect the eye from glare, probably neutral gray are the best. Blue glasses and glasses of any colour, if long used, render the retina unduly sensitive to those colours that have been excluded. The spectacle-frame should be made to fit correctly, so that the centres of the glasses should be opposite the pupil.

General Rules.—It should be remembered that in distant vision only is the eye at rest, and if prolonged close work must be continuously performed, the eyes should occasionally be rested by withdrawing them from the work for a few seconds.

Reading in a train or carriage is bad, as the constant jarring alters every few seconds the relative positions of the book and eye, causing continued action of the ciliary muscle and consequent fatigue.

Reading when lying down is also inadvisable, as it is almost impossible to get the book in a favourable position, and the external muscles of the eye are strained.

Attention should be paid to the type of a book. The size of the letters, the good and distinct quality of the type and shade of the paper, are each of them important.

Gas-light is not a good light for the eyes, as it contains so many yellow rays. Some of the oil lamps are best for close work at night. They require, however, shades, as most

of them are of such a height that otherwise their full flare falls just on the eye.

The arrangement of the light in schoolrooms has been already considered in the chapter on the "School."

This is scarcely the place to descant on diseases of the eye; but attention may be drawn to one or two small practical points. (1) Never neglect the inflammation of the eye which so often occurs in new born infants, and is attended with a great deal of discharge. It is the most fertile cause of most cases of blindness. (2) Recollect that a foreign body in the eye causes almost exactly the same symptoms as a "cold," but the evil will not be cured till the foreign body is removed. (3) A cold in the eye simulates to an unprofessional gaze numerous more serious diseases. If it does not soon yield to treatment, skilled advice should be sought.

Respirators.—The object of the use of these unfortunately repulsive looking appliances is to warm the air before it enters the air-passages. It is generally used in front of the mouth, and if people learnt to breathe more through the natural channel of the nose, the use of a respirator would be less necessary. In many lung affections, however, they are now made to cover both the nose and mouth, and hideous looking things they are, to which nothing but stern necessity will make a person submit. Respirators are chiefly of use to persons predisposed to bronchitis and other lung affections, and are essential in those recovering from such diseases who have for a long time been confined in a room kept at one temperature. To convalescents of this kind any sudden change is of course highly detrimental, but a person simply predisposed to such complaints would probably be wiser to gradually accustom himself to change of temperature by cold or tepid bathing and other means, rather than to coddle himself unnecessarily. Another object attained by respirators is that of filtering out of the air breathed any minute particle

that would otherwise be drawn into the lungs, and there set up mischief. Thus in mining, stone-cutting, wool-sorting, and many other trades, the air inspired is loaded with fine particles of a most irritating nature. If respirators were universally used by those engaged in these pursuits, whilst at their work, there is no doubt that it would conduce to much longer life than they at present enjoy. A miner's lungs are absolutely black instead of the natural colour, from the minute particles of coal that have been continually drawn into his lungs.

The Voice.—The voices of children of both sexes are alike till about the age of thirteen to fifteen, when the larynx enlarges rapidly, and a great change takes place, especially in boys. A boy's voice often falls an octave, but the larynx of a girl does not enlarge to the same extent, and it falls only one or two notes.

A strained method of using the voice, and especially trying for too much effect, causes congestion of the mucous membrane of the throat and enlargement of its glands. This is known as clergyman's sore throat, from its frequent occurrence in the clergy. That it is only a faulty use of the voice is seen by its infrequent occurrence amongst actors, who manage their voices much better. The mistake arises from the conviction that many people have that it is important to fill the lungs as much as possible at the beginning of each phrase, so that the sermon is carried on by a multitude of energetic pumpings and upheavals of the whole chest, which are not only perfectly unnecessary, but throw immense strain on the vocal organs. The ordinary abdominal mode of breathing is quite sufficient, and the voice should be practised so that breath is not taken too often. Pitching the voice in too high a key is very injurious and detrimental to it. Care should also be taken not to speak too loudly, not to speak too rapidly, and to open the mouth sufficiently whilst speaking.

The Teeth.—The chief causes of decay in the teeth are an accumulation of tartar about their necks, and the retention of food in the interstices between the teeth, which, by decomposition, sets up an acid fermentation that reacts on the elements of which the teeth are composed, disintegrating them and setting up decay. The great thing is, then, by perfect cleanliness and other means to remove these deposits before they have time to work mischief. It is astonishing how few people have any idea as to the proper way of cleaning their teeth. First, as to the proper wash or powder to be used. All the advertised nostrums, the composition of which is unknown, are to be avoided. Many of them contain acid materials which, though they thoroughly clean the teeth, do so at the expense of the enamel, which they tend to dissolve. Astringent washes habitually used, and strong alkaline washes, are injurious, as also are tooth powders containing gritty materials which roughen instead of polishing the enamel, such as powdered charcoal and ground barks.

A good tooth wash should be slightly alkaline, soapy, and pleasant, and the powder should not be sufficiently gritty to imperil the polish of the enamel. Good soap is not pleasant, unfortunately, but it is very efficient. Precipitated chalk, with or without other ingredients, as a little camphor, or with soap and a little perfume, forms about the best tooth powder. Once daily is sufficient to use a powder, and best just before retiring for the night, so as to thoroughly cleanse the mouth after its day's work of all impurities. At other times a little alkaline wash will be sufficient—water with a small quantity of bicarbonate of soda, or of sal volatile added to it.

Next, as to the tooth-brush. It is almost impossible to get a good one. They are made too wide and much too hard to be of any practical use. The teeth should not be vigorously scrubbed—such a process only scratches the enamel and rubs particles of food and mucus between the teeth. The

great object is to remove the particles of food from the depressions between the teeth, where they naturally lodge. For this purpose the brush should be moderately soft and narrow, and the bristles long and elastic. All surfaces of the teeth should be gently brushed, the front, back, and upper part of the back teeth, and the movement of the brush should be upward and downward, so as to insinuate the bristles between the teeth. It is better to use carefully a quill toothpick than to allow pieces of food to remain between unruly teeth. Sweets taken in excess, especially if they lodge between the teeth, do injury, as they soon undergo acid fermentation, and then act on the enamel. The use of tobacco greatly discolours the teeth. The extraction of a tooth is seldom required if the aid of a dentist is sought in time. It is terrible to think of the reckless manner in which teeth are sacrificed for want of a little patience and care, and their painless extraction by nitrous oxide gas, probably often leads to their reckless sacrifice

CHAPTER IV.

FOOD AND DRINK.

Food—Its Object.—To go fully into the subject of food would require a considerable dip into the region of physiology, with many technical details which could hardly be made intelligible to a general reader. Yet some little attention must be devoted to this subject, or the use and object of food—the primary points of our subject, in fact—could not be clearly understood. The body of man has been likened to a steam engine, and this simile will perhaps most easily serve to make our subject clearly understood, though it will not explain all points in physiology. Thus, in a steam engine we have the iron framework and the different motive parts of the machine, requiring to be kept in perfect order, and liable to wear and tear, with need of patchings and renewals occasionally as parts get worn. So in the human body we get the bony framework with its joints lubricated constantly with oil so that they may work easily, the whole covered by the skin, which needs cleansing and polishing like the engine. The muscles with their nerves will correspond to the different motive parts of the machine. They are liable to constant wear and tear like the works of the steam engine, but, while the engine is patched up occasionally, the muscles are being renewed continuously, so that we are hardly sensible of any such process at work in our bodies. The simile must not be carried too far, but to a certain extent the chimney may remind us of the lungs, where much of the air used up in the body is thrown off; the steam escaping from the safety valve may remind us of the action of the skin, which by its perspira-

tory secretion keeps down any dangerous excess of temperature in the body, whilst the fuel will represent the food we take. There is, however, this essential difference between our food and the fuel of the engine, that whilst the latter is required only to keep up the fire and to supply the motive force of the engine, our food must also be such that it can be applied to supply the wants caused by the wear and tear of the muscles, and to carry on that constant renewal of which mention has just been made.

This at once divides our food into at least two principal classes—(1) that required to compensate for the wear and tear of the muscles, &c.; (2) that necessary to be used as fuel in keeping up the temperature of the body and in supplying motive force. The ordinary fuel of the steam engine is composed of the two chemical elements known as carbon and hydrogen, with other matters of no moment or merely accidental. To provide fuel for the body the food must contain the same two elements. When, however, we come to examine the composition of the muscles, another element—viz., nitrogen—is added to our list, so that we at once get the two divisions of (1) nitrogenous and (2) non-nitrogenous. The non-nitrogenous are again divided into *fats* and *starch* or *sugar* sub-divisions from the different proportions of carbon and hydrogen respectively in these two sub-divisions. There are one or two other articles of diet not yet mentioned, which are absolutely necessary to the body, but do not fall under the above headings. These are water and the various salts. We have now our classification of the essential kinds of foods complete as follows :—

Nitrogenous.
Non-nitrogenous { Fats.
Starch or sugar.
Water.
Various salts.

Quantity of Food necessary.—The standard diet for a man at ordinary work is given by Dr Parkes as :—

Nitrogenous food, . .	4½ oz.
Fats, . . .	3 ,,
Starch or sugar, . .	14 ,,
Salts, ...	1 ,,
Water, ...	50 to 80 ,,

The weight of the first four are calculated in the dry state, but all food contains a certain amount of water—on an average, half its weight. Hence, roughly, two pounds of bread and three-quarters of a pound of meat will represent the quantity of food necessary for a healthy man in the twenty-four hours.

The following table is copied from Dr Parkes, and gives the amount of the different food constituents in 100 parts of each of the following articles of diet :—

Articles.	Water.	Nitrogenous.	Fats.	Starch or Sugar	Salts.
Ordinary uncooked meat,	74·4	20·5	3·5	...	1·6
Dried Bacon, . .	15	8·8	73·3	...	2·9
White Fish, . .	78	18·1	2·9	...	1
Poultry, . . .	74	21	3·8	...	1·2
Bread, . . .	40	8	1·5	49·2	1·3
Rice, . . .	10	5	·8	83·2	·5
Oatmeal, . . .	15	12·6	5·6	63	3
Peas (dried), . .	15	22	2	53	2·4
Potatoes, . .	74	2	·16	21	1
Butter, . . .	6	·3	91	...	Variable.
Egg, . . .	73·5	13·5	11·6	...	1
Cheese, . . .	36·8	33·5	24·3	...	5·4
Milk, . . .	86·8	4	3·7	4·8	·7
Cream, . . .	66	2·7	26·7	2·8	1·8

Experiments have at various times been made to test how far one form of diet alone will suffice for the wants of the system. It has been found that the fats and starches alone

will not long support life, as might be supposed, since they do not contain sufficient nitrogen to make good the loss by wear and tear of the body. So, again, the nitrogenous articles alone are not permissible, for they contain so little carbon and hydrogen comparatively that a very large excess must be taken to obtain the necessary quantity of these elements, and consequently a much larger proportion of nitrogen than is requisite. This excess leads to numerous other evils. Again, the quantity of food taken must vary. A man on extraordinarily hard work will require more than the average, a sedentary man less. So again it varies with the climate. Inhabitants of a very cold country require more food, especially of a fatty nature, to keep up their temperature, whilst those who live in a very hot country take much less food of both the fatty and nitrogenous classes. Thus the Esquimaux eat large quantities of blubber; the Hindoos live principally on rice. Women require less than men, and children of ten years about half the amount of adults.

Digestion.—Another and perhaps more important practical point remains to be considered, and that is the digestion of the food. All foods are not alike: the digestive fluids secreted by the different organs act one on one kind of food, another on another, and some people can best digest one kind of food, others just the opposite. Each person must study for himself his own idiosyncrasy. Speaking generally, it may be said that starchy food is digested in the mouth, and then again by the secretion from the liver (known as the bile) and other fluids beyond the stomach, but not in the stomach itself. The function of the stomach is to digest the nitrogenous articles of diet, whilst the fats are digested by the bile and pancreatic secretions. The object of digestion is to transform insoluble articles of diet into soluble ones, so that they can be taken up into the blood-vessels, &c., and

applied to the purposes of the body. Sugar is already in a soluble state; it can therefore at once gain entrance into the vessels, and requires no digestive process. Starch, on the other hand, is a very insoluble substance, and could not be absorbed without some change. Consequently it undergoes what is known as a process of fermentation, under the influence of substances contained in the digestive fluids which act upon it, and becomes transformed into soluble sugar. Nitrogenous substances, again, are insoluble, but in the stomach, under the influence of an acid, and of the principle called pepsin, it becomes transformed into a soluble kind of meat (peptone). Fats undergo a process of saponification, of which mention has been elsewhere made, and are taken into the system by a separate set of vessels known as lacteals (part of the lymphatic system), not into the blood-vessels. Thus the system of digestion is seen to be a very complex one, and it is easy to understand how one person may be able to take one kind of food, whilst another person cannot touch it, but enjoys something that would be almost poison to the first. It depends in each individual on the state of the glands, which act on the different kinds of foods. So also in a person who suffers from bad digestion; we can understand how almost all things for a time must be presented to his system in a state of solution, or ready for immediate absorption. Hence the use of the many artificial foods now prepared in these cases.

ANIMAL FOODS.

It will now be necessary, dividing food into that derived from the animal kingdom and that derived from the vegetable, to go a little more into detail concerning some of the principal foods.

Meat.—This necessarily belongs to the nitrogenous class of food; it is pleasant to the taste, satisfying and more digestible than nitrogenous food of the vegetable class.

Mutton is rather more easy of digestion than beef, especially to a person suffering from indigestion. Veal and lamb, though more tender, are not so easily digested as beef and mutton. Pork contains a great quantity of fat, and its fibre is hard, so that it is not suitable for all persons. The reason that fat in its many forms is known as a rich food, and one difficult of digestion, is that it does not allow the digestive juices to mix well with the food, forming an oily coating over them, through which the fluids cannot act, especially as fat is only digested after passing through the stomach. Bacon contains a large amount of fat also. There is a tendency in these days to consume too large a quantity of meat. A meat meal twice a day is quite sufficient for a person doing an ordinary amount of work. Liver is a very rich dish. Kidneys are hard, and not very easily digested. Tripe is the paunch or first stomach of the ox; its fibres are easily broken up, and it is very digestible, though it contains a considerable amount of fat.

Poultry.—The fowl, turkey, and guinea-fowl are delicate, tender, and easy of digestion. The duck and goose have harder, richer flesh, and are less easily digested.

Game.—The flesh of game contains little fat; it is tender, easily digested, and has a delicate flavour, increased by keeping. Venison is one of the most digestible dishes we possess.

Fish.—The flesh of fish contains but little fat; it is very nutritious, but not so satisfying as meat, so that more of it is required. The flesh of white fish is more digestible than the red flesh. Salmon is richer, and more nearly approaches meat. Whiting and sole are the two fish probably most easily digested. Drying and curing fish lessens their digestibility. Shell-fish, with the exception of oysters, are not very digestible, and in many people they give rise to symptoms of irritation in the system, such as nettle-rash and the like.

Eggs.—The white of the egg consists of nitrogenous matter

only, the yolk of nitrogenous matter with a considerable amount of fat. It is a great mistake to suppose that there is no nourishment in the white. Lightly boiled eggs are much more easy of digestion than hard boiled ones.

Milk.—As will be seen by the table, milk contains a certain proportion of each class of food, as might be expected, since it alone has to support the life of the young for some time. The nitrogenous matter is the casein or curdy part, whilst the fat or cream is made into butter by churning, which causes the milk globules to run together and form a solid mass. More is noted about milk in the chapter on the Nursery.

Cheese.—This is the nitrogenous part of the milk coagulated by the use of rennet, with a certain amount of fat carried down also. By keeping, it undergoes decomposition, and numerous volatile fatty acids are formed which give it its varying degrees of taste. From its solid form most kinds of cheese are very indigestible, as they are with difficulty acted on by the digestive fluids.

Dripping and Lard are simply fats derived from meat.

VEGETABLE FOODS.

These, speaking generally, contain much more of the starchy principle than foods belonging to the animal kingdom, and less of the nitrogenous. They are principally of service in supplying carbon and hydrogen for combustion, to carry on the work of the body and to maintain its heat.

Wheat.—This by grinding is made into flour. The outer part or bran is separated, and the finer portions afterwards again separated from the coarser. This gives a much finer and whiter flour, though a large part of the nutritive matter, in some of the outer coats especially, some nitrogenous matter and important salts (phosphates) are thereby lost. There is much outcry in these days against this waste: hence the attempt to bring into fashion the decorticated or whole meal bread, in which the bran

is excluded, but all the other constituents of the grain remain. For children especially it is desirable that these phosphates should not be lost. Bread is made from flour, and from its porous character is very easy of mastication and digestion. It becomes porous by the development of carbonic acid gas, held in it by the tenacity of the nitrogenous matter. To obtain this gas several processes are utilized. The ordinary one is to add yeast, which sets up a fermenting action on the sugar in the flour, and converts it into alcohol and carbonic acid gas. The numerous baking powders also act by liberating this gas, whilst aërated bread has this gas pumped into it, as it were. New bread is soft and difficult of mastication. Brown bread, which contains the bran of the flour, acts somewhat as an irritant of the bowel.

Oats.—Oatmeal contains much more nitrogenous matter, fat and salts, than wheat flour. From the want of tenacity, however, of its nitrogenous principle it cannot be made into bread. It forms the porridge of the Scotch when well boiled and eaten with milk, and it is a pity that this is not a more common article of diet in England. It has also a slight aperient effect. Besides porridge it is formed into thin cakes, and baked.

Barley, except as pearl barley, and **Rye** as rye bread, are not much eaten in England.

Maize.—This contains nearly as much nitrogenous matter as oatmeal, and still more fat. It is sold as hominy, and should be in more general use. It can be made into porridge or various kinds of pudding. It is very cheap, but has at first a somewhat disagreeable flavour to those unaccustomed to it.

Rice consists almost entirely of starch, being very poor in nitrogenous matter and fat. It is easily digested, but not of much use alone as a food.

Sago—Tapioca—Arrowroot.—Obtained from the vegetable kingdom, and consist almost entirely of starch.

Peas—Beans—Lentils.—These are very nourishing, for they contain a much larger proportion of nitrogenous matter than any of the other members of the vegetable kingdom. They take the place of meat with vegetarians. They are, however, very difficult of digestion, and require prolonged boiling to make them tender. With some people they never agree.

Potatoes.—These consist chiefly of starch, and contain a large quantity, so that they are not very nourishing. When properly cooked, however, they are very digestible, and make a wholesome and agreeable vegetable.

Other Vegetables.—Are chiefly useful for the salts which they supply to the blood. Some of them, as carrots and beetroot, contain a good proportion of sugar.

Fruits.—Are not of much value as nutriment, containing much water and little nitrogenous matter. They are of use principally for the sugar, vegetable acids, and salt that they contain. They are useful for what are known as their anti-scorbutic properties, that is for their power of counteracting the unhealthy state produced by living too long on salted and dried provisions. If eaten to excess, especially in an unripe or over ripe state, they are apt to excite disorders of the stomach, from the free acids and principles they contain, which are very prone to undergo speedy changes.

Cooking of Food.—The effect of cooking on food is to make the meat more agreeable and more digestible. It also kills many low forms of life apt to be present in some kinds of meat, which would develope in the body and give rise to dangerous or fatal symptoms. Thus in Germany much raw pork is eaten in the shape of sausages and otherwise, and occasionally very dangerous epidemics of poisoning arise, as the parasites of the pork have not been destroyed by cooking. It is probable also that salads, watercress, and other uncooked vegetables, are the means of introducing tape worms and other parasites into the human body.

Boiling of Meat.—The object to be attained is to keep in the juices and soluble salts, and yet to cook the meat sufficiently to make it palatable. To effect this, the meat should be at once plunged into boiling water, and boiled briskly for five minutes. By this means the outer rind of the meat becomes coagulated and forms a more or less impermeable layer, which prevents the escape of the more soluble internal juices. After this it must be kept from boiling, and allowed to cook only very gradually at a temperature below boiling point. In this way the central parts of the meat remain juicy and tender, whilst if exposed to a much higher temperature, they shrink and become hard and indigestible. Boiled food is more insipid than roast from the lower temperature employed, but it is more digestible by a weak stomach.

Stewing.—Somewhat like boiling. The food is just covered with water, and exposed to a heat sufficient to allow of gentle simmering in a close vessel for some hours. Much of the nutritive matter passes into the water which is eaten with it.

Hashing.—The same process applied to previously cooked meat.

Roasting.—Here, as in boiling, and for the same reason, the meat should first be exposed to a strong heat, and then the process should be continued at a greater distance from the fire, basteing well all the time. From the higher temperature employed, meat thus cooked is more savoury, and a good deal of the fat melts and comes away as dripping.

Baking.—Much like roasting, but being carried on in a confined space the volatile products cannot escape, but permeate the cooked articles and render them stronger and richer than in roasting. Baked meat is therefore not so digestible as roast meat.

Frying.—The heat is applied through the medium of boiling fat, which soaks into the meat and renders it very rich, less accessible to the digestive fluids, and more indigestible than by other modes of cooking.

Broiling.—Chiefly applied to chops and steaks cooked on the gridiron. The principle is the same, to well cook the outside and retain the juices. The meat must be frequently turned to prevent scorching, but not by a fork, which would let out the juices.

Soups and Broths.—Here we wish to extract all the nutritive material of the meat, so that the process must be the reverse of the above. The meat should be cut into small pieces, allowed to macerate for some time, and then in the case of broths should be kept at a gentle heat for about an hour. In the case of soups the liquid must be boiled gently for some time, in order that the gelatine may be extracted. Bones and tendons which contain much gelatine are therefore of use to make soup.

Vegetables.—These are very indigestible unless their fibres are softened by thorough cooking. Many of them also contain a large proportion of starch, and unless this is well cooked it is exceedingly indigestible, because the starch is contained in a cell, the outer covering of which is very tough. Unless, therefore, the starch is heated sufficiently to burst this outer layer, the digestive fluids cannot act on the digestible matter in the interior of the cell. Potatoes should be cooked in their skins, which prevents many of the salts they contain from being lost; some salt put into the water will also aid in preventing the escape of these salts. What is said above applies also to all kinds of food containing starch—wheat, rice, arrow-root, &c. The process of bread-making has been already noted.

Pastry.—This is a rich indigestible compound, from the close impregnation with fatty matter which it undergoes in its manufacture. As before mentioned, such impregnation prevents the admixture of digestive fluids in such a manner that they can act on the food.

Preserved Meats.—These now come over in tins in great

variety and number. There is, unfortunately, a strong prejudice against them. They contain a good deal of nourishment, but from the extreme process of cooking they have undergone to make them keep well, they are not so palatable as ordinary meat. They are very serviceable, however, for rissoles, soups, and minces, and it is a great pity they are not more extensively used in the preparation of such dishes.

Times of Meals.—It is known that a meal is digested and has passed on from the stomach in about four hours time, and the stomach should then have a short period of rest before any more is taken. Applying this rule, about three good meals a-day will be sufficient. Breakfast should be a fairly substantial meal, taken before the work of the day begins. No hard work should be done before this meal, but a short walk is permissible. The next meal should be at 1 to 1.30 P.M., and is called either lunch or dinner. To the man who can afford to give up a clear hour at this time, dinner or the substantial meal of the day may be then taken. Many, however, cannot spare so much time, and not only so, but after such a meal they feel indisposed or unfit for further exertion. The lighter lunch is then more judicious, but it is very detrimental to health to go from breakfast to a late dinner without any mid-day meal; such a mode of life will inevitably lead in time to indigestion and all its troubles. Dinner at 6.30 to 7 P.M. will, in this case, be the substantial meal. It is advisable that it should not be later, or the stomach will be overladen at bed-time—a thing to be avoided as much as trying to sleep on an empty stomach. Moreover, if this meal be made later, the ladies of the family will indulge in a good tea at 5 o'clock, which impairs the appetite for dinner, though a refreshing cup of tea at this hour is permissible. To those who dine in the middle of the day a supper is necessary, or is taken at a late hour after, perhaps, a fairly substantial tea.

It is better, however, to take a meat tea at about 7 P.M., after which hour no meal of a substantial kind is good.

Proper Quantity of Food.—If food is eaten slowly the appetite is the guide as to the quantity of food necessary, and it must necessarily vary according to the work and mode of life of the individual. With a variety of food, however, the appetite is tempted, and more is often taken than is advisable or healthy. Taking an ordinary person, Dr Pavy estimates the quantity of food necessary at 23 oz. of dry food, or about 40 oz. if the quantity of water contained in all food is taken into account. For sedentary people, however, less is required. This quantity is contained almost exactly in 2 lbs. of bread and ¾ lbs. of meat, which may form a rough guide for most people.

General Hints on Food.—Be careful to chew the food properly, and therefore take plenty of time over meals. Insufficient chewing is a great source of indigestion, as much extra work is then thrown on the stomach, the juices of which have to act on large lumps instead of on properly masticated food.

Food taken in too large quantities is also productive of dyspepsia. Most people who suffer from "attacks of liver" suffer really from too much eating and its attendant dyspepsia, almost all the organs as well as the stomach being thrown out of gear.

Do not drink too much at meals, as by that means the gastric juices are much diluted and digestion is delayed.

Strong emotions have a great effect on the digestion; thus anxiety and depression will often bring on dyspepsia.

Starch and sugar are specially fattening. Bantingism consists in a diet of meat (with no fat), fish, green vegetables, tea, coffee, toast, biscuits, and light wine, and in the avoidance of bread, potatoes, butter, fats, milk, sugar, soups, beans, and starchy food in general.

A gouty disposition is usually caused by living well and taking too little exercise. Port wine, malt liquors, and meat diet are most prone to cause it, whilst a mild starchy diet, without stimulants, but with plenty of exercise, will counteract it.

Hot pickles and curries, if taken too frequently, irritate the stomach, and are apt to lead to permanent congestion of that organ, and secondarily of the liver.

Violent exercise must neither be taken immediately before nor immediately after a good meal.

An exclusively vegetable diet predisposes to fat. Nitrogenous vegetable matters are somewhat difficult of digestion. There is also a difficulty in getting proper vegetables all the year round. It is probable that a vegetable diet alone is not conducive towards the highest state of mental vigour.

Eat proper materials—at regular intervals—not too much —not too little.

Alcohol—Its Action.—A small part escapes from the body, but the greater part is lost sight of. It has been burned up in the system. It is not, however, a food in the sense that it can be used up to form tissue, but it is of use in keeping up the temperature of the body by its combustion. In small quantities it increases the activity of the heart and of the brain, and acts generally as a stimulant. It has been stated that it has the power of checking tissue change, but experiments of Dr. Parkes prove that the change—at any rate in the nitrogenous tissues—is in no way interfered with by small doses. Its effect on temperature in moderate doses is with healthy men extremely slight; there is no increase, and in many persons no decrease. In small doses it aids digestion, in large doses and taken habitually it lessens appetite and produces a congested state of the stomach. In large doses it acts most injuriously on the liver, producing serious disease of that organ. Combined muscular movements are much less

perfect after its use. If taken by soldiers on the march, it never should be given during the march. It then produces for a short time a feeling of exhilaration and loss of fatigue, but this very soon wears off, leaving the individual much more prone and sensitive to fatigue than before. Given when the march and fatigue of the day are over, and the men are at rest, the evidence goes to prove that in this case it is beneficial. Alcohol tends also to enlarge the small vessels of the skin, a fact very well known, as such enlargement in time becomes permanent in those who drink to excess.

Practical points concerning Alcohol.—The above is a short summary of Dr Parkes' evidence on this subject. It requires, however, some translation into practical form to render it intelligible. It is needless to go into the question of the abuse of alcohol and the diseases arising from such abuse. That would be going over well-worn ground, and would be valueless, since everyone knows the dreadful evils to which intemperance leads. It is only necessary to remark that it is chiefly the daily continuous abuse of alcohol that does most harm as a rule, even if the person gets so accustomed to the use of stimulants as to show outwardly very slight evidence of intoxication.

Is the habitual use of Alcohol desirable?—It cannot perhaps be denied that every one in good health would do as well, or better, without alcohol than with it. There is also strong evidence that under conditions of exposure to great heat and great cold, to extreme hardships and exposure, those who have not taken alcohol have come off much better than those who have. The use of alcohol, then, is not usually necessary to a healthy person. Does its use do harm to such persons? It probably does in many cases. Thus alcohol, by its greed for oxygen, is burnt off before many effete products which ought to undergo combustion. Consequently these latter accumulate in the blood, and give rise to such diseases as gout, especially

if too much food is taken at the same time, and too little exercise to aid in getting rid of it. But, on the other hand, a person who leads a very active life may, for a long time, take even a slight excess of alcohol all his life without any appreciable ill effect. The general acceptance of these views has led to a great decrease in the consumption of alcohol by all classes in this country during recent years. If, however, the use of alcohol is given up altogether, it is coming to be asserted by thinking men that the sin of gluttony is gradually taking its place, and it is doubtful which is the worse. There is no doubt that most people in these days consume far more than they ought, and among all classes we shall find, as a rule, that those who do not drink, eat enormously. Is it not true that the middle course in all these things is the safest course? Each one has his own special failing, and too great a check in one direction may lead to an outbreak in another. He leads the most healthy life who lives soberly and temperately in all things, avoiding all excess. But all men are not healthy, and many live in these days at too great a rate, they work too hard, they lead lives of great excitement, and somehow or other they find they must take a certain amount of alcohol to keep them in good health. Furthermore, it is alcohol, and this alone, that seems to supply them with the necessary power to carry on their work, and if from conscientious motives they give up its use their health suffers. It is impossible to explain how alcohol acts in these cases, but the fact remains. Two instances from real life will explain what is wished to be conveyed, and any medical man could supply similar ones. A man who belonged to the Blue Ribbon Army consulted the writer: he had been gradually losing flesh at a rapid rate, was at hard work for many hours daily, and found he could no longer do it; his appetite was very good, and no reasons could be found for his failure in health. Tonics of all kinds were tried, but he went from bad to worse, till he had

lost over two stones in weight, and seemed most dangerously ill. He was then advised to take a pint and a half of stout daily, and the change immediately was most marked; he soon regained his flesh, and returned to work, looking as well as ever. The other case was that of a lady with feeble digestion and nervous disposition; she wanted, from conscientious motives, to leave off all alcoholic liquors, but directly she did so she had most violent attacks of neuralgia, which only came on after leaving off her daily small allowance of stout. As to mental work, many people assert that they do such work better without stimulants, whilst other men, equally conscientious, and in as high position, assert that their daily small allowance of alcohol enables them to get through their work more easily. Much must in all these cases be allowed for the idiosyncrasies of the individual. To old people, however, wine is usually a great comfort. The wearinesses and annoyances of age call for a slight stimulant and narcotic, and the digestion needs strengthening. The failure in force is well met by a substance whose destruction in the system yields much power without effort. To sum up—

(1) Alcohol is unnecessary for healthy people, and occasionally harmful.
(2) Its moderate use does to most people no harm, and its discontinuance may lead to gluttony.
(3) To many people on the confines of health leading exciting, wearying lives, and to those sometimes doing hard mental work, its use is beneficial.
(4) It is frequently beneficial to the aged.

The effect of alcohol in disease has no place in this book. It is wise to have no hobbies on the subject, but to trust to and be guided by one's medical attendant.

Quantity of Alcohol permissible.—Dr. Parkes finds from experiments and calculation that 1½ oz. of absolute alcohol

daily is *the maximum amount that should be taken by a healthy man.* This is equivalent to, on the average—

3 oz. of Brandy, or 1½ glasses.
7-8 oz. of Sherry or Port, or 3-4 glasses.
12 oz. of Hock or Claret, or 5-6 glasses.
1½ pint of ordinary Beer, or Stout.

A wine glass is usually reckoned as holding 2 oz., but many of the thin glasses now in use hold considerably more ; this must not be made an excuse for excess.

The different alcoholic beverages differ so much in their various constituents that a short notice of the principal ones is desirable.

Beer and Stout.—Contain principally extractive matters and sugar, bitter matters, free acids, and a proportion of alcohol varying from one or two per cent. in small beer to nine or ten per cent. in the strongest ales. The extractives belong to the class of starchy foods, hence the tendency of beer and stout drinkers to get fat. The bitter matters act as tonics. With some people of a dyspeptic nature they disagree, producing headache, heaviness, and other symptoms commonly described as "biliousness." Taken in excess they tend to produce gouty disorders.

Wines.—These are divisible, according to the amount of alcohol they contain, into natural and fortified. The natural contain from 18 to 22 per cent., whilst the fortified reach 34 to 36 per cent. The former include claret, hock, and sauterne ; the latter port, sherry, and madeira. They also contain a varying amount of sugar and other extractives, many salts, and ethers, which give the varying flavours. The light ones are scarcely likely to disagree with anyone. They are suitable for gouty, rheumatic, and dyspeptic persons, and do not produce bilious disorders. Port contains a large amount of sugar and extractives. It is

very serviceable in low states of the system, and in convalescence from fevers. Persons who suffer from dyspepsia and gout should avoid it. Sherry generally agrees well in dyspepsia and gout, but some people complain of its producing acidity. It is a lighter wine altogether than port, whilst madeira forms a kind of link between them.

Spirits.—These are mostly flavoured alcohol, and do not contain the dietetic ingredients of wine and beer. From their strength they are dangerous, as it is easy to take them undiluted, and their customary use should be discontinued save in cases of illness. Their action is identical, save that gin, from the juniper in it, possesses also diuretic properties.

Liqueurs are spirits sweetened and flavoured with various aromatics. They are taken at the end of dinner to stimulate the digestion, but their use can do no good, and is best avoided.

There are other beverages not containing alcohol which must receive some notice, as also the use of tobacco.

Tea.—Consists, as everyone knows, of the leaves of a plant grown in China, and is divided into two chief kinds, black and green tea, from the different manner of their preparation. Its chief constituents are tannin or tannic acid—a substance with a very astringent taste,—a volatile oil to which it owes its aroma, and a special substance known as theine. It is prepared by pouring boiling water on it, and allowing it to stand a short time. If it stands too long, as many poor people let it, simmering on the hob all through the day, it loses of necessity its volatile oil which gives it its agreeable flavour, and takes up more of the tannin and bitter disagreeable matter. The same occurs if it is boiled. In England it is customary to add milk and sugar to it: in other countries other things are added. The best tea contains a good proportion of small young leaves. It produces two distinct sets of effects—(1) it stimulates the brain, dispelling drowsiness, and is not followed by torpor, as after the use of alcohol;

(2) it lessens tissue waste, and consequently the desire for food and the sense of fatigue from over-work. It is thus of use in those especially who wish to do hard mental work at night, also in those who are exposed to much fatigue, especially under extremes of temperature. The excessive use of tea in women of the lower class is a fertile source of indigestion, probably from the bad manner of its preparation, as it is allowed to stand for an indefinite time, and then contains a large amount of tannin and substances that act injuriously on the coats of the stomach. Women also allow it to take the place of more solid and essential nutriment, and the only meal—morning, noon, and night—of many of them is tea with bread and butter.

Coffee.—The seeds of a small fruit from a tree now cultivated in most hot countries. Coffee requires roasting to develop its flavour and other qualities, and as these depend on volatile products the sooner such roasting is done before it is required for use the better, though it will keep good in a tightly closed tin for some time. The same remark applies to the grinding of coffee. Its constituents are a volatile oil developed by roasting, which gives it its flavour, some tannin, but less than in tea, and a special principle called caffeine, which, however, is identical with theine. It is in England generally made by allowing boiling water to percolate gradually through it, and this is attended with less loss of its flavouring agent than in boiling, a process adopted in some countries. Its action on the body is almost exactly like that of tea, but it is more stimulating and oppressive to the stomach, often producing bilious symptons. Like tea it disposes to wakefulness, and relieves the sensations of hunger and fatigue. It should not, however, be used at the expense of food. It must be noted that some persons can take neither tea nor coffee without their producing unpleasant symptoms. Coffee has often mixed with it some chicory, not in all cases as an adulterant,

as some people prefer the mixture, because it gives increased colour and flavour to it. Chicory is the root of the wild succory or endive cut into pieces, then dried and roasted.

Cocoa.—A manufactured product of the seeds of the cacao tree. The seeds simply roasted, crushed, and winnowed from the husks form cocoa nibs. These require boiling for some time, and then only a portion of the kernel is extracted, so that this product more resembles tea and coffee. Soluble cocoa is made by squeezing a part of the fat out of the nibs and grinding the cake to powder, or by grinding the nibs with the fat and adding some form of starch and sugar. Those made with sugar alone require only boiling water poured on them, whilst those made with starch require boiling. Chocolate is cocoa more carefully prepared and mixed with sugar and some flavouring agent, as vanilla. Cocoa consists of:—(1) a volatile oil to which it owes its flavour; (2) a special principle called theobromine, much resembling theine and caffeine, and which can be converted into caffeine; (3) fatty matter amounting to half its weight; (4) nitrogenous matter, a fifth part; (5) starch. It possesses in a milder degree the properties of tea and coffee, but containing so much fat, nitrogenous matter, and starch, it must be looked on also as a most valuable food, especially when made with milk. For this reason it is apt to be heavy on the stomach and to disagree with invalids and dyspeptics. Such persons may, however, use the cocoa nibs, which form a much lighter beverage, whilst those who use it as food should try the soluble varieties. There are so many varieties of cocoa now made that each one should try for himself which is the most suitable. It is a pity that cocoa is not more frequently used in children's meals, for which it is eminently fitted.

Tobacco.—The effect of this depends on two principles—nicotine and a volatile oil. The oil produces a sensation of burning in the mouth, and tends to paralyse the nervous

system, whilst nicotine affects chiefly the heart through the brain. The symptoms it produces are nausea and vomiting, with giddiness and a feeling of intense weakness, going on to produce a rapid, feeble, and at last imperceptible pulse, with cramps, an absolute loss of muscular strength, and finally collapse. In spite of all this it certainly acts, in those accustomed to its use, as a restorative, soothing and restoring exhausted nervous power. It should, however, only be taken when the active work of the day is over, and never fasting, except when food is not obtainable, as it stays the sense of hunger. In the Franco-German war the German soldiers, by the free use of tobacco, managed at times to do without food for many hours, although executing long marches and undergoing much fatigue. The second battle of Orleans was, it is stated, fought and won on tobacco, as the transport department broke down, and the German army was without proper rations for some thirty-six hours. The troops had plenty of tobacco, and this enabled them to stay their hunger and to endure immense fatigue.

There is no doubt, also, that tobacco is very pernicious to the young. It should not be accompanied by spitting, which wastes a large quantity of saliva so necessary for the digestion of food. When used in excess, it produces chronic sore throat and dyspepsia, but its more serious symptoms are connected with the heart, as palpitations, irregular and intermittent pulse, and faintings.

CHAPTER V.

WORK, REST, EXERCISE, AND RECREATION.

Effects of Overwork.—No rule can be laid down as to the amount of work that can be performed safely by each man, for each has a definite power of doing work, and what one man bears well may prove very injurious to another. The age also of a man will make a great difference. An amount of work that a young man of twenty-five can do with ease may prove very detrimental to the same man at forty-five. To a great extent each man must be guided by his own feelings as to whether he is doing too much work. If a man, after his work, feels fatigued, and his temper irritable, if he experience a gradual loss of power and difficulty in applying his mind to his work, and is subject to headache and sleeplessness, he may know that he is taxing his strength unduly, and that these are the first danger signals thrown out by nature, whose warnings are not to be neglected. If, as too often happens, he still perseveres in his hard work, the strain is sure to tell sooner or later on his weakest organ, generally either the heart or brain or kidneys; the former when the work is of an active kind, the latter when the work involves great mental strain and worry.

Too often, in the present day, the London business man is exposed to both these trials. Working hard in an office all day, he lives probably in a continual state of hurry and excitement. He hurries to different appointments, he hurries to catch the train to and from his office, he hurries home to a dinner

party, and so the day is spent. No wonder if the heart and other organs give way under the strain. There is now too much of a race for wealth at the expense of health, and the haste to make money works far more harm to the individual than a much larger amount of quiet steady work. The work least taxing to the brain is that which can be made to vary somewhat. Thus the clerk who all day long is employed in adding up rows of figures really wears himself out much more than one who interrupts his tasks by work of a different character. The change of task would, according to Dr Wilks, be a recreation to the mind, and render it, after a time, more fit for its former work. There is too much monotony in the work of many clerks of the present day, and their employers would find them break down much less frequently, and would get more useful work from them, if they took to heart these observations. Excitement and worry react more than steady work on the system, and steady monotonous work tells more on it than work of an agreeably varied kind. Excitement and worry are the great things to be avoided, and as it is impossible to altogether prevent them, since severe mental work usually involves great strain and harass, it is essential that prolonged rest should follow great excitement. A man whose work is of this description must take short hours of labour and long holidays, and, when away from his work, he must find amusements of sufficient interest to entirely divert his thoughts from business.

Recreation.—Dr Wilks' observations on this subject are so much to the point that they ought to have a place in every work on hygiene. He says, "Change of work is true recreation, for both brain and body get relaxation and relief through exercise in another arena of activity." He advises young people to encourage a hobby. "If you cannot find pleasure in the study of the very many wonders that surround you, if you care not for geology, natural history, or astronomy,

collect walking sticks, buy and cherish old and cracked china, fill up albums and scrap-books, or even gather together autographs and postage stamps, anything sooner than be idle." There is no doubt that this is the truth. True recreation requires a thorough change of work, and let us add of thought. A man, for example, whose life-work requires long continued hard thinking is likely to derive more harm than good from the thinking involved in a game of chess. Pastimes which involve much muscular exertion are preferable for a person engaged in sedentary pursuits. The recreation must be of a kind that will give pleasure, and that does not involve mental labour of a kind similar to that of the working hours. Concerning the choice of a recreation everything will depend on the taste of the individual. Fishing, yachting, mountain climbing, hunting, have each their votaries, whilst others enjoy milder recreation, such as billiards, tennis, whist, and the like. In turn all are good, but whatever recreations are taken up, two hours a-day at least must be given to some out-door exercise. The man who spends almost all his day in an office and then seeks his amusement in a hot close billiard or card room, is not likely to attain robust health, whilst in many cases the excitement of the office is only exchanged for the excitement of gambling, a change for the worse rather than the reverse. Another essential in all recreation is that part of it at any rate must be made conducive to bodily improvement, that is to say, the subject of recreation is closely interwoven with that of exercise, which must now be considered.

Effects of Exercise.—It increases greatly the number of the heart-beats and the amount of blood passing through all parts of the body. There is a greater influx of blood to the lungs to be aërated, so that the quantity of air inspired and the amount of carbonic acid gas exhaled are much increased. It increases the flow of blood through the small vessels of the

skin, and causes a profuse discharge of perspiration. It causes the muscles to increase in size and become harder and firmer. It improves the appetite and digestive powers.

Necessity for Exercise.—It is necessary for burning off many of the used-up materials that enter the blood from all parts of the body, which if not burned off would accumulate and set up various diseases. Everyone probably takes more food than is absolutely essential to the repair of the body, and if the refuse, as it were, of such food is not burned up by a proper amount of exercise, it will be necessary to draw a very hard and fast line as to the amount of food required, which is impossible. But exercise probably does good also by maintaining the balance of the circulation. Thus, a brain worked largely gets flushed with blood. If exercise follows, the blood is attracted to the muscles and the brain is relieved. In the same way exercise will relieve a congested stomach and liver, and it is also necessary to maintain the muscles in a firm and healthy state.

Amount of Exercise required.—Dr Parkes has calculated that the amount of exercise a man in health should take regularly is equal to walking nine miles a day upon level ground. The amount of walking done in walking about the house and other domestic duties may probably be put down as three miles, which will leave only a walk of six miles per diem on level ground. If the ground is hilly this will be still more reduced, so that it certainly does not seem an excessive amount to advise. The proper quantity must, however, vary greatly with circumstances. Females, for example, will not take as much as men. In winter more may be taken than in summer. In youth, when the body is undergoing its most active development, care must be taken that every muscle is exercised in its turn. Hence the free use of gymnastics, games, and sports at this age is most beneficial. In advanced life the power and inclination for exercise both fail, but even

then every effort should be made to prevail upon the individual to take some amount of exercise, and to postpone the evil day when he will become completely bed-ridden. Such an amount of exercise is in all cases necessary as will keep the muscles in good health, and enable them to meet the physical requirements of the rest of the body.

General Rules on Exercise.—Excessive exercise, especially climbing steep hills or much running up stairs, acts chiefly in a prejudicial manner on the heart. Any palpitation and great breathlessness are therefore signs that the heart is being over-taxed, and less exertion must be taken.

Regular exercise is the necessity for a healthy life, not sudden occasional prolonged exertion. The youth who spends all the week in an office, and on Saturday indulges in a violent game at football, probably does himself more harm than good.

Is there an antagonism between brain and muscle? Many people maintain that very athletic persons are proverbially stupid. When carried to an extreme point there is probably a certain amount of truth in this statement. It must not be forgotten, however, that some of the most intellectual men have been keen athletes, and to this fact may be attributed the immense amount of mental labour some are able to undergo throughout their lives. On the other hand, no one after following the hounds all day can come home and do a large amount of brain work. He is fit only for rest: he has exhausted his stock of nervous energy in violent exercise, and is unfitted for any close brain work.

From thirty-five to forty is about the age at which the middle of life is past, and the decline begins. Dyspeptic troubles, gout, &c., commence with perhaps a disinclination for exercise. This disinclination must be driven away and exercise imperatively enforced, or these troubles will develope with alarming rapidity. A person who has long led a sedentary life must only gradually change to an active one.

Strong exercise must never be taken on an empty stomach, especially in winter time. Too violent competitive sports should not be engaged in until the period of growth is complete.

Sleep.—Is a temporary suspension of most of the bodily faculties. All the body does not sleep: such a sleep is equivalent to death. Whilst we are asleep all the bodily functions essential to life are still carried on. Thus we continue to breathe, our heart beats regularly, and most of the organs of the body carry on their functions more or less. It is very doubtful even whether in the most profound sleep the brain is entirely at rest. Thus if we study our own sensations in regard to sleep, what shall we find? As a rule there will be a prelude to sound sleep—a time when the least external action, as the rustle of the bed clothes, or a draught of cold air will produce dreams hardly affected by consciousness, as if the outer world is only half forgotten. Then, again, there are the times of nightmare, probably occasioned by some internal unpleasant impression, as indigestion, when the whole sleep seems full of life, yet the fancies evoked have been so extremely improbable that the sleep must have been profound to have caused them. Thus some have maintained that sleep is never free from dreams, but that that time is the period of most profound sleep when the sleeper is quite unable to remember his dreams. Many things tend to support this theory. Everyone can remember waking after having experienced a delightful dream, yet only the dim shadowy feeling of having dreamt remains, and he is utterly unable to recall any of the incidents of his dream. So again some people habitually talk and laugh in their sleep, and others will even rationally answer any question addressed to them, yet will not remember on waking anything whatever of it. The theory as to sleep which is generally accepted is that it is caused by a diminished supply of blood

to the brain, and experiments tend to confirm this. But it is objected that instead of the cause this may only be the effect, and that it is the sleep that causes the diminished supply, whilst the habit of sleeping at definite times, together with fatigue, has much to do with its causation. It is essential before sleep can be obtained that the mind shall break itself away from the work on which it has been intent during the day, and those people who can sleep at any time are able by a strong effort of the will to divert their attention from such subjects.

Amount of Sleep necessary.—For a healthy person seven hours is the minimum that should be allowed. In the present age of unrest, even these cannot always be obtained at night. The hardworked statesman who is up through most of the night, and others whose work runs into the small hours, must therefore take the necessary amount at other times. What cannot be obtained at night must be taken in the day time, though the night sleep is more healthy and less liable to interruption than the day sleep. On a solitary occasion less sleep may be harmless, but if too little is attempted to be taken as a rule it will lead to dangerous consequences. The child at school requires not less than nine hours, whilst the infant should spend the greater part of its time in sleep. A man of sixty requires less sleep than he did at thirty-five, whilst in old age again more sleep is required, and the aged may pass much of their time slumbering.

Effects of Deficiency of Sleep.—The first sensations are those of restlessness and prostration, with headache, fulness, and throbbing of the head. Then sleep is difficult or impossible to obtain, and a state of feverish excitement commences. If, at this stage, perfect rest for a time is not taken, brain fever, insanity, and loss of mental power will result, often attended with such a feeling of wretchedness and despondency as occasionally to end in suicide.

General Rules on Sleep.—Duly regulated exercise of body and mind is the best remedy for sleeplessness.

A *very* hearty meal should be avoided just before retiring for the night. A moderate meal is conducive to sleep, and the nap after a meal so commonly longed for by the aged, may certainly in their case be indulged in without harm.

It is better to sleep on one or other side than on the back. The head should be somewhat raised, and an elastic mattress is better than a hot feather bed.

The bedclothes should be sufficient but light. Eider-down quilts are very valuable adjuncts to sleep.

Have the bed-room well ventilated, and never close the chimney.

Light tends to prevent sleep, as do loud, abrupt, or musical sounds, but monotonous sounds aid it. This is, however, mostly a matter of custom. Not only may we get accustomed to any sound, but on removing to a different place sleep may be difficult to obtain at first from missing the accustomed sound.

Robust people and dull heavy passionless people sleep much, whilst thin, wiry people take less sleep, but probably sleep more profoundly.

Sleep depends much upon habit. Some of the greatest men, as Napoleon I., have been very sparing sleepers.

Professions and Occupations.—The healthiest profession in England, at any rate, is the clerical. This is probably due to the fact that a large percentage of the clergy live healthy country lives, without too much severe work. In this profession, too, there is a certain secured income, and until the recent agricultural depression, the clergyman who was willing to cut his coat according to his cloth had little need for anxiety on this score.

Next to the clerical profession in point of longevity come barristers and agricultural labourers, and following these, carpenters, wheel-wrights, shoemakers, grocers, publishers, and booksellers.

Medical men, chemists, drapers, barbers, hatters, and miners, have a somewhat high rate of mortality, as also have gilders, and workers in wool, silk, and cotton; but these last classes do not now suffer so much as they used to do before legislative measures were taken for their protection.

The highest rate of mortality is found among earthenware makers, tailors, needlemakers, file and saw makers, railway employés, cabmen, commercial clerks, butchers, and publicans. The high rate of mortality among many of these is due to exposure to the weather and habits of excessive drinking brought on by their occupation.

The breathing in of large quantities of dust has a most deleterious effect in many trades, depending partly also on the quality of the dust. Thus what is known as grinder's asthma is a form of consumption developed amongst file cutters and needle polishers, from the inhalation into their lungs of the fine metallic dust developed during their work. Consumption is six to eight times as frequent amongst these trades compared with others. The mortality is minimised by grinding things wet as far as possible, and by the extended use of machinery. Stone-cutters suffer greatly also from the same cause; whilst coal-miners, though their lungs get absolutely black, do not suffer so greatly, probably owing to the free system of ventilation employed in mines.

Hatters and persons employed in silvering mirrors often suffer from poisoning by mercury, which they use for different purposes, whilst painters, type-founders, printers, and workers in lead are subject to colic, dropped wrist, and other symptoms of poisoning by lead. Lead poisoning is chiefly prevented by scrupulous cleanliness, by not eating without washing the hands, and similar precautions. In some places a drink containing very small quantities of sulphuric acid is used, which converts any soluble salt of lead into the very insoluble sulphate.

At one time, match-makers used to suffer frightfully from the inhalation of the fumes of phosphorus, which produces death of portions of the jaws, besides other general symptoms. The great remedy for this is the substitution of amorphous phosphorus, which will not produce these effects. The use of all other should be forbidden by law.

In the beating and carding of cotton a great quantity of dust is given off, which is injurious to the lungs when continuously inhaled. By a proper arrangement of ventilators and fans this evil ought to be abolished.

Bronchitis and rheumatism are especially prevalent amongst those who are exposed to rapid transitions from heat to cold, as stokers, puddlers, forgemen, and washerwomen. Baking is unhealthy from the night hours of work and the close, ill-ventilated atmosphere in which bakers work.

A soldier's life now, except for the accidents of war, is essentially a healthy one. At one time the deaths from consumption in the army used to be very high; but since more attention has been paid to hygiene and the barracks have been better built and ventilated, the mortality from this cause has been very greatly reduced.

Clerks and persons who write much are subject to a form of palsy from over-use of the muscles of the thumb employed in writing. From their sedentary mode of life, often in close, badly ventilated rooms, they are not a healthy class. They ought to pay more attention to their health by taking plenty of outdoor exercise daily, regardless of the weather. Shoemakers, tailors, and shop people suffer from the same sedentary mode of life. Shop people also are very liable to pain in the soles of their feet and varicose veins from their long hours of standing. Fortunately some stir has been made on this subject lately, but it is not easily remedied.

The causes of bad health in barristers are spending so many hours daily in close, foul courts, and the necessity for working

afterwards till late into the night if they are in large practice. Probably their high duration of life is due to the fact that so many rich men enter the bar as a mere form with no intention of practising.

Medical men find their length of days diminished by their tendency to contagion, by the anxious life they lead from the constant worry of serious cases, and by their never being able to call their time their own.

The Sea-side Trip.—It has become of late years so much the custom to consider a trip to the sea-side a necessity that a few remarks on this subject are necessary. There is no doubt that to dwellers in towns a change of air does an immense amount of good, and the children especially benefit from such change, returning from the visit sunburnt, rosy, and healthy, when perhaps before they were pale, weak, and cachectic. The choice of a sea-side resort, however, is not altogether a simple matter, and if a very mild, relaxing climate is chosen instead of a bracing, invigorating one, more harm than good often results. It is impossible to go fully into this subject in this place, but a subsequent chapter gives very full particulars about the various health resorts at home and abroad, and the special diseases for which they are most beneficial.

Speaking generally, the sea-side places on the south coast are the warmest, and are therefore most used by patients suffering from consumption and other lung diseases, who require a mild equable climate during the winter months. All these towns, however, are not alike. Some from their position or from the fact of their being sheltered from the coldest winds by hills and woods, stand out as pre-eminently fitted for winter resorts for patients suffering from lung diseases. The chief of them are Torquay, Bournemouth, Penzance, the Undercliff of the Isle of Wight, and Hastings.

The season at other sea-side resorts is generally limited to

the summer months, and parents take their children for a change at this time not only because more settled weather may be expected, but also that they may escape from the heat and dust of the towns to the more bracing and invigorating air of the sea-side. The most bracing places are those situated on the east and north-east coasts, as Scarboro', Filey, Cromer, and Yarmouth. Occupying intermediate positions as regards climate are some places on the south and west coasts.

Other circumstances besides climate, however, must have a voice in the decision. Thus convenience of access will weigh considerably with the father of a family who cannot afford to pay a considerable sum for mere railway travelling. The state of the coast at the different watering-places must also be taken into consideration. Thus for children good sands in which they can dig, and a good beach for bathing, are requisite. So also the length of the purse must weigh in the balance. Some fashionable watering-places are exceedingly dear, both lodgings and food being during the season at fancy prices. It is unfortunately the case that sea-side places are now so much sought after, and the accommodation is practically so limited, that tradesmen and lodging-house keepers reap during the season a rich harvest at the expense of poor paterfamilias.

Again, the amusements at a sea-side place will form an attraction to different people. Those fond of fishing or shooting will choose one place, those whose inclination leads them to geological and other pursuits will choose another, whilst the fashionable person will probably think there are only two sea-side places in England of any note—Scarborough and Brighton—and when the London season is over he will hurry to continue his dissipation at one of these. Such an one is not wise. The person who visits the sea-side should go for health, which cannot be obtained by a continuance of late hours at dances and indolent strolls to the strains of a band whilst

dressed in the height of fashion. To our mind the cream of watering-places is Eastbourne. Its climate is mild and equable, the amusements of a most healthy description, lawn tennis being carried on to almost an excess; whilst on the hottest day in summer a most delightful breeze may be enjoyed by climbing or driving up to the neighbouring promontory of Beachy Head. The question of change of air for convalescents from acute diseases must be left to their medical adviser. As a rule, those who have suffered from lung diseases or rheumatism will need the mild air of the south coast, whilst convalescents from acute fevers will require the medium bracing air of the west or south-east coast.

Much attention has lately been directed, and none too soon, to the sanitary condition of sea-side watering-places; but the inhabitants now know so well how intensely the subject is watched that most of them have put their houses in order, and the hygienic arrangements of watering-places as a rule are more perfect than in other English towns. It is worth while, however, to be acquainted with the state of the drainage and water supply of a place before making a final decision, as well as to enquire into the death-rate, and whether there has lately prevailed any serious epidemic disease. It is so much the custom for convalescents from the acute fevers to go to the sea-side, and, unfortunately, also to hide their maladies, that without great care, when it is too late, a father may find that in taking his children in search of health he has unfortunately only rushed into the midst of danger, and that the lodgings he has taken have just been vacated by a convalescent from an infectious fever. More stringent legal precautions are requisite on this head, and it should be an offence to be punished by a heavy penalty for any person having suffered from an infectious disease to take lodgings without declaring such fact. No landlady ought to be permitted to take in other lodgers without a medical man's certificate that

all proper measures have been taken to disinfect rooms that have been so occupied. In this connection the provision about to be made by the Home Hospitals Association for Paying Patients, Fitzroy House, 16 and 17 Fitzroy Square, London, for the removal and care of infectious convalescents, may be mentioned with advantage. A contribution of fifty or twenty guineas to this association confers substantial privileges upon heads of families, bachelors, schoolmasters, and all who reside in lodgings. The Convalescent Home Hospital or Hotel will be found a delightful residence, where the cost of everything is reduced to a minimum, although the cuisine, the skilled nursing, the management, and the accommodation are of the very best. The scheme has been so devised as to be brought within the means of every middle-class family, and all thoughtful people will do well to make themselves acquainted with it.

Many persons on first arriving at a sea-side place are troubled with diarrhœa, whilst others on the contrary suffer from constipation. These ailments are probably due to the change of life suddenly adopted, and would be prevented by due regard to the choice and amount of food for the first few days, with proper precautions as to exercise and living.

CHAPTER VI.

THE CHOICE OF A HOUSE.

Importance of care in selection of a House.—Much more depends upon the choice of a dwelling than most people imagine. A house stoutly built of sound materials, on wholesome soil, and with a proper aspect, may make all the difference between permanent good health and systematic discomfort. The sanitary defects of houses are so numerous, so varied, and so intermingled the one with the other, that it would be impossible within the limits of these pages to set out in detail the remedies for every set of circumstances which may arise in a dwelling. But certain general principles will be laid down, the application of which to the particular dwelling ought not, as a rule, to be difficult.

In seeking for a fit abode for one's household gods, abundant troubles and vexations have to be undergone. We shall not here descant at length on the iniquities of the house-broker and the house-agent,—of which some people entertain a very vivid and painful recollection. It is well, in commencing the adventure of house selection, to make up one's mind to a healthy and impartial disbelief of much that those who want to let a house desire to impress upon you in reference to it, and to satisfy oneself personally with regard to every point.

Locality.—It is rare for an intending householder to be absolutely unbiassed as to the locality of his abode. When he is, he will of course betake himself to one or another of

the health resorts treated of in another part of this book. If he proposes to "build him a house," he will naturally have abundant scope for the satisfaction of his peculiar wants and inclinations. The average house-hunter is less fortunately circumstanced. He has to be content with a house ready-made; and happy is he who finds a place to his taste without abundant leg-tire and vexation of spirit. Assuming, however, that he has limitless choice of locality, aspect, and construction, he will do well to bear in mind the following suggestions.

Situation.—The great things to be aimed at are to have as much air and light as possible. The slope of a hill is perhaps the best situation; but the house had better not be quite at the top, so as to secure shelter from the wind. Trees are a great adornment and often a protection; but they should not be allowed close up to the house walls. Very steep hills are, however, objectionable, not only on account of the difficulty of climbing up them, but because the close proximity of the hillside at the back of the house prevents the free circulation of air, making the chimneys smoke, and keeping the house damp. The vicinity of ponds, lakes, canals, or other stagnant water should be avoided, on account of the moisture which they impart to the air. If the house be low-lying, this precaution must be especially observed. The supply of drinking water must of course be good and abundant. An open space at the back of all houses is a *sine quâ non*.

Neighbours to be avoided.—So much for natural conditions. But the proximity of undesirable industries and other matters must also be reckoned with. Thus in the country offensive trades or factories should be given as wide a berth as possible. Infectious hospitals, cemeteries, sewage works, dust yards, and bank holiday neighbourhoods are all things to be avoided. In towns there will be equally obnoxious neighbours to keep at a distance—such as places of public refreshment and amusement, mews, cab-yards, noisy church bells, elementary schools, under-

ground railways, and the like. It is as well to avoid unfinished suburbs, *i.e.*, those which, in the language of the house-agent, are "in process of development," for the lighting, paving, drainage, scavenging and other similar matters are sure to be incomplete and unsatisfactory.

Aspect.—Probably the best situation for a house is the slope of a hill facing nearly due south. The cold winds from the east or north will be thus cut off, and as much sunshine as possible will be secured, which is the great brightener and beautifier of all things. A northerly aspect is cold and bleak, and often damp. An easterly aspect is also cold, but is as a rule fairly dry; whilst a westerly aspect is warm, but damp and exposed to boisterous and rainy winds. For some parts of the dwelling, however, sunshine is not so much required; and it will therefore be well to consider the disposition of the several rooms when planning the erection of a new house. Information on this point will be found in the chapter on the Interior Arrangements of the House.

If one's choice be limited to the side of a street or square, avoid the west side, which faces the east wind, gets scarcely any sun on its living rooms during the winter, and in summer has the heat pouring into its bedrooms in the hottest part of the day. Choose, if possible, the north side, which is sunny in front and cool at the back.

Soil.—It is necessary to remember that the ground is both an air-carrier and a water-carrier. Gases of all kinds filter through the soil, and are directed up into houses by the warmth of the air inside. Thus sewer gas, coal gas, foul air from cesspools, and the like, may find their way into our rooms, and thence into our lungs. The amount of surface-water in the soil affects largely the dampness of the ground. Hence in choosing a site for a house it is necessary to avoid a water-logged or filth-sodden soil. All clay soils, which are invariably damp and unwholesome, come under this ban; and so also do

alluvial soils, which, though porous, are mostly wet. Gravel, the looser limestone formations, and chalk, are, from a drainage point of view, the best soils. Where, as in the neighbourhood of London, clay cannot be avoided, the house should be well trenched all round with damp areas, the sub-soil drainage laid with sharp gradients, and the foundations built up with cement or concrete. "Made ground," *i.e.*, ground from which the proper sub-soil has been removed, and where house and street sweepings, cinders, and other refuse have been substituted, is the very worst kind of soil on which to build a house, and should be shunned by the careful citizen.

Water-supply in Towns.—The necessity of a good supply of wholesome water is all important. In towns water is usually supplied by pipes laid on to each house under the control of the local authority or a public company. This supply ought to be constant, but is mostly intermittent, *i.e.*, the water is turned on from the main for two or three hours only each day. During this period the house cistern is supposed to fill itself; and in any event no more water than it contains can be had until the next day. Intermittent supplies of this kind make possible the ingress of sewer gas into the water pipes through the water-closet fittings, and are in every way disadvantageous. A constant supply should be insisted upon wherever practicable. It is as well to bear in mind in this connection that stronger fittings are required, and that much damage and inconvenience may arise from the forcing of a weak fitting by the weight of water behind it.

Water-supply in the Country.—But in the country the case is altogether different. Here a separate supply for each house or each group of houses has to be found independently. The householder will have to satisfy himself that the source from which he proposes to draw his supply of water for domestic purposes is pure and of sufficient quantity for his requirements. The River Pollution Commissioners give the

following table of the relative value of the different classes of water :—

Wholesome	1. Spring water	Very palatable.
	2. Deep well water	
	3. Upland surface water	Moderately palatable.
Suspicious	4. Stored rain water	
	5. Surface water from cultivated land	Palatable.
Dangerous	6. River water to which sewage gains access	
	7. Shallow well water	

It is therefore with the first three classes that we have to deal, dismissing the other four as entirely useless for our purpose.

Wells.—If a house be placed in such a position as to be able to utilize a good spring, such a course should be adopted. Failing this, inquiry should be made into the geological structure of the district, and the propriety of sinking a well considered. Wells may be divided into two classes—shallow and deep. The shallow wells depend for their supply on the local rainfall. They are often exhausted in a dry summer, and the water is more liable to be impure than that from deep wells, on account of the small quantity of earth through which the water runs, so that it is not sufficiently purified. The deep wells receive the general ground water which is slowly moving through an extended region to the nearest river or lake, the centre of drainage of the country. It is a necessary precaution to have the water carefully analyzed before commencing to use it. The well should be at least 50 or 60 feet distant from the closet for fear of possible leakage and pollution, and if on a slope the closet should be below the well. The water from a well should also be pumped up. This presents many advantages over the

draw well, and the top should be carefully covered and raised above the surface level to prevent the entrance of storm water.

Dr George Wilson in his book on "Sanitary Depôts in Villages," says on the subject of water-supply:—"Specially suited for use in rural districts are Norton's Abyssinian tube wells. They consist of narrow iron tubes driven or screwed into the ground in lengths, and with the lowest length pointed and perforated at the end. The dangers arising from the entry of surface impurities are entirely obviated, and they further possess the advantages of being driven into any good water-bearing seam which may be selected, of securing a sufficient yield in dry seasons, and of entailing comparatively little outlay, either for their first cost or in sinking them. Wherever pump wells are in use, these tube wells can be sunk. In two days a well sixty feet deep can be sunk, which in most cases will yield an abundant supply of pure clear water within a few hours after completion."

A difficulty that occurs with these wells is that the water which enters the perforated end at a high velocity frequently comes to the surface so charged with sand or other particles of other material that it is unfit for use. To obviate this the following method has been devised:—the tube is withdrawn and the pointed end unscrewed, and the tube driven down without it. The sand is then pumped up until a sufficient amount has been removed to form a cavity below and about the end of the tube. The cavity thus formed is filled in with clean gravel, and the tube is withdrawn, the point refixed and driven down into the gravel, when the water can be pumped up in a clear state.

The utmost care and forethought are necessary in the arrangement and construction of a well. Whether it be deep or shallow, it is necessary to guard against (1) the entrance of surface water, (2) the percolation of underground

water, and (3) the percolation of the contents of cesspools or drains. In order therefore to fortify himself against all possible dangers of contamination to his water-supply, the householder will do well to have careful examination made of the wells in the immediate neighbourhood, and to ascertain the direction of the flow of the underground water.

In some kinds of soil the water which is yielded is of so hard a nature that it is bad for cooking and washing, besides being often positively unwholesome for drinking. In such circumstances it is best to provide as large an amount of storage as possible for rain water, which is the best of all waters for cooking and washing.

Rain Water.—Rain water tanks may be either constructed underground, or they may be ordinary cisterns fixed anywhere that is most convenient. In the case of the underground tanks, it is necessary to provide a pump for raising the water to the different points of supply, and it is also advisable to construct some sort of filter to remove from the water any impurities it may absorb. Rain water is not so pure as might be expected, since it washes down various impurities from the atmosphere, the roof, &c. Still it is a very soft water, and as such highly useful for most washing and domestic purposes. It should not be stored in a lead or zinc cistern for fear of contamination by such metals; slate, concrete, or brick lined with cement, are the best materials for such cisterns. If used for drinking and many cooking purposes, it must be filtered before use.

The quantity of water available for domestic purposes should be not less than thirty gallons per head per day. If less than this has to be endured, a sacrifice of some of the water used for the bath will have to be made.

Warnings to intending Householders.—Before you decide to take any particular house, be careful to have it thoroughly inspected by your own surveyor or sanitary engineer. A

number of Sanitary Assurance Societies now exist, whose function it is to examine houses, and to report what work is necessary to put them into a proper sanitary condition. If the householder has no one else upon whom he can rely, let him pay a guinea or two to one of such societies, providing that he has clear evidence of its public character, and that it is not merely a high-sounding title used for trade purposes by enterprising individuals, whose knowledge of sanitation bears an inverse ratio to their business astuteness. Such an inspection, properly carried out, will be money well spent, and very likely be the means of avoiding much trouble and expense later on.

Never take for granted the report of the house-agent as to the state of repair of the house, especially if you propose to take it upon a "repairing lease." Either look into these matters yourself with an attentive eye to details, or get some trustworthy surveyor to do so for you. Never trust to the effusive promises of the landlord or his representative that such and such things will be done as a matter of course, but that as some one else is "after the house" it would be wise for you to settle upon it at once. The reply should be that you will send him a written answer by the post. Then go home, make out a list of everything you wish the landlord to do, and write him a letter, of which a copy should be kept, enclosing your list of requirements, and stating you will take the house on hearing from him that he agrees to do what is required. Let the agreement be once signed without this preliminary precaution, and the repairs will never be done. It has been held that the whole duty of the landlord is to keep the roof on and the rain out; and certainly most landlords grumble at the necessity of any repairs whatever. It is well, therefore, to have a distinct understanding in writing as to what the landlord will do and what he will not do, before taking a house.

In entering upon possession, see that the gas and water bills and the local rates and taxes have been paid by your predecessor. Otherwise you will have to pay them for him, with a strong probability of never being able to get your money back. The landlord is bound to return to you the sum you pay under Schedule A of the Income Tax (*i.e.*, property tax), and some other charges.

CHAPTER VII.

THE STRUCTURE OF THE HOUSE.

Dangers of Unwholesome Houses.—Although the average householder may not be able to control all the matters which are essential for a perfectly healthy house, it is right that he should be made fully acquainted with the various dangers to which neglect of the rules which govern good house building give rise. A very large proportion of the houses now being built are sanitarily imperfect and unwholesome. They are intended to last only, at the utmost, for the length of the lease of the plot of ground on which they stand; and they are accordingly built of improper materials, and are run up by the score with little or no regard to their healthful occupation. "Jerry-building" has become a bye-word amongst sanitary reformers; and it cannot be doubted that abundant discomfort and impaired health, if not in all cases actual disease, is the lot of a large proportion of the dwellers in "suburban villas." There are, of course, good and bad builders, though, perhaps, in the class we are alluding to, the bad predominate; but, good or bad, the houses are every one of them got up to sell, and it is only dire experience that makes manifest their defects. It is important, therefore, before buying or renting a house, to obtain, if possible, a written guarantee, from the seller or landlord, of its sanitary condition. In addition to this, it is eminently necessary to carefully examine all those adjuncts of the house upon whose stability and good construction so much of the well-being of the inmates depends.

Law as to Stability and Sanitary Condition of Houses.—To a certain extent the law comes to the aid of the householder, and, if properly applied, supplies him with the means of bringing pressure to bear upon a defaulting builder. Under the Public Health Act, England (omitting London) is divided into sanitary districts, urban and rural, for the purpose of putting in force the provisions of that Act. Urban sanitary authorities are either Town Councils, Improvement Commissioners, or Local Boards. Their functions are twofold—(1) legislative and (2) administrative.

The legislative functions consist of the power to make bye-laws for carrying out the provisions of the Public Health and Nuisances Removal Acts — and these bye-laws may relate to the following among other subjects: the level construction and sewerage of new streets, the structure of walls, foundations, roofs, and chimneys of new buildings, the sufficiency of open spaces about buildings, and the drainage of buildings, water-closets, earth-closets, privies, ash-pits, and cesspools; the closing of buildings or parts of buildings that are unfit for habitation; the prevention of nuisances arising from snow, filth, dust, ashes and rubbish; and the prevention of the keeping of animals so as to be injurious to health.*

The administrative functions of a Local Authority with which we are more particularly concerned, consist mainly in enforcing the observance of their own bye-laws, when they have them, and in making proper provision for the removal of refuse. But it is necessary to observe that the Act says that a Local Authority *may* make bye-laws, not that it *shall* make them; and it is just this optional or permissive char-

* It is to be noted that the power of making bye-laws in respect to the structure of new buildings is limited by the Act to three objects: for securing stability, for the prevention of fires, and for purposes of health.

acter of the law that opens the door to so much wilful neglect by Local Authorities of their obvious duties.

The method of preparing a code of bye-laws of a district is as follows: the Local Authority prepares a draft code, and forwards it for confirmation to the Local Government Board, which either confirms it or sends it back to the Local Authority for revision. It is easy to see that if a Local Authority wishes to defer the confirmation of its bye-laws, it has only to put in clauses which are certain to be rejected by the Central Authority, and to repeat the process until the desired object is gained: the object being that the jerry builders of the district shall be unfettered by building regulations until all the available land has been covered.

The Sanitary Authorities for rural districts are the Boards of Poor Law Guardians, and their districts are such parts of parishes or unions as are not included in any urban district. Their powers are more limited than those of urban sanitary authorities. While practically identical in respect of sewerage and drainage, water supply, and the removal of nuisances, Rural Authorities have no powers (except in cases where such powers are specially granted by the Local Government Board) of making bye-laws for the regulation of buildings, streets, &c.

It will be seen from the above that ample powers of regulating the construction of buildings are conferred on Local Urban Sanitary Authorities, and it only remains for them to exercise those powers in a proper manner.

For the metropolis there is a Building Act which regulates the construction of buildings as regards their stability and the prevention of the spread of fire, but only in a minor degree as regards purposes of health. The Vestries and District Boards have powers for the removal of nuisances and for the regulation of drainage; but, as compared with an Urban Sanitary Authority, armed with a code of bye-laws, the health powers of metropolitan authorities are very imperfect.

Sub-soil.—It has already been stated that serious and fatal diseases have resulted from the leakage into the sub-soil of a house of gas from faulty pipes, or of organic filth from neighbouring premises. Frequently, too, houses are built on ground impregnated with fœcal matter, or the original soil of which has been removed and replaced by the contents of local dust-bins or other filth. In all these cases, unless a solid impervious bed of concrete or a layer of asphalte be spread over the whole surface of the ground under the house, the air continually drawn up into the house from the ground will be laden with possibilities of disease. In all districts where the model bye-laws of the Local Government Board are in force it is compulsory, whatever be the nature of the soil, to cover it with either asphalte or a layer of cement concrete six inches thick; but in the bye-laws issued by the Metropolitan Board of Works the extraordinary exception is made in favour of "virgin soil," as if "virgin soil" were any less porous than "made ground"! A square yard of concrete six inches thick can be laid down at a cost of from 2s. to 2s. 6d.; but good lime concrete costs about half that amount, and if covered on the upper surface with a good thick coat of cement will answer the purpose equally well.

Prevention of Dry Rot.—The internal structure of a house is, in many respects, at least as important to the health and comfort of the inmates as its external fabric. We have already described the precautions necessary to be taken to prevent the air and moisture contained in the ground from rising up into the interior of the house. The concrete bed which is laid down for this purpose serves to support the framework of the floor; but in order to prevent the occurrence of dry rot in the timbers (or joists, as they are called) it is necessary that the space between the concrete and the floor should be properly ventilated. The bye-law which regulates this provides that there

shall be a space of at least three inches between the under side of the joint and the upper surface of the concrete. This provision is, however, not infrequently made a dead letter by the jerry builder, who, to save a few bricks, puts the lower floor of his house on a level, even sometimes below, the ground surrounding it. There ought never to be less than two steps into a house, and a householder will be well advised to shun any house the ground floor of which is on a level with or only slightly above the surrounding earth. Dry rot is a species of fungus which spreads very rapidly. Inferior timber frequently comes over to this country with the disease in it; but it is possible by stacking it in the open air, with plenty of space around each plank, to eradicate it. This, however, takes time, and time to the jerry builder means money, so in goes the green diseased wood fresh from the merchant, and in due course the rot makes its appearance. This use of unseasoned wood is one of the most trying things the long suffering householder has to contend with. The joints of the floor boards yawn, and become so many receptacles for dust and refuse of all descriptions. Doors split, windows rattle, and skirtings part company with the walls; and all from the one cause, green unseasoned wood.

Prevention of Damp.—Having thus taken care that the air and moisture shall have no chance of rising into the house from the ground beneath the floor, we must now turn our attention to the walls, which it is equally necessary to protect from rising damp. If you plant a brick or stone wall on ground which is capable of retaining moisture, it will inevitably happen that unless you take means to stop its progress, the moisture will climb

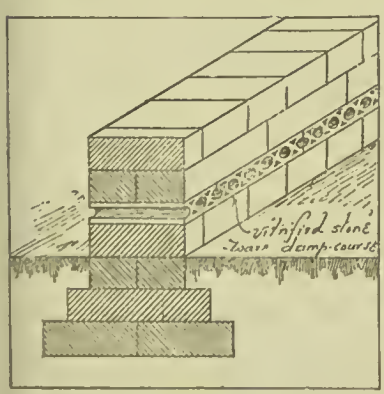

Fig. 1. Damp-proof course.

up the walls in obedience to the law of capillary attraction. The way to prevent this is to insert above the ground-level, but below the floor-level, either a course of vitrified stoneware made on purpose, or two layers of slates laid in cement, or some other equally effectual impervious material, the intervention of which between two courses of brickwork bars will prevent the further upward progress of the damp (see figure 1).

The existence of a concrete bed over the surface of the house-site cannot as a rule be discovered without removing one of the floor-boards, unless, indeed, the intending occupier sees the house in course of construction and ascertains the fact for himself. As to the damp-proof course, however, it is possible by knowing what to look for, and where to look, to find out for a certainty whether there is or is not such a thing. Examine carefully the joints of brickwork between the ground and the

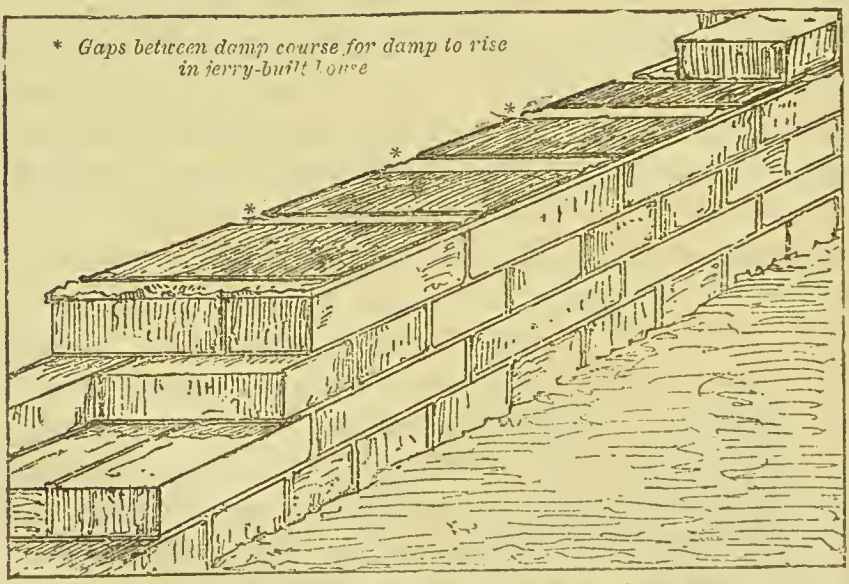

Fig. 2. Diagram shewing imperfect damp-proof course

level of the lower floor. A vitrified stoneware damp-course will be conspicuous from its perforations, and the difference in colour between it and the bricks. Asphalte or slates or cement alone will all appear, the two latter like mortar joints

about three or four times the usual thickness. A favourite material with speculating builders is tarred or asphalted felt, the presence of which can generally be detected by portions of it projecting from the wall. Its efficacy is, for all practical purposes, useless, and on no account should a Local Authority sanction its use.

The damp course shewn in fig. 2, sketched from a house in course of construction at Willesden, is a remarkable illustration of how not to keep the damp from rising. It is composed of one course only of ordinary roofing slates laid in mortar, with a space of at least an inch between each slate and the next one.

Walls.—There are other ways than those above described by which damp penetrates the outer walls of a house. Walls of only one brick in thickness are in most positions, but especially so in exposed angles, absolutely powerless to resist the ingress of driving rain. Wet soaks down walls if parapets are defective, or is drawn in under window sills if they do not project sufficiently to throw off the rain.

A wall that does not keep out the wet because it is too thin can generally only be mended by having a coat of stucco put all over it; but stopping up the joints with good cement, and applying a waterproof composition to the bricks, may often effect a cure. In many country places, and especially by the sea, it is impossible to keep out driving rain except by the use of hollow walls, that is, walls formed of two thicknesses of brick, with an intervening space of about two inches. This is a costly form of building, and one, moreover, which loses on the score of strength. The common substitute of battening the walls inside and then stretching canvas to take the paper, is a process that cannot be too strongly condemned. Instead of attempting to cure the evil it only hides the effects.

There are, however, other sins of the jerry builder in the matter of walls which are of scarcely less moment. Badly burnt, soft, friable bricks, put together with a composition of road

drift and garden mould, and pointed after the wall is built with a species of putty, is a sort of construction that is advantageous to no one but the builder. The first frost removes the pointing, and the first succeeding shower of rain washes the "mortar" half out of the joints: with the result of settlements and cracks, and damp penetrating in all directions.

Where it is necessary to have any rooms or cellars underground, the walls which abut on the earth should be built hollow. Without some such protection as this, a basement is worse than useless, as its damp condition would affect the whole house to a certain extent.

Roof.—We now come to the roof covering. Of the various materials available for roofing purposes, two, slates and tiles, are chiefly used for dwelling houses. Of the two, slates are, as a rule, the more economical, from the fact that they are lighter, and therefore require slighter timbers to support them, and that they can be laid at a much less inclination than tiles. They are, however, not so good a roof covering as the latter, being thinner, and therefore more affected by alternations of heat and cold. Good stout slates, properly laid with a sufficient lap, make as durable a roof covering as can be had. The "lap" is the part of the slate covered, not by the slate immediately above it, but by the one above that; thus, at the part where the lap occurs, there are three thicknesses of slates. If this precaution be neglected, as it frequently is in order to save slates, the wet will undoubtedly beat up and make its way in between the slates. Then again where an angle is formed, either at the apex of the roof (the ridge) or where two slopes meet each other at an angle (a hip), a covering is necessary in order to keep the joint water-tight. This is done in several ways: by lead or zinc, or by tiles or slate made specially; and inasmuch as both hip and ridge are the points on the roof most liable to be injured by wind, it is especially necessary to have a sound and durable covering. Zinc is not to be recommended

for the purpose on account of its lightness, and also the difficulty of making a satisfactory joint in such a position. Lead may be dismissed as being too costly for our purpose.

There remain tiles and slate ridges and hips. Tiles, if well made and if strongly fastened and well pointed, are as good as anything, and the slate hips and ridges, if properly secured to the woodwork and the screw holes protected with red lead, are equally efficient. The effect of "scamping" this part of the work may be seen in at least one suburb of London (Willesden), where, in a row of twelve semi-detached houses having in all twenty-four hips, four only have escaped being entirely stripped of their coverings during recent gales.

Besides keeping out rain and snow, an important function of the roof is to preserve as far as possible an even temperature inside the house. This duty is, as has been remarked, more efficiently performed by tiles than by slates; but if slates are used it is quite possible by interposing a layer of felt between the rafters and the slates to materially lessen the conductive power of the latter. The felt should be laid on boarding, and the battens nailed on over the felt.

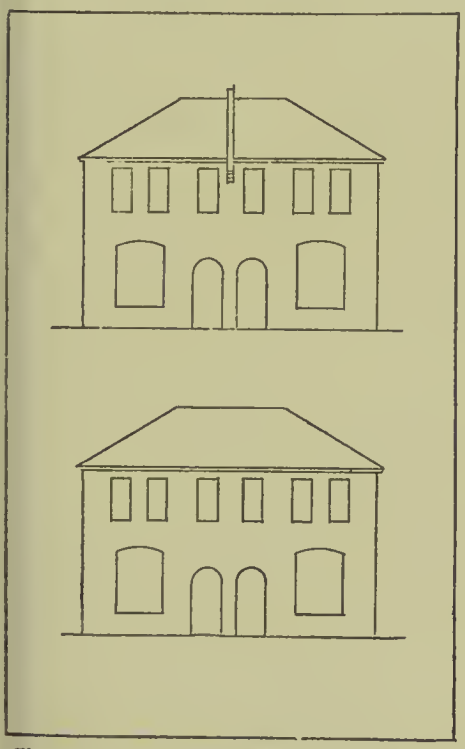

Fig. 3. Diagram shewing houses with and without party walls above the roofs.

Before leaving the subject of roofs and roof coverings, it will be well to warn the house-hunter against zinc flats. As generally laid by the speculating builder, they are utterly worthless. Made with thin zinc with soldered joints and

seams, they expand and contract with every alternation of cold and heat until water pours in at every seam and joint, and after a few years' wear, the whole thing has to be taken up and replaced with lead.

We have pointed out that one of the purposes for which bye-laws respecting the construction of new buildings may be made is the prevention of fire; and accordingly it will be found that in any code of bye-laws sanctioned by the Local Government Board, clauses are contained regulating the height of party walls above roofs, and providing that where the space between two detached houses is less than 15 feet, parapet walls shall be carried up at least 1 foot above the gutter of the roof in each case, in order to prevent the possibility of fire being communicated from one house to the other by the overhanging woodwork of the roof (see diagram on page 127).

Drainage.—The importance of good drainage to a house is pretty generally recognised to-day; but in the application of theory to practice, the average builder of suburban villas is by no means up to date. Nor is the builder the only sinner in this respect. Had architects been alive to their duties in this matter, it is certain that several grave blunders, with results of a most serious kind, would have been avoided. Were local surveyors and engineers, to say nothing of sanitary inspectors, properly vigilant in the supervision of builders in their districts, many scandalous and fraudulent cases of neglect would be detected and remedied. The following is a typical instance of the combination of scamping by a builder and neglect by the local authorities, which had a result that was well nigh fatal. In a house built about fourteen years ago in a large London parish, one of a row let at a rental of £50 per house, the drain was carried down to within two feet of the sewer, and there ended, leaving a gap of that width between drain and sewer. So far the blame was chargeable to the builder. But the parish authorities put in the "eye,"

that is the connecting orifice to the sewer, charged their fees for so doing and were paid, though—in the face of their own printed regulations—they neglected to see that the house connection for which they were paid was actually carried out. The consequence of this double dishonesty was, that after the sewage from the house had soaked into the ground around the end of the pipe until its powers of absorption were exhausted, it gradually accumulated in the pipe until it was full, and then burst through the joints and flooded the ground under the lowest floor of the house. In the result a child a few months old was nearly killed by a violent attack of infantile diarrhœa.

Disposal of Sewage.—The ultimate destination of the water borne sewage from a house may be in one of three ways, (α) into a sewer, (β) into a cesspool, and (γ) to a sewage farm. In each case, however, the function of the drain is the same: viz., to carry off as swiftly and as completely as possible every particle of fæcal or other matter discharged into it.

Where a public sewer exists, the drain should be taken by the most direct route available from the house to the sewer, and its direction should be an absolutely straight line from point to point. Its inclination or fall should be regular and even, and ought not to be of a less gradient than 1 in 30—that is, 4 inches fall to every 10 feet of linear measurement. In order to obviate the possibility of the pipes being affected by subsidence of the ground, they should be laid in a solid bed of concrete, and in order to prevent leakage, the joint of each pipe should be carefully made either with Portland cement or with the bituminous substance known as "Stanford's joint." Drains which pass under houses, as of necessity they must in most cases in London, should either be completely enclosed in concrete or should be laid with heavy cast-iron pipes with socketted joints caulked with lead. In any case, all drains, however laid, should be thoroughly tested

before being used, by plugging the lower end and filling the pipes with water, which should be allowed to stand for some hours.

Cesspools.—These general principles apply equally to drains which lead to a cesspool instead of to a sewer. While, however, the householder has no control whatever over the public sewer, he has most complete control over his own cesspool. The situation of the cesspool is naturally the first consideration. Where there is plenty of space and no difficulty about fall there will be little difficulty in fixing on the situation of the cesspool. It will of course be placed as far as possible from the house, and in the lowest part of the grounds, and be remote from any possible sources of water supply. But it will at times occur that a space some twenty feet or even less from the house is the greatest available distance at which the cesspool can be placed. Under these circumstances the only thing to be done is to take every possible precaution to render the cesspool water-tight, and to provide the most ample means of ventilation. Cesspools, wherever they are placed, should be provided with ready means of access for cleansing purposes, and ought never to be so situated that their contents cannot be removed without being carried through some portion of the house. A very useful clause in the Model Bye-laws (No. 85) provides that no cesspool shall have any outlet either to a drain or sewer. The object of this is to prevent the construction of cesspools in any place where a public sewer exists.

The Public Health Act (sec. 47, 3) expressly prohibits the overflow or soakage from cesspools in urban districts, so that in districts where no bye-laws exist the aggrieved householder can put the Local Authorities in action to compel the builder to construct his cesspools in a proper manner. The results of scamping work of this kind may be exemplified by an instance of what was actually observed in a London suburb

last summer, at Willesden, where, from a row of houses the cesspools of which were about twenty feet from the front doors, sewage was to be seen leaking through the front garden walls and under the public footpath into the gutter in the road. In all cases where sufficient space exists, means should be adopted to intercept the solid matter on its way to the cesspool, which would then receive only the liquids. This is done by means of a chamber formed with a rounded concrete floor, across which a wire strainer is fixed. The solid matter is retained, and is available for use in the garden, while the liquids flow on to the cesspool.

It cannot, however, be too strongly insisted upon that cesspools are in themselves objectionable, and should on no account be adopted unless it is impossible to dispose of the sewage in a better fashion. Unquestionably the best of all methods of sewage disposal, where the proper facilities exist, is by utilizing it on the land either by surface treatment or by one of the recognised methods of irrigation. These systems are applicable only to large establishments, and where land of a suitable nature is available in a sufficient quantity, and it is beyond the scope of this work to enter into the details of them.

Ventilation of Drains.—Having taken due care to see that the drain is properly laid, it is necessary to ensure that, so far as is possible, the air in it shall be pure, and shall neither be liable to stagnation nor to contamination by foul air from the sewer. In order to keep the air from stagnating, it is necessary to provide at least two openings,—one as near the lowest point of the drain as possible, the other at the highest point, and the larger these openings are the better. The usual practice is to form the lower opening at the ground level close to the main trap, and to carry up the soil pipe above the roof to form the higher opening. This arrangement is very clearly and explicitly laid down in the Model

Bye-laws, and an essential element in the success of such a scheme is that the ventilating pipe in continuation of the soil pipe shall be of the same diameter as the latter. It is also important that the pipe shall be carried up in a straight line without angles or bends, it being a well ascertained fact that the flow of air up a shaft of this nature is readily impeded by abrupt changes of direction. The annexed examples were all sketched in one district, where the Local Board have a code of bye-laws which forbid the use of such abominations.

In fig. 4 the pipe is made to open exactly over a chimney-pot, so that if there be any down draught in the flue the air in the pipe will be sucked down into the house. In fig. 5 we have a four inch pipe ventilated by a one inch pipe, in which the air would have to pass six angles before it could reach the outlet. Fig 6 is, it may be hoped, an entirely unique example; the soil pipe is there, and the ventilating pipe is there also, but the necessary connection between the two is absent.

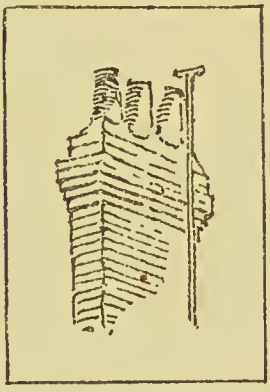

Fig. 4.

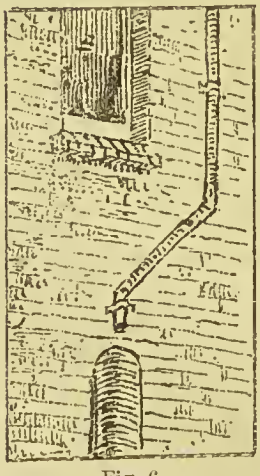

Fig. 6.

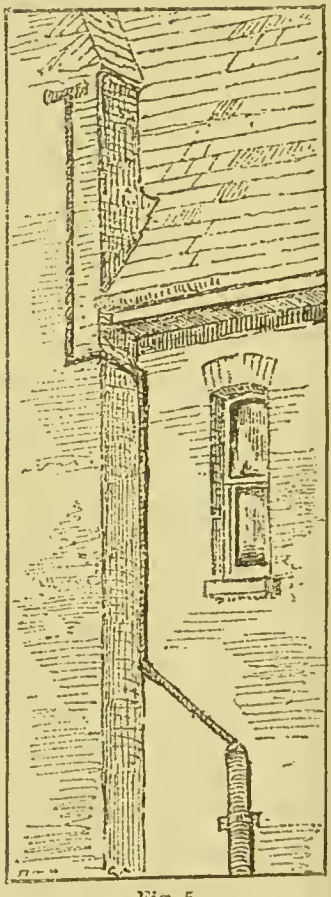

Fig. 5.

It is equally necessary, if the air of a house drain is to be

kept pure, to shut out the sewer air, which is, as a rule, the very reverse of pure. The only way to accomplish this is to interpose between the sewer and the drain such a body of water or "trap" as will prevent the passage of air from one to the other. There are two ways of forming this trap: one being to build a square brick pit divided transversely by a stone slab called a dip-stone, because its lower edge dips some two inches below the standing water level (see fig. 7). *This is emphatically the wrong way to do it;* the square pit becomes in course of time a foul cesspool on a small scale, and cannot be kept even tolerably clean except by constant cleansing by hand. The objections to such a practice are obvious.

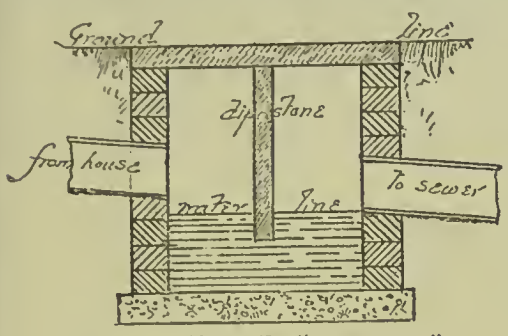

Fig. 7. Dip Trap—the "wrong way."

The other and right way to intercept the sewer air is by a trap constructed as follows (fig. 8):—It is made of one piece of glazed stoneware, and is practically a bent pipe so formed that the passage is absolutely barred by the water, which is kept at a certain fixed level by the formation of the trap. Such a trap as this is self-cleansing. Next, an opening at or near the ground level should be made as near to the house side of this trap as may be. There are two ways of forming this opening. One is to carry up a pipe to the surface of the ground and put a grating on the top. This is the simplest and least expensive method. The other and more costly way is to form a rectangular chamber or manhole, some 2 ft. by 3 ft., with a hinged lid or cover (fig. 8), and to take the drain through the floor of it in an open channel. The advantage of this arrangement is that access is readily obtainable without the necessity for opening the ground and breaking

into pipes. Fig. 8 shows the interior of such a chamber, with one half of it removed to show the arrangement of the channel and trap. A is the trap, B the half pipe or channel, C the cleaning arm for the drain beyond the trap, the mouth of which is covered with a disc cemented down, D is the drain leading from the house, and E that leading to the sewer.

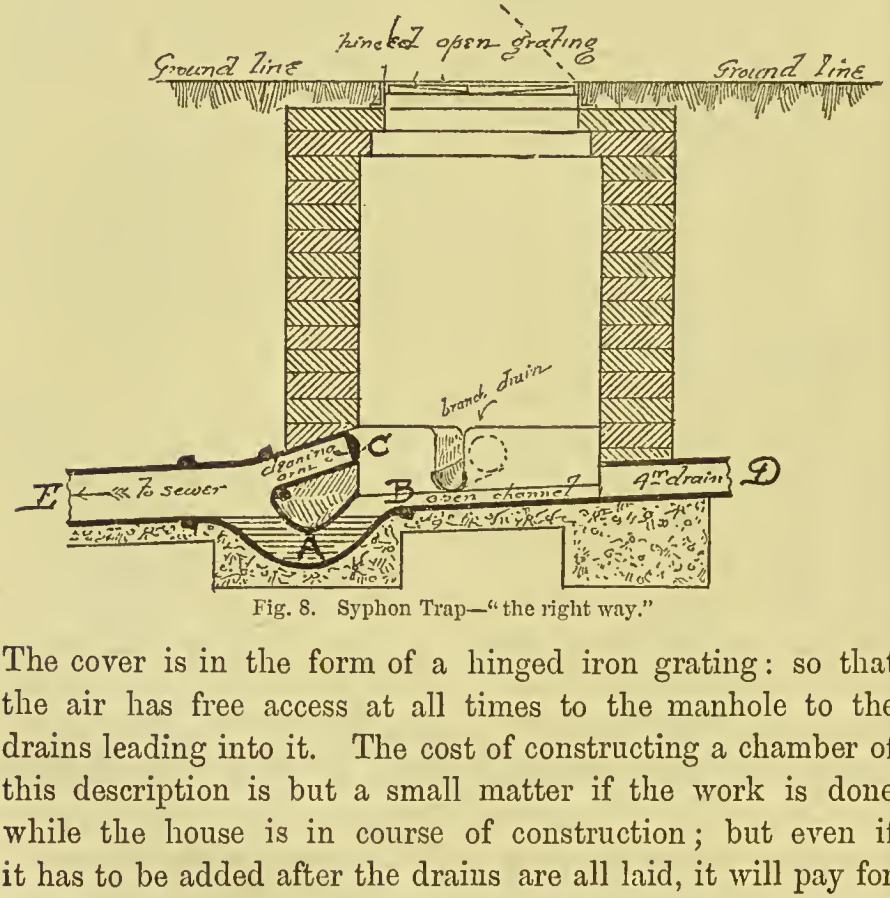

Fig. 8. Syphon Trap—"the right way."

The cover is in the form of a hinged iron grating: so that the air has free access at all times to the manhole to the drains leading into it. The cost of constructing a chamber of this description is but a small matter if the work is done while the house is in course of construction; but even if it has to be added after the drains are all laid, it will pay for itself by the saving effected in repairs to the drains.

Disconnection of House Drains from Sewers and Cesspools.—In figures 9 and 10 we have examples of the proper method of disconnecting house drains from sewers and

from cesspools. In fig. 9 the house is supposed to be one of a row in which it is absolutely necessary that the

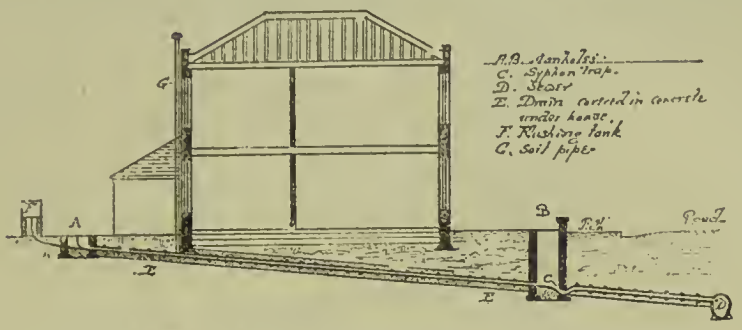

Fig. 9. Diagram shewing drainage into a sewer.

drain should pass under the house in order to reach the sewer. The trap which forms the disconnection between house drain and sewer is placed as near to the latter as the premises will allow. From the manhole which is formed at this point, the drain runs in a perfectly straight line to the rear of the premises, that part of it which passes under the house being covered over with concrete. At the head or upper end of the drain is another manhole, and also a flushing tank for periodically scouring the drain. The soil-pipe is carried up above the roof as a ventilating shaft, but for the sake of clearness the rain-water pipes are not shown.

In fig. 10 the drains are kept entirely outside the house.

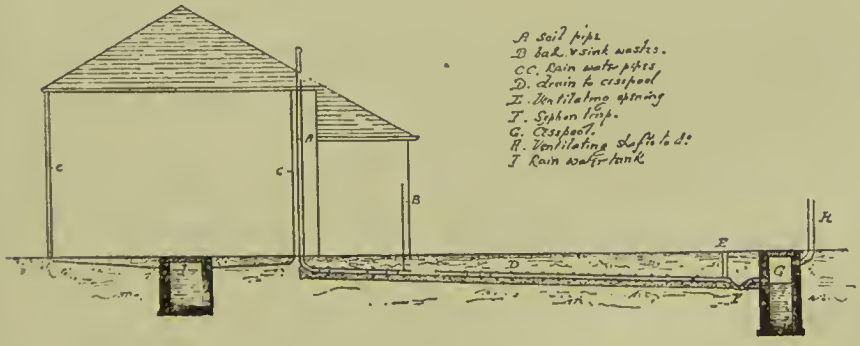

Fig. 10. Diagram shewing drainage into a cesspool.

The soil and waste water drain is taken direct from the house to the cesspool, which, in order not unduly to enlarge the

drawing, is shown very much nearer the house than it would be in fact. Just before the drain enters the cesspool, a syphon is placed with a ventilating shaft on the house side of it. In this case the simpler form of ventilation without the manhole is shown. There should be provided means of inspection between the upper end of the drain and the cesspool, the number and position of which must necessarily depend on the distance to be traversed. The rain water is all collected in an underground tank, which should be provided with a properly trapped overflow. The cesspool is ventilated by a shaft which should be carried up some neighbouring tree.

Any one who will take the trouble to master and apply the simple system here explained, whether he resides in the country or in the town, will always have a healthy house, pure air, and the perfection of sanitary surroundings.

Ventilation of Soil-Pipes and Waste-Pipes.—Hitherto we have been dealing with drains under the ground; there is, however, one very important drain, which is a vertical one and above ground. This is the pipe which leads from one water-closet or more above the ground floor level, and is known as the soil-pipe. It is generally made of lead, and should be placed outside the house. As before explained, this pipe should be carried up full bore at least to the eaves of the roof, to act as the ventilating shaft or outlet for the drain. The soil-pipe must communicate directly with the drain without any intervening trap. The waste-pipes from sinks, baths, and lavatories should not, however, be connected directly with the drain, but should discharge in the open air over properly trapped gratings. Rain-water pipes also, unless they are all led to an underground tank, should be disconnected in a similar way.

It will not suffice, however, to take a pipe straight from the grating or outlet of a sink or bath into the open air. There is always more or less grease hanging about the interior of

waste-pipes, more especially those from scullery sinks, and the cold air blowing up such a pipe into the house causes an intolerable nuisance. It is therefore necessary to fix under the sink, bath, or lavatory, a trap cast in lead of the form shown in fig. 11, in order, by interposing a compact column of water, to keep out the rush of air through the open end of the waste-pipe. It will also be found of service to fix at the lowest part of the trap a screw cap ("A") for cleaning purposes.

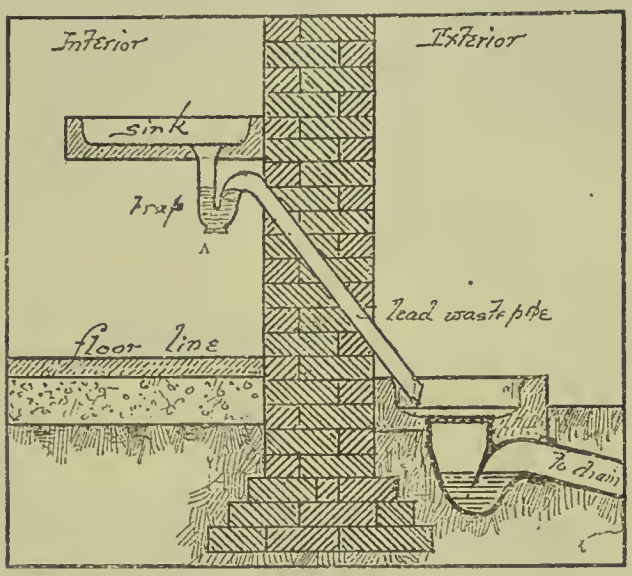

Fig. 11.

Evils of Jerry Building.—It may be interesting, as pointing the moral of neglect to observe proper precautions in the erection of houses, to give the illustration on page 138, which shows a pair of houses actually in existence in a London suburb. The drawing was in fact copied from a photograph taken at Willesden, and expressly made for this work. The house on the right hand of the picture is drawn in the condition in which it left the builder's hands some four or five years ago, while the left hand house, so far as black and white can show it, is the same building in its present state of damp and dilapidation.

The houses are nine-roomed semi-detached "villas," let at a rent of £50 a year each. They are built of bricks, with stone dressings and slated roofs.

The first thing to be observed is the level of the ground

floor. The front door step is a bare three inches above the ground, while the side door step is slightly below the ground. Next we look, but look in vain, for any signs of a damp proof course, or for any gratings to show that ventilation to the ground floor joists has not been forgotten. The results of the first two defects are visible enough in the house as it

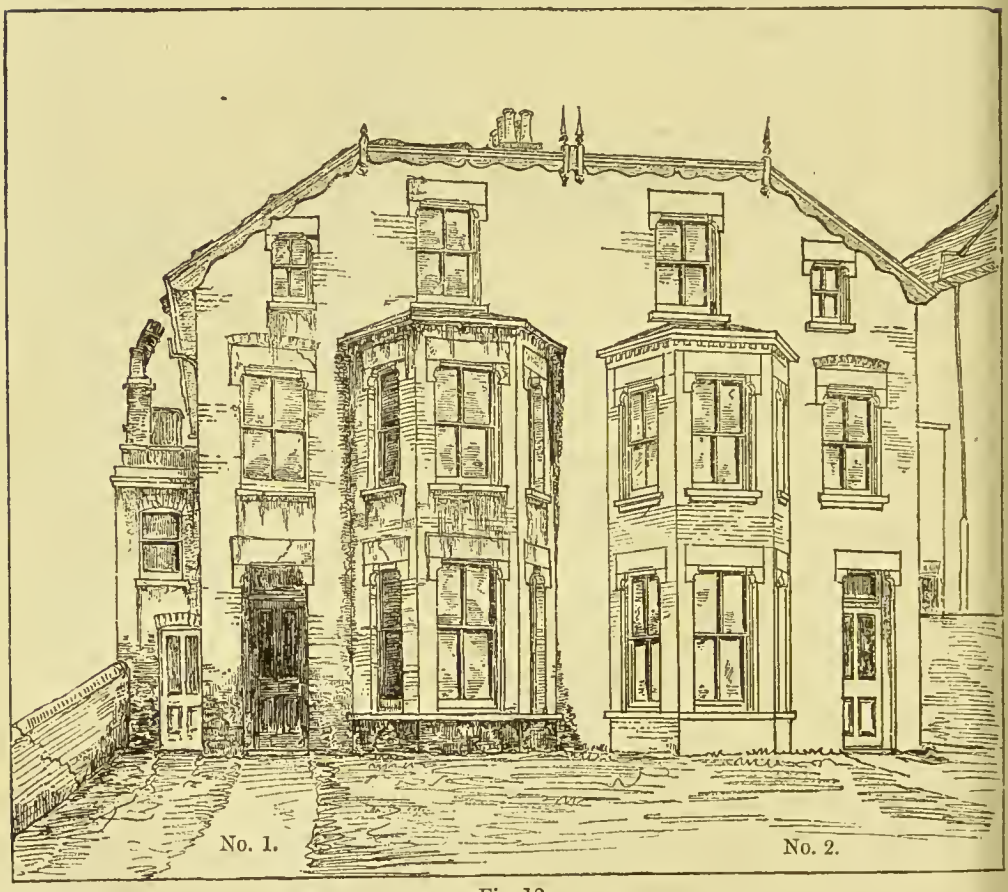

Fig. 12.

No. 1. Four years in occupation. No. 2. Just built; waiting a tenant.

now exists, in the damp and green stains which are everywhere to be seen from the level of the ground to some two or three feet up the walls. The want of ventilation to the floor joists will make itself apparent one day when the floor boards will give way without warning, and reveal a plentiful crop of dry rot.

Under every window sill there are streaks as of streams of water running down the brickwork, the cause being the want of a proper groove or "throat" below the sill to throw the water off from the surface. The result is that the wet trickles down the wall, and its doing so is unpleasantly obvious inside the house.

The same condition of affairs is observable also at each angle of the bay window, the cause in this instance being the absence of an eaves gutter.

The lintels over the windows are in almost every case either cracked or sunk, and have had to be stopped with cement.

Just peeping round over the eaves at the side of the house a pipe about one inch in diameter is seen. This is the (so-called) ventilator to the soil pipe. It is made of very flimsy zinc, and is so crippled where it turns the angle of the roof, that it is almost a question whether there is any space whatever for the air to pass up. This inch pipe starts from a four-inch iron soil-pipe, which has close up against the wall a crack of no inconsiderable size, through which the contents have been leaking on to the wall and *through* it.

Shortly before the photograph from which the drawing was made was taken, there had been a gale of some force. Its effects may be seen in the position of the zinc chimney-pot, and the slates, which have slid from their proper position, and are overhanging the eaves gutter.

General Caution.—The directions given here concerning the position of soil-pipes outside the house are to be followed in this country and in others having no greater alternations of temperature. In countries where extremes of heat and cold are far greater, the American system of placing the soil-pipes in a well-ventilated and sealed shaft situated in the centre or inner wall of the house should be adopted.

CHAPTER VIII.

THE INTERIOR ARRANGEMENTS OF THE HOUSE.

Distribution of Rooms.—Different rooms have different requirements as regards aspect, size, height, and the like; and it may be well to give some attention to these points. *Bedrooms* should be as airy and lofty as possible, and should be so disposed that the bed need not face the light, or stand in a position where a draught, as from door to window, plays across it. The *Nursery* and *Schoolroom* should also be airy, and have as much sunshine as possible. *Bathrooms* should be well ventilated, and the floors should be well jointed. The walls should be painted, not papered, tiles being placed in the vicinity of the bath to receive the water that will be splashed about.

Of downstair-rooms, the *Drawing-room*, which should of course be as bright and cheerful as possible, should face the south, and have the best natural outlook obtainable. The *Dining-room* should face the north or east, and should not be too far from the kitchen. The *Breakfast-room* should be on the east or south-east side of the house. The *Library* needs to be thoroughly well ventilated and dry, or the books will become mouldy and damp. The *Kitchen* should be so arranged that its odours do not, as they are apt to do, penetrate the house, and it should be amply ventilated. Of cooking ranges mention is made further on.

Windows.—Windows should bear a certain relation to the size of the room in which they are. There should be to every habitable room at least one window opening directly into the external air, and the area of the opening should be equal to

at least one-tenth the floor area of the room. That is to say, a room 10 ft. by 12 ft. should have a window 4 ft. by 3 ft. While several different forms of sashes are permissible, no habitable rooms can be ventilated either by "borrowed lights," *i.e.*, windows opening into the interior of the house, or by skylights.

There is no better form of window than the ordinary double-hung sash, and of late years builders have generally recognised the necessity for making them so that both sashes open. By a simple and inexpensive contrivance it is possible to admit air between the upper and lower sashes without draught. The bottom rail of the lower sash is made 6 inches deep, about 2 inches deeper than it is usually made, and a board 5 inches deep is fixed on the cill inside instead of the ordinary bead. By this means the lower sash can be raised $4\frac{1}{2}$ inches, and a stream of air with an upward direction can be admitted between the upper and lower sashes while there is no direct opening made. In the case of sashes already made in the ordinary way this result can be obtained, though not in quite so satisfactory a manner, by raising the lower sash some 4 or 5 inches, and placing under it a board made for the purpose, and to which the sash should fit closely. As to warming and ventilation see Chapter IX.

Fig 13.

Stoves and Grates.—It is scarcely within the scope of this work to go minutely into the details of different kinds of stoves and cooking ranges. It will, however, not infrequently happen that a builder will allow an intending tenant or purchaser of a house to choose his own grate and range at certain fixed prices. In these circumstances, the best advice that can be given is that, if the price allowed be manifestly

inadequate to provide strong and durable grates, it will be economy in the long run to supplement the allowance in order to insure good work. There are different forms of grates in almost endless abundance, from the modern - antique hob grate, a product of the ultra æsthetic Queen Anne school, to the remarkable examples of ingenuity exhibited at the Smoke Abatement Exhibition a year or two ago. Of the first - named grate, it may be said that for strict attention to lavish consumption of fuel, combined with the least possible amount of warmth given off, it probably has no equal. It should be remembered that the function of a stove is to radiate the heat generated by the fire into the room in which it is placed. And this is best attained by a comparatively shallow fire, with cheeks and back of fire clay.; add to this splazed sides of glazed encaustic tiles, and you have as good a grate as can be desired for all ordinary purposes (see slow combustion grate on page 143). Having got your grates, of whatever kind they be, see that they are set with solid brick-work behind and around them, and that they are not

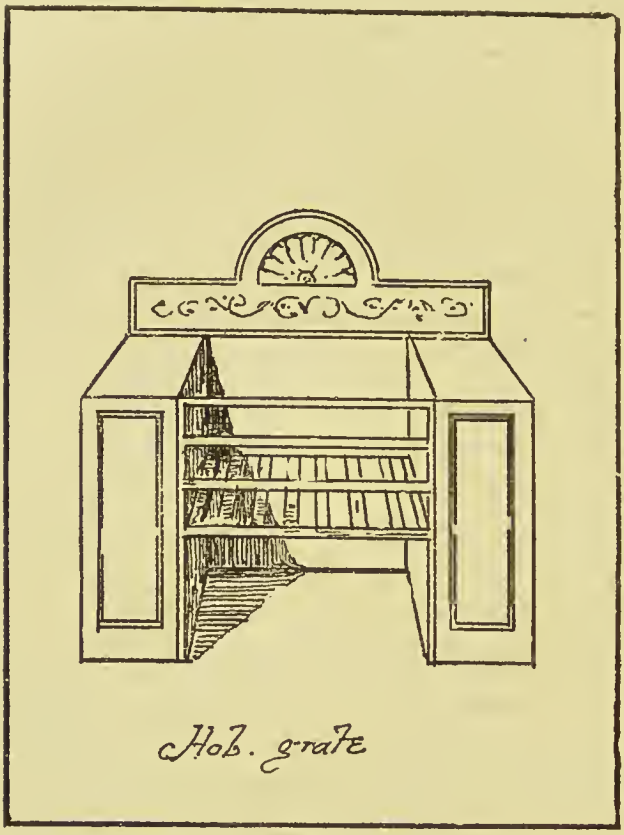

Fig. 14.

just tucked into the opening. The kitchen range in most moderate-sized and small houses is now-a-days one of the many forms of close range or kitchener. Various opinions are current as to the relative value of close and open fire ranges; but the superior cleanliness and greater heating surface afforded by the close range in a small space makes it certainly more convenient for general use than the older form of open fire.

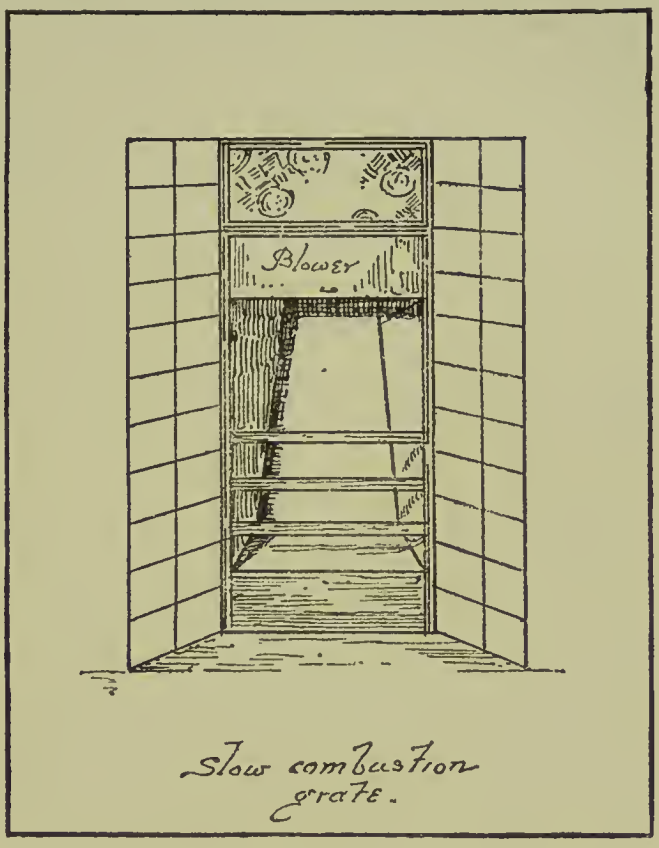

Fig. 15.

Hot-Water Service.—In these days no house of £40 a year rent is considered complete without a bath fitted with hot and cold water service; and, from a health point of view, such a demand is most commendable. But it is of the utmost importance that the system which is adopted should be as safe and free from the possibility of accident as it can be made. The system which a few years ago was well-nigh universal was this. At the back of the kitchen fire is a boiler as large as the space will admit, and almost at the top of the house is the hot-water circulating cistern for supplying the bath and draw-off taps on the upper floors, which is supplied from the cold

water cistern placed at a higher level. As there are always draw-off taps in the kitchen and scullery fed immediately from the boiler, it is possible to empty both the latter and the circulating cistern at a time when either through failure of the supply, or by reason of frost, the cold water cistern was empty. If in these circumstances the fire is lighted before the water supply is properly restored, the empty boiler will become red hot. When the supply is renewed, the cold water rushes into the red hot boiler, and an explosion may take place.

A stop-cock to shut off the water from the boiler is an improvement, but there is always the possibility, one might almost say the probability, of its not being used when needed. The system is in fact a vicious one, and is happily not so frequently adopted now as formerly.

Perhaps the best system is that in which the water passes from the boiler into a cylinder, which is usually placed somewhere near the kitchen fire. The cold water from the cistern at the top of the house enters the cylinder at the bottom, the hot water from the boiler about the centre, and the circulating flow pipe leaves it at the top. The return pipe is taken from the highest point of the service, and is connected with the cold water pipe near the cylinder. By this system an explosion is rendered impossible, inasmuch as the hot water being drawn from the top of the cylinder its supply is dependent on the cold water forcing it upward from the bottom. When, therefore, the cold water supply fails, the hot water will also fail, but the cylinder, and consequently the boiler, cannot be emptied.

Baths.—Painted iron or zinc are the usual materials for baths, though, without doubt, the most durable bath, and the cheapest in the long run, is a copper one, or, by preference, one of Rufford's porcelain baths. But these latter are costly as compared with iron, and a very serviceable bath in enamelled cast-iron can be had for about half the price of

copper or porcelain. The difference in cost between the first and inferior qualities of cast-iron baths is due to the number of times a bath is fired. A "first finish" bath is painted and fired three times, while a "third finish" bath undergoes the process once only. And it is just this difference of finish which makes the difference in durability. Other kinds of baths, as, for instance, glazed fireclay and concrete, are very valuable in their way, but scarcely appropriate for small houses.

Sinks.—Sinks are made of various materials: stone, wood lined with lead, pewter, or tinned copper, zinc, slate, stoneware, and glazed fire-clay. Scullery sinks are often made of stone of a very inferior character, which after a very few years' wear scales off and gets to a condition in which cleaning is an impossibility. Under the best conditions a stone sink rarely looks clean. Pantry sinks are commonly made of wood and lined with lead. These sinks again rarely look clean, and hot and cold water have a way of expanding and contracting the lead till the bottom of a sink (usually, by the way, of far too thin a substance) is all over wrinkles. Pewter and tinned copper are very bright in appearance, but too expensive for general use. The best kind of sink for all purposes is one made of glazed fire-clay. These are creamy white in colour, and have a surface which is as near perfection as possible; and when clean they look clean.

Water-closets.—Usually the speculating builder knows two kinds of closet apparatus, and two only: one being the "pan closet," and the other the "hopper." The first, with its invariable adjunct, the D trap, is used for the best closet, the second for the servants' closet. These may be said to be the two most objectionable forms of closet apparatus obtainable. The pan closet with its D trap consists of three parts—first, the basin of earthenware with a tinned flap at the bottom to keep the water in; secondly, the container, an iron vessel

under the basin made apparently in order to be fouled, and to afford a corrosive surface to the greatest possible extent; and lastly, the D trap, a lead box in which every facility is afforded to fæcal matter to accumulate. (See fig. 16.)

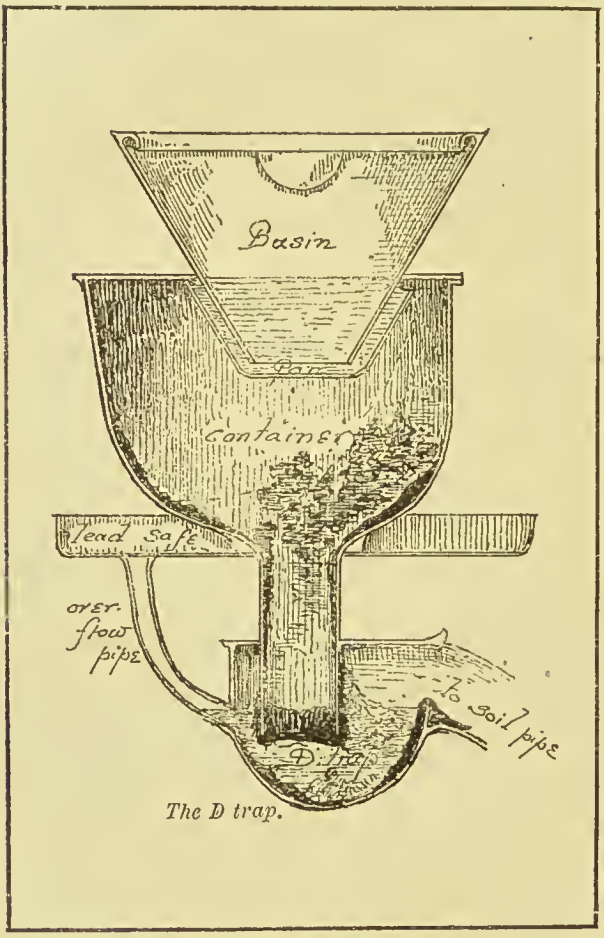

Fig. 16.

The peculiar faint smell which is emitted by one of these closets after it has been in use for some little time is familiar to most people, and it is only by taking the apparatus out and subjecting the iron container to the action of heat that it can be kept at all bearable. This form of closet is now happily prohibited wherever there are bye-laws sanctioned by the Local Government Board. As, however, it must occasionally happen that, in places where there are no such restrictions, builders will insist on using them, it will be well to point out one arrangement which is by no means necessary, and greatly adds to the objectionable nature of the apparatus. At the side of the basin it will be noticed there are some holes, which are meant to afford an escape for the water, should the supply valve happen not to act, and so to prevent an overflow of water on to the

floor below. The almost invariable custom amongst plumbers is to connect these overflow holes by means of a lead pipe with the D trap, thus affording a ready means of escape for the foul air generated in the trap, into the water-closet. This pipe should be carried straight through the wall, and made to discharge into a rain water pipe or over a trapped grating.

The second form of closet apparatus referred to is that known as the Hopper, from its form, which is simply that of a round hopper head upon a pipe. The objection to this form of basin is that it is almost impossible to keep it clean with ordinary means.

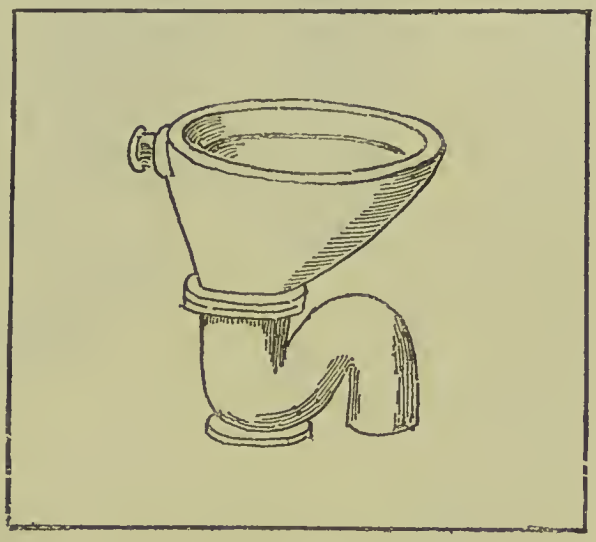

Fig. 17, The Hopper Closet.

The first requisite of a good closet basin is that it shall be self-cleansing by means of the flush of water from the cistern; and it must be confessed that a basin which fulfils this condition, under all circumstances, is a thing of the future. There are several forms of closet apparatus which go very near towards perfection in this respect; they are all more or less variations of the closet known as the "wash out," and are made entirely of glazed earthenware. Without unduly advertising one kind in preference to another, it may be said that those in which the trap is readily accessible from the basin are better than those in which the trap is out of sight, and only to be got at by means of a special cleaning arm. These closets all need regular and systematic cleaning, and when kept clean are by far the most satisfactory kind that

can be had, the absence of any metal work about them conducing greatly to the possibilities of keeping them sweet.

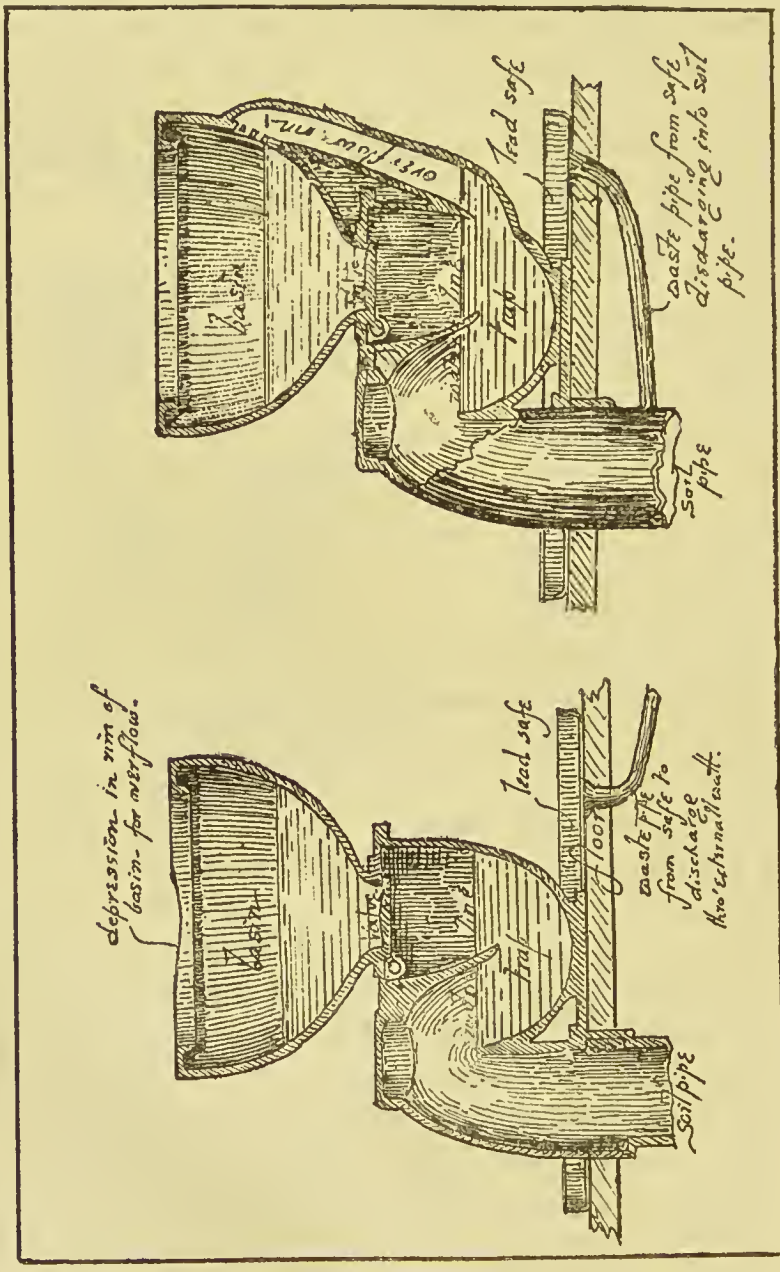

Fig. 18. Valve closets.

In houses of a more expensive class the best closets are usually furnished with the valve apparatus. There are so

many things to be said in favour of a good valve closet that it will probably retain its hold on popular favour for a long time to come. In the first place it is, always providing it be a good one, almost noiseless, an advantage of obvious value, especially in a small house; and secondly, there is always a large body of water in the basin. An almost invariable defect in valve closets is that the overflow is taken by a pipe (sometimes, it is true, this pipe is trapped) into the soil pipe. This is a most objectionable arrangement for the reason that the most usual, one might say the only, cause of an overflow is that slop water is thrown into the basin without the valve being opened. The trap, therefore, in the overflow pipe is filled with foul water, which remains there until displaced by another discharge of a similar nature. The condition of the overflow pipe and trap in such circumstances, and the nuisance arising from it, cannot fail to be excessively foul, and to become after a time very offensive. The remedy is to abolish the overflow pipe entirely, to stop up the holes in the side of the basin, and let the water overflow, if need be, on to the lead tray or "safe" below the apparatus, from whence a pipe should conduct it through the wall into an open pipe. For other methods of disposal of excreta, see page 175.

Cisterns.—It is sometimes said that if a house be supplied with water on the constant system there is no need for cisterns, and they should be dispensed with as unnecessary and objectionable. It is easy to see that a cistern may become by neglect a very foul and objectionable thing, but it is not on that account to be absolutely condemned as useless. Even where the service is constant, the water mains are liable at times to get out of order and want repair, and an intermission of the supply for twenty-four hours is an occurrence to be provided against. This necessitates cisterns, and it becomes tolerably plain that cisterns we must have, whether the service be constant or intermittent.

The two most important things to be observed in reference to the cisterns are that the water-closets should be supplied from separate cisterns to those from which the supply for drinking, cooking, and other household purposes is drawn, and that the overflow pipes of all cisterns should discharge into the open air and not into the soil pipe. It would be well before taking a house to have the water-supply fittings (taps, ball cocks, valves, &c.) inspected by the water company's officer, and, if necessary, altered to conform with their requirements. The companies have full powers in these matters, and it is not pleasant to have notice to alter fittings because the builder has chosen to disregard the regulations. Cisterns should always be placed where they can readily be examined and cleaned out; and it should be possible to get at all the pipes without pulling down plaster or tearing up boards. The cleansing should be thoroughly well performed at least every three months.

The best and cheapest material for cisterns is galvanised iron. Lead acts on certain kinds of water in an injurious manner, and it is therefore wise not to use it for cisterns.

Filters.—Too many people pin their faith to filters, and think that so long as they pass their drinking water through an earthenware jar with some mysterious filtering medium inside, the source of the water or the condition of their cisterns does not in the least matter. This is a similar delusion to the belief, which passes freely current, that if you add spirits to unwholesome water you rob it of its noxious qualities, or at least diminish them. We are not prepared to deny the usefulness of filters, but we desire to point out that they must not be exclusively relied upon. Water filtration has in its way had as much nonsense written about it as water analysis. The great point is to keep the water itself as pure as possible. Where pollution is suspected, let the water be well boiled for a considerable period. It may after-

wards be ærated by pouring it several times from a height of two or three feet from one vessel to another, or by artificial means. If a filter be used, it should be of the simplest possible construction, and the filtering medium should be readily removable for cleansing purposes. If a filter be not very frequently and very thoroughly cleansed, it pollutes rather than purifies the water.

CHAPTER IX.

VENTILATION, WARMING, AND LIGHTING.

Ventilation.—It would serve no useful purpose to criticise in detail the very numerous contrivances for doing artificially what should in theory be done naturally; and it must suffice, therefore, to state the principles upon which proper ventilation rests. First, then, it is essential that there should not only be an inlet but an outlet for air. Unless some means be adopted for setting up circulation of the air, it is manifest that fresh air to replace foul air, can find no room for itself. In an ordinary room we have excellent examples of an air inlet and an air outlet in the windows and fire-place; but when fires have to be lit in the latter, in the winter time, the rush of cold air across the room from the window is too severe an experience for most people to bear with complacency. In summer time, and whenever the external air is sufficiently warm for comfort without the necessity of a fire, all the ventilation that is wanted in an average room can be had by opening the window. But in winter the case is different, and means have to be devised for securing a flow of fresh air into the room without chilling the occupants. The best method of doing this is to connect the back of the fire-place with the outer air and with the air of the room by means of tubes or flues. The cold air flows in along the tube from the outer wall to the chamber at the back of the fire-place, is there warmed, and is then dispersed into the room. As inlets for air, Sheringham ventilators are very efficacious

and inexpensive. They are placed in the wall of the room communicating with the outer air, and may be shut or opened at pleasure. The valve falls at an angle of 45° into the room, and admits a steady flow of fresh air upwards. In this country, speaking roughly, with the addition of properly constructed outlets for foul air, as afterwards described, these are all the appliances any ordinary householder will require to secure adequate warmth and ventilation for his dwelling at all seasons of the year. There are, however, so many fallacious ideas on the subject of ventilation and heating now commonly current, that it may be well to say a few words on the subjects of carbonic acid gas and the tests of impure air in rooms, the necessity for adequate distribution as well as for adequate admission of fresh air to rooms, the action and size of flues, smoky chimneys, cubic and superficial space, open fires, furnaces, steam and hot water heating, methods and cost of ventilation, and to describe various appliances.

A General Caution.—The following remarks are intended for the guidance and instruction of people living in the United Kingdom. As this book is, however, likely to be circulated in the colonies and abroad, it must be remembered that differences of climate and temperature affect the ventilation and heating of houses more perhaps than anything else. Thus, English houses are never heated, even in the coldest winter, much above 60° F., whereas in America a temperature of 70° F. constitutes probably the minimum point which people regard as necessary for comfort and health. These circumstances must be borne in mind; and where there is great excess of heat or cold special allowance must be made for such conditions, or else disappointment will result.

Objects to be aimed at.—If a new house is about to be built, it is not difficult to arrange at the commencement for its adequate heating and ventilation. The first point to be determined, and the most difficult, is to decide the amount of

fresh air to be supplied to each room. Sanitarians base their estimates of what is required, to keep the air of occupied rooms in a dwelling-house free from perceptible odour to a person entering it from the outer air, upon the percentage of carbonic acid found in rooms in which this odour is barely perceptible. We must first, then, consider the presence of carbonic acid in relation to pure atmosphere.

Carbonic acid and the tests of impure air in rooms.—It may be well to state at the outset that the most dangerous impurity in air is not a gas, nor do deleterious products possess any very decided or unpleasant odour. To this class of impurities belong those arising from contagious disease in a hospital ward, from sewers, and from collections of filth. Against such enemies good plumbing work is often the best safeguard, though it is one difficult to secure, owing to the bad workmanship or design, or both, of many workmen engaged in this business. Nine hundred and ninety-nine people out of a thousand believe that the ordinary impurities of air in inhabited rooms are due to carbonic acid gas, and that to provide against this impurity is to secure an adequate and healthful supply of air. As Dr. Billings has humorously declared, the average ventilating enthusiast holds this as the dogma of true ventilation, in his papers on the subject he will enlarge on the deadly nature of this subtle poison, will point out that this deadly gas is heavy, and collects near the floor, and that special arrangements should be made to allow it to escape at this level. Now, all this is nonsense, and until a person knows enough of the physics of gases in general, and of carbonic acid gas in particular, to be sure it *is* nonsense, and to be able to demonstrate *why* it is so, it is useless to discuss ventilation problems with him. Owing to the law of the diffusion of gases, in an inhabited room the proportion of carbonic acid at the floor will be about the same as, and in some cases even less than, at the ceiling. It depends upon

the system of ventilation adopted, the number of occupants and lights the room contains, and the currents of air within it. The main producers of carbonic acid gas are respiration and lights, which raise the temperature of this gas above that of the room, and so cause it to rise to the ceiling, because when so heated its weight is less than ordinary air. Ascending thus to the ceiling, it becomes thoroughly mixed with the air of the room, and so is found in combination with it in pretty uniform quantities in all parts of the apartment. Of course we have been speaking of rooms to which the outside air has access. In wells or in the shaft of a mine, which are closed on all sides except the top, this mixing is not possible, and so carbonic acid gas sinks to the bottom and gradually expels the air. Here no currents are produced, there is little if any difference of temperature, and the process of diffusion is so slow that special means have to be adopted to secure its removal. These are very exceptional cases, however, and in no others will it be necessary for special provision to be made for the expulsion of carbonic acid gas. But if it is all nonsense to say that the ordinary impurities of air in inhabited rooms are due to carbonic acid gas, how are we to define them, and how has this fallacious idea become so general? In pure country air carbonic acid is present in the proportion of about four parts to every 10,000. In theatres, schools, and crowded buildings its proportion has been found to be from 40 to 100 parts per 10,000, whilst in soda water manufactories, in champagne cellars where the bottling is done, in certain rooms in breweries, and at a few celebrated baths and health resorts, pure carbonic acid gas is present in the proportion of 150 parts to 10,000, without producing discomfort or giving any special evidence of its presence. This proves that carbonic acid gas, in the proportions in which it is met with in the worst ventilated rooms, is not in itself a dangerous or even an injurious impurity. It

is because, as Solomon has it, people are known by the company they keep, and because carbonic acid gas is usually found in very bad company that sanitarians lay so much stress upon the results of chemical tests of air with reference to this substance, and on what may seem very small variations in the proportions in which it is found. Dr. Billings, who we have largely quoted, states "that variations in the amount of carbonic acid gas in the air to the extent of three or four parts per 10,000 indicate corresponding variations in the amount of those gases, vapours, and suspended particles, which are really offensive and dangerous." Now we have tests by which we can, with comparative ease and certainty, determine the variations in the quantity of carbonic acid gas, whilst we have no such tests of recognised practical utility for the really dangerous impurities. Carbonic acid is then in the case of air a danger signal, a sign post, a barometer of impurity, and hence the popular fallacies above alluded to have arisen. Of course we must make sure that the circumstances of any particular case present nothing unusual, or our deductions will be valueless, because our initial premiss is unsound. This precaution adopted, we may measure by this test the quantity of dangerous impurities present in the air of inhabited rooms. Sometimes a variation of one ten-thousandth part of carbonic acid gas may be very significant. This test should be combined with the sense of smell, for when the proportion of carbonic acid in a room increases from the normal amount of four parts in 10,000 to between six and seven parts in 10,000, a faint, musty, unpleasant odour is perceptible to anybody entering from the fresh air. If the proportion reaches eight parts the room is said to be close. To secure entirely satisfactory ventilation which will prevent this odour, the proportion of carbonic acid derived from respiration, or what is sometimes called the carbonic impurity, should never exceed two or, at the utmost, three parts in 10,000 of the air of the

room; that is to say, if the proportion in the fresh air be four parts, the foul air must not exceed seven parts per 10,000. Although the method of testing air for carbonic acid is comparatively simple, much care and precision must be used throughout, and it would serve no useful purpose to explain it here. Every architect ought, however, to be able to use all these tests, as without them it is impossible to decide on the merits of ventilating appliances. Householders and the public will, however, be wise if they also consider the explanations here given, and if they bear them in mind when next urged to purchase the "Patent Automatic Purification Ventilator," the "Sanitary Air Renewing Grate," and other similar appliances. The one infallible test to be applied to all such goods is that of air analysis. If a patentee cannot produce the air analysis of his invention prepared by a chemist of repute, do not purchase his goods or believe in his assertions. As Dr Billings says: "It is not your business to investigate the value of this or that patent. It is the patentee's business to prove it to you, and this proof must be the detailed air analysis."

Admission and Distribution of Fresh Air in Rooms.—This is a subject of the first importance, as unless the adequate distribution of the fresh air admitted be provided for, the ventilation of any house or room must necessarily be bad. Air possesses the property of adhering closely to surfaces even when in motion. When a current of air is started along a wall or floor, it may adhere to it for several feet or yards, and in this way draughts occur in places where they are least expected. Dr Billings once found a warm air register so placed in the floor, in the corner of a room, that the entering air adhered to the sides of the room, and passed directly upwards, almost as if it were in a tube. It then streamed along the ceiling to an opening into a foul air or outlet flue in the opposite corner, and passed out without disturbing the air in the lower part of

the room at all. In this way it may happen that plenty of fresh air may pass in and out of a room, but that the air within it may remain vitiated and the ventilation bad. Adequate distribution is as important therefore as an adequate supply of fresh air.

Situation of Fresh and Foul Air Flues.—This brings us to consider the best situation for fresh and foul air flues respectively. In old and existing houses there will often be no choice but to use the chimney flue, with an inlet on one particular wall, but even here situation, or rather the respective and relative positions of inlets and outlets, are important points to bear in mind. The shape of the air inlet is an important consideration, and upon it will depend, in great measure, the comfort of the occupants of the room, as the velocity of the entering currents of air can be regulated by a proper attention to the position, size, and shape of the opening. No discomfort is likely to result from these inlets even in large assembly rooms, providing that the registers are of such an area as to cause the velocity of the inflowing air not to exceed one and a half feet per second. When the incoming air is heated previous to its admission to the room, it is necessary to secure that these inlets are not placed below the outlets, or else very little change will be effected in the largest portion of the air in a room, because direct currents between the inflow and outflow registers are easily established. An air flue which measures less than five inches in its smallest diameter is of little use, and no fresh air flue should be placed in a floor so as to be flush with its surface, because dust and dirt will fall into the flues and be returned in part with the incoming air. Besides, many small articles will constantly be lost through these openings, and it is always desirable, therefore, to continue the flue upward into a step, seat, or wainscot, and then to place the register in the side of this. Hot air flues should be placed by choice in inner walls, and foul air flues should never be placed in outer walls unless they

are to be carried downwards, and to have some means of aspiration connected with them. Foul air flues should be situated as a rule near the level of the floor, and although many eminent authorities recommend that the place for the introduction of fresh air should be near the ceiling, in order to avoid unpleasant currents, attention to the size and shape of the inlets will equally prevent these disagreeable effects, whilst a fresh air register, if situated at a lower level, will be found more satisfactory in many ways. Experience proves satisfactorily that in dwelling-houses where the rooms are of ordinary size, and where the windows are not on opposite sides of the rooms, good ventilation can be secured by placing the fresh warm air opénings in an inner wall and the discharge or foul air openings on the same wall, at a lower level. By this arrangement the fresh air register is placed in the side of the chimney near the floor, and the foul air passes out a few feet away, but on a lower level. Thus the fresh air passes upwards and along the ceiling to the outer walls and windows, down the wall to the floor, and thence along the floor to the foul air outlet. There is, however, far too little reliable evidence of the effects produced by apparatus fixed in this and other ways, and there is much need of careful experiment from actual experience, especially as those with models and not with the apparatus *in situ*, are, for practical purposes, nearly valueless. As complaints are often made of the dryness of hot air admitted to rooms, although experience proves that this is in no sense harmful or dangerous to health, it may be useful to add that a large coarse sponge, moistened and kept in front of the fresh air register, will often prove a source of great comfort.

Draughts in and Smoky Chimneys.—The problems relating to velocities of currents and areas of flues, more especially in chimneys, are, as Dr Billings remarks, comparatively simple, if the nature of the force which produces draught in a chim-

ney be thoroughly understood; but the popular mind is by no means clear on this point. Many persons seem to suppose that a chimney has some independent power of its own, and in this sense say that it draws well or it draws badly. Dr Billings has heard a mason contend that the chimney itself must do some of the work independent of heat, because in a house which he was then at work on, he found an upward current in the chimney, although the roof had not yet been placed on the building, and it required several trials under different circumstances to convince him that this current was due to the heating by the sun of the south wall in which the chimney was placed. Experience proves that a velocity of 10 feet per second in a chimney is sufficient to make it act properly under different circumstances, because that rate of upward current will prevent the usual winds from interfering with it at the mouth of the chimney. A greater velocity than this means a waste of fuel, and in an ordinary dwelling-house a velocity in the main flue of 5 feet per second will usually suffice. To secure this the opening at the mouth of the chimney should be about one half that of the main flue, and the temperature in the chimney, assuming it is 40 feet high, to produce this velocity must be about 40° Fahr. above that of the external air. The shape of the flue should be as nearly round or square as circumstances will permit, with a preference for the circular form. The sizes of smoke flues may be given for ordinary dwelling-houses built of brick as 1 foot square, or if lined with cement or smooth pot pipes they may be 9 inches in diameter, and for bedrooms a flue 9 by 12 inches will be found sufficient.

Smoky chimneys are due to various causes, and are especially prevalent where open fires are mainly used for heating purposes. The true remedy in most cases is to secure that each chimney has its own proper supply of air from without, and that it does not draw against another flue. When flues

are damp, the current of ascending air is rapidly cooled by evaporation, the chimney smokes vigorously, and hence the desirability of avoiding placing a flue in an outer wall, where it is sure to be difficult to maintain it in good working condition. The effects of wind upon the action of chimneys have already been indirectly considered, and providing the upward current be maintained at a maximum speed of 10 feet a second, and a minimum of 5 feet per second, no difficulty is likely to be experienced on this account. Patentees, of course, maintain that cowls are an absolute cure for smoky chimneys, whereas, as a matter of fact, they were probably intended originally to prevent the entrance of rain or snow into flues. The following amusing account is given by Mr Briggs of one such attempt to cure a smoky chimney in a large public building at Washington, in which there was a series of rooms freely communicating with each other, and each having an open grate. When the caretaker commenced to light the fires in a morning, he found the first one had a magnificent draught, the second one not so good, the third one worse still, whilst the fourth smoked vigorously. Then came the chimney doctor with a patent chimney top, which was placed on flue No. 4, lengthening it about three feet. No. 4 now drew well, but No. 3 was no longer dubious, for it smoked like a tar kiln. Of course the same remedy was applied to No. 3, but then Nos. 2 and 1 became a nuisance. When these also had been duly furnished with the patent chimney pots, all the flues were again of the same height, and the process had to be begun *de novo*. These chimneys did not need chimney pots or patent preventers of any kind, but each required its own sufficient air supply from without, and precautions taken to secure for each a separate draught.

Cubic and Superficial Space.—For purposes of heating and ventilation, it is not desirable that the rooms in an

ordinary dwelling-house should be more than 14 feet high, even if very large, whilst for ordinary living rooms 12 feet in height is ample, and for bedrooms, about 10 feet is the most satisfactory height. To keep a room comfortably warm and airy in an ordinary dwelling-house, when the temperature of the external air is below freezing point, and the heating is by some indirect method of ventilation, it will be necessary to secure a fresh air supply per hour, equal to one and a half times the cubic contents of the room. Of course, all such calculations must depend upon the dimensions of the room, the internal and external temperature, the number and occupations of the inmates, and the time they inhabit it during each twenty-four hours, and so forth. Thus the minimum amount of cubic space per head which should be given has been stated by Dr. Billings to be as follows:—

	Per Head.
In a common lodging-house, . .	300 cubic feet.
In a schoolroom, ...	250 ,,
In a barrack dormitory for soldiers or police, ...	600 ,,
In an ordinary hospital ward, . .	1000 ,,
In a fever or surgical ward, . .	1500 ,,

It must be borne in mind, however, that other matters—such as, floor space, the number of persons, lights, and fires to be supplied with air, and the quantity of air to be supplied to each—are much more important considerations than the mere cubical capacity of a room. It is impossible to ventilate or heat any room properly where these considerations are not accurately weighed and acted upon. The folly of regarding cubic space as the sole consideration is becoming to be fully recognized, and is like many another fallacy now thoroughly exposed. In most modern and other houses it would be impossible to provide a fresh air supply of 3000

feet per head per hour if the crevices and inlets, which are the accompaniments of bad construction, were not almost everywhere in full use. In a properly constructed house, where such aids to ventilation are avoided, in rooms which will be constantly occupied, it will be necessary to provide foul, fresh, and hot air flues and registers to supply one cubic foot of air per head per second. In a room which will be occupied only three or four hours at a time, and which is well aired in the interval, a supply of three-quarters of a foot per second, or 2500 feet per hour, will suffice. No theatre, schoolroom, or church building should, however, have a less supply than this. In rooms constantly occupied, at least 3500 feet of fresh air per hour are desirable. These calculations are based on the knowledge that in the open air, with a temperature at 60° F. without perceptible wind, about 32,400 cubic feet of air per hour will flow over, or come in contact with, the person of a man, supposing his body to present an area of about nine square feet, and the displacement of air to be at the rate of one foot per second. A winter allowance of 3000 cubic feet of fresh air per hour per head is therefore little enough, and little argument should be needed to convince the most stupid and prejudiced person that in the warmer weather, that is, for at least six months in the year, every available window and inlet for fresh air should be utilized to the full.

Open Fires, Steam and Hot Water Heating.—In Great Britain, except for entrance halls, greenhouses, conservatories, and other places not constantly occupied during many hours in the day, the system of heating adopted is mainly that by open fires. In many countries where great extremes of heat and cold occur, stoves, hot water, and steam are utilized in lieu of open fires. It is hoped that every reader of this chapter has by this time realized, if he did not know before, that no satisfactory system of ventilation can be tolerated or

endured without the arrangement of an efficient system of heating. The first thing to accomplish is, in reality, to secure an adequate system of heating for every occupied house, and then to make the plan of ventilation correspond. The first consideration with householders is cheapness, and for this reason the inhabitants of cold countries, and especially in America, if they have stoves, hot air furnaces, steam heating, and hot water to select from, for the most part adopt stoves or steam. For scientific purposes, heating is divided into two systems—(1) by direct, (2) by indirect radiation. In direct radiation, the heating apparatus is placed in the room or place to be warmed, and fireplaces, stoves, and coils filled with steam or hot water are the means employed. In these cases the heat passes from the radiant body to the solid bodies and surfaces which the room presents, which absorb it, but the air through which the heat passes is not raised in temperature. It is therefore possible by this system to keep a room comfortable, although the air in it may be from five to ten degrees below the temperature of the solid bodies in the room, and this result is generally secured when an open fire is used. It is much disputed whether it is injurious to health or even trying or uncomfortable to the individual after a little practice, to constantly inhale air heated to from 65° to 75° F. It is, however, indisputable, that those of us who have been accustomed to an open fire believe that we cannot with health, as we most certainly cannot with comfort, constantly inhale air heated artificially above 50° to 55° F., and that we feel the heating of inspired air above about 50° F. should be done in the lungs and not by other means. Those who have travelled in Russia or America must have experienced great discomfort and some ill-health from the artificially heated air which they have been compelled to breathe in houses, railway carriages, and elsewhere. Still insular prejudice and habit may have much to do with this,

although the physique of the women especially is certainly not improved by the systems at present in force in those countries. The truth seems to be that where the external temperature falls below 10° F., it is absolutely necessary to adopt furnace, steam, or hot water heating, although in these cases it is desirable to retain the open fireplace as a cheerful additional means of raising the temperature, and of maintaining adequate ventilation. Certainly, in the English climate, an open fireplace, which provides for a fresh air supply, is, if carefully selected and fixed, a quite adequate means of heating an ordinary room in the coldest weather we are likely to experience. A few useful words may be said, perhaps, about other methods of heating which have been the result of the experience gained by Dr. Billings in America and elsewhere.

Hot Air Furnaces.—In using these furnaces it is desirable that the following points should not be forgotten:—

(1.) The furnace itself must be large enough for the work it has to do, or over-heating in cold weather will soon loosen the joints of the furnace, causing the escape of hurtful gases into the dwelling-house.

(2.) Provision must be made for mixing cool air with the heated air before its entrance into the rooms, or over-heating and discomfort will result.

(3.) The sources of air supply to urnaces must be guarded from the entrance of contaminated gases, *i.e.*, the air chamber must be kept absolutely clean and free from impurities, and the air duct, if brought in underground, must be air tight.

(4.) The furnace should be placed at the side of the house against which the winter winds blow most frequently and strongest, rather than in the centre of the house or building, especially as horizontal flues cause great inward friction, which checks the current and involves loss of heat.

Finally, those furnaces which have the fewest joints and the

largest amount of radiating surface in proportion to the size of the fire-box are the best. We must remember at the same time "that it is poor economy to buy a furnace which is not large enough to furnish, in the coldest weather, all the heat required without heating the fire-box to extra heat."

Steam Heating.—The advantages of this system are that the original outlay on plant is smaller, the difficulty of fixing a steam heating apparatus which will work are far less than in the case of hot water, and the radiating surfaces are kept at a higher temperature than when hot water is used. They can, therefore, be made smaller and more compact, and will occupy far less space. It is also easier, Dr Billings adds, to "scamp" a steam heating job than a hot water one. Again, the general use of steam has made workmen more familiar with the boilers and fittings required for steam heating, and the plant can be everywhere obtained without difficulty. These are the reasons which have led to the general adoption of steam heating in the United States and elsewhere.

The disadvantages of this system are, however, important and must be borne in mind. They are—(1) The constant attention which it necessitates, because the moment the production of steam in the boiler ceases, the coils begin to cool rapidly. (2) Owing to the high temperature of steam as compared with hot water radiators, it is more difficult where steam is used to regulate the supply of heat in accordance with the changes of temperature in the external air. (3) A steam apparatus is more dangerous than a hot water one, although with proper care this point is not very material. In the case of hot water these objections are largely removed, and it is probably by far the better system of the two.

In conclusion, it may be well to add that Mr Charles Hood, in the fifth edition of his book on "Warming Buildings by Hot Water," bases his calculations as to the amount of radiating surface required upon the assumption that these radiators

should be composed of cast-iron pipe four inches in diameter. The Americans prefer three inch piping. For greenhouse purposes the best authorities agree that four inch pipes are preferable, because a large body of hot water is required as a sort of storehouse of heat to guard against the effects of negligence in firing. It will also be useful to remember in calculations, that including sockets, &c., 100 feet run of three inch pipe gives about 100 square feet of radiating surface. From a rule laid down by Mr Hood, it appears that to heat 1000 feet of air per minute, using for this purpose three inch pipe, at a temperature of 180° F., and supposing the temperature of the external air to be at Zero F., the amount of pipe stated below under each temperature would be required to maintain the room at the following degrees of heat:—

Temperature at which room is to be kept.	55°	60°	65°	70°	75°
Number of feet of 3 inch pipe required for each 1000 feet of air per minute supplied.	330	375	424	477	536

It will thus be seen that Englishmen owe much to their climate after all, as it is of a nature to obviate the adoption of costly systems of heating which in practice form anything but unmixed blessings.

Methods of Ventilation and Various Appliances.—There are four chief methods of artificial ventilation.

(1.) Aspiration from above, by which system all the foul air flues are made to converge and enter a single shaft in the attic, in connection with which there is a furnace or coil of steam pipe to giv additional heat and ascensional force to the air.

(2.) Aspiration on a level or horizontally, in which case the foul air flues of each story are carried horizontally to the central shaft, which they enter at the level of the ceiling.

(3.) Aspiration from below, where the foul air flues are carried downwards to the cellar, where they are collected into a duct or ducts leading to the central up cast shaft.

(4.) Combined aspiration upwards and downwards, in which case the foul air flues in the upper rooms are carried upwards as in the first system, and the remainder are carried downwards as stated in the third method.

It is not possible to consider in detail here the respective advantages and disadvantages of these various methods, but it may be stated that the third system is the least costly as regards maintenance; it also secures greater uniformity of action, and is more convenient to manage. On the other hand, and especially in an old building, the first system will be found much easier to apply, and will probably prove the only one which can be used.

Of the many and various appliances which are now offered to the public, the most useful inlet for fresh air is the Sheringham valve already described, providing the openings are to be directly in the outer walls and unconnected with the windows. Of Tobin's tubes Captain Galton has well said: "The main objection to these tubes is that they form very convenient receptacles for dirt, insects, cobwebs, and dust, which after a time may injuriously affect the air passing through them. Moreover, inlets of this shape do not readily lend themselves to act the part of outlets when occasion requires, which is so convenient a feature of the Sheringham ventilator." Of syphons and syphon-like arrangements as exit flues for foul air, of cowls, and of the effect of Archimedean screw ventilators, Dr. Billings declares with truth, many fallacies and errors have from time to time been urged by writers on ventilation. He adds: "With regard to the various forms of Archimedean screw ventilators as usually made, they have no effect, unless driven by power independent of the wind. In calm weather, of course, all forms of cowls

are entirely inoperative, except as furnishing more or less obstruction to the free egress of air; and on a still, warm day, when the temperature within a large building may be several degrees lower than that out of doors, there will be a tendency to a reversal of the current, and to down draughts through any form of cowl that can be devised." He is therefore sceptical of the utility of cowls, and he prefers a single shaft about three feet in diameter and properly capped, in preference. To those who desire to make themselves thoroughly acquainted with the whole field included in the heating and ventilation of houses and buildings of all kinds, we can confidently recommend Dr Billings' book, "The Principles of Ventilation and Heating, and their Practical Application" (Trübner & Co.), to which we are mainly indebted for all that is most valuable in this chapter. It is undoubtedly the best book which has yet been published on the subjects of which it treats, and no architect or other person who desires to understand these matters thoroughly or to possess practical knowledge should be without it.

Gas.—Whatever may be the case in the future, gas is, at the present time, the illuminant in the very great majority of houses; and though the sanitary objections to its use are considerable, it would be absurd to forbid it or to refuse to discuss it because it is objectionable. No one will need to be told that gas is greedy of oxygen; that it fouls the air and the ceilings; that it injures delicate fabrics and destroys the binding of books. On the other hand, it is easy to manage, needs but little care or cleansing, and is cheap in comparison with other modes of lighting. For preference, perhaps, nothing exceeds for effective and harmless lighting a good oil lamp, of which there is a great variety now-a-days. Assuming, however, that gas has to be used, it becomes needful to devise some means for the removal of the noxious products of its combustion. This need not be a very expen-

sive matter. The choice of a burner is more important than most people seem to think. As an eminent gas authority recently remarked, when boots wear out people buy themselves new ones; but they do not appear to think the same principle should apply to burners. The periodical renovation of burners would not only give us better light, but would often decrease our gas bills. For preventing the fouling of the ceiling, a tall cover is very efficient; and it helps also to diminish the amount of carbon set loose into the air. The sun-burner is an excellent contrivance for removing not only the products of combustion, but the greater part of the heat as well. It is infinitely more sightly than some of the elaborate gasaliers that are now the fashion, and might often be substituted for them with increased lighting effect and with greatly improved purity of the air. When these sun-burners are not liked or cannot be used, a bell-shaped glass inverted over each burner and connected by tubing with the outer air will achieve much the same result. For bedrooms, halls, and other places where the diffusion of light over a large surface is not required, some such contrivance as is figured in the annexed sketch (fig. 19) should be used.

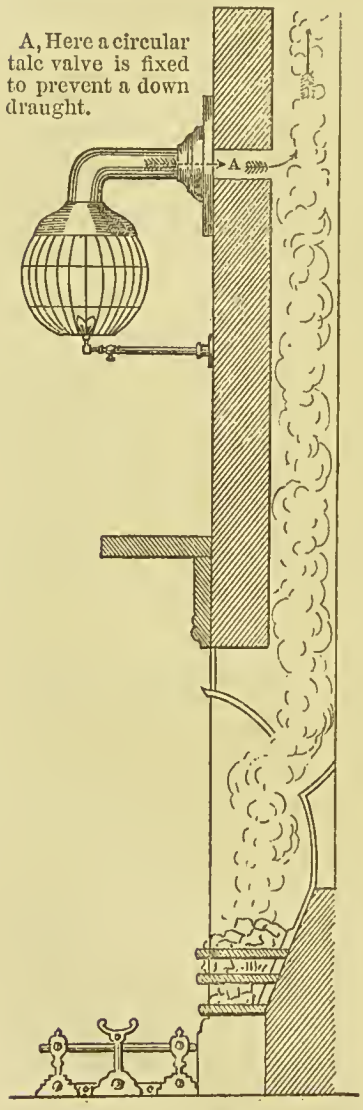

Fig. 19.

Electric Lighting.—It would be idle to assert that, at the

present moment, the domestic lighting of individual houses by means of the electric current is within the range of practical possibilities. But so soon as the problem which is agitating so many electricians and engineers has been solved, and the electric light can be supplied to our homes as easily and as cheaply as gas, then the days of the latter as an illuminant will be doomed. The electric light is almost precisely like sunlight, the spectra of the two being practically the same. As at present generated, the light is, as a rule, too strong for ordinary vision, and some means have to be adopted for toning down the light so as not to injure or distress the eye. This, of course, all involves expense; but, no doubt, eventually, means will be adopted for so developing the light that it can be used for ordinary purposes without discomfort. Arc lighting is, of course, only applicable to large areas; and the domestic electric light of the future is undoubtedly the incandescent system.

As to the cost of employing electric lighting for individual houses, no reliable figures are yet available, for such items as the price of coal vary in different localities to such an extent as to make estimates impossible. In many places it might be possible to employ water-power to drive the dynamo, and the working expense of the installation would thus be very materially reduced. But as a practical contribution to this question, the experience of Mr Octavius Coope, M.P., at his country residence at Brantwood, may usefully be given. In letters to the *Times* of January 16, 1883, and January 25, 1884, Mr Coope gave the following particulars relative to the actual cost and working expenses of an installation of incandescent lamps at his country house :—

Cost of Installation of 200 *Lights each of* 18 *candle-power.*

12-horse power engine and boiler, . . .	£300	6	0
Shafting and foundations, ...	65	0	0
Four dynamo-electric machines, . . .	405	0	0

200 incandescent lamps,	55	0	
200 sockets,	10	0	0
Cables, wires, switches, cut-outs,	66	4	0
Cutting, and making good, walls and floors,	60	0	0
Erection, laying of wires, carriage,	90	0	0
Buildings,	150	0	0
Chandeliers and brackets,	268	18	0
Total cost,	£1470	8	0

Actual working expenses for one year, each lamp burning 1823 hours.

Coal, small, at 13s. 6d., mixed with coke at 18s. per ton,	90	0	0
Wages, engine-driver and lad,	79	14	0
Renewal of lamps, 300 at 5s.,	75	0	0
Oil, cotton waste, &c.,	20	0	0
Repairs,	5	8	1
Sundry small items and expenses,	7	16	8
Depreciation of machinery at 10 per cent.,	78	0	0
„ conductors at 5 per cent.,	4	0	0
Total working expenses,	£359	18	9

Or ·95 of a farthing per lamp per hour.

The lamps were actually employed for 1823 hours instead of for 1150 hours as intended; and hence, though the actual working expenses for the year exceeded the estimate, the expense of each lamp per hour was found in practice to be less than had been anticipated.

To produce an equal amount illumination with gas, the estimated cost of the necessary plant was £1333 18s., and the estimated working expenses £400 per annum. Hence it appears that though the prime cost of the electrical installation was rather more than what a gas installation would have required, still the annual expenses in the latter case would have been in excess of those of the electric installation.

CHAPTER X.

MATTER IN THE WRONG PLACE.

Dust in Living Rooms.—The one great object of the householder is, or should be, to banish dirt—in all its Protean forms—from his precincts. It is with this object that he provides himself drains and sinks, that he lays on water, that he sets up a dust-bin, and that he, or his wife, engages parlour-maids. Dust obtrudes itself everywhere, unless the household is perpetually on the alert against it. For these reasons every unnecessary cornice, or cupboard, or curtains, or hangings should be sternly repressed. Carpets ought never to cover the whole surface of a floor. They should be placed in the centre, with rugs in addition here and there and where necessary, and the floor of the room should either be stained and beeswaxed, or covered with parquet flooring. Carpets should never be allowed under a bed. Really all that is necessary in a bedroom is some wide strips of carpet at the sides of the bed and dressing-table. All articles of furniture, even the heaviest, should be made to run on castors. Behind wardrobes is a very favourite resting-place for dust.

Dust-bins.—All vegetable or animal refuse should be, as far as possible, burnt in the kitchen fire. This is not difficult of accomplishment, if only a little pains are taken. The dust-bin of towns need not be the offensive adjunct of a house that it too often is at present, if more care were taken to dry the matters before they were deposited in it. No useful purpose can be served by drawing a lurid picture of the contents

of a dust-bin as at present constituted, but the dangers to health of an ill-kept receptacle of the kind are very real. Dust-bins in towns ought certainly to be emptied once a week in winter, and at least twice a week in summer. No vegetable matters, or anything of a decaying character, ought to be allowed to be thrown into a dust-bin. Dust and dry matters only should alone be permitted to enter it. It would, however, be far better to abolish the dust-bin entirely, and in its place to have a small galvanized iron tub with a cover and a couple of handles, so made that the dustman can lift it up bodily and empty it into his cart. A dust-bin of this kind can be completely emptied once a week, and thoroughly washed out with soda and water, or, if desired, with Sanitas, Condy's Fluid, or some other disinfectant.

But as dust-bins must for the present be tolerated, it is well that they should be constructed on proper principles. The principal points to be observed as to the receptacles for refuse are, 1st, that the receptacle, whatever it is, should be at least six feet away from the house, in order to prevent nuisance arising from the decomposition of its contents; 2nd, that it should, if a well or spring exists on the premises, be far enough removed therefrom to prevent contamination of the water; 3rd, that its position shall be such that the contents can be removed without being carried through the house; 4th, that the capacity of an ash-pit shall in no case exceed six cubic feet, or such less amount as may be sufficient to contain the refuse for a period not exceeding one week. This provision is made with a view to ensure the regular removal of dust, at least weekly. Lastly, ash-pits should be constructed of impervious materials and be properly protected by a roof from rain. A tub or other suitable means of removing the refuse should also be provided, which must be so constructed that when closed the escape of its contents shall be prevented.

Removal of Refuse.—In most populous places, the removal of refuse is placed in the hands of contractors, under the supposed control of the Local Authority. The dustmen are usually very troublesome people to manage. They come at wrong times, or do not come at all, and they are insolent if they do not receive gratuities. If there is any difficulty in getting the refuse removed, a letter to the Department of Works of the Local Authority will usually remedy the matter. Failing that, application can be made at a Police Court. It is as well to know that dust-contractors are not bound to remove trade refuse, for which a special arrangement must be made.

Dry Methods of Disposal of Excreta.—In a previous chapter (VII.) the methods of disposing of sewage by the agency of water have been dealt with. It will often happen that for some reason or another it is impossible or inexpedient to adopt the water carriage system, and it becomes necessary to choose some other method of disposing of the excreta. In several of the large towns in the north, the various forms of the tub or pail system are in use. With these we need not deal, as the householder has in such cases no option but to adopt the system arranged by the Local Authorities, and to comply with their regulations. But in cases where the householder is free to act as he pleases, there can be no doubt that the system devised by the late Rev. Henry Moule, and known as the *dry earth system*, is the best. The system consists in the application of dry earth to the fresh excreta, the result of which is not only to render the latter inoffensive, but to effect so complete and rapid a change in them that their original character cannot be recognised. It is necessary to have the earth very dry and finely sifted; and in order that the process shall be successful, it is absolutely necessary to prevent slop water from being mixed with the earth. The kind of earth best suited for the purpose is loam. Clay is

theoretically the best, but practically difficult to manage. Sand, gravel, and chalk are useless.

A very efficient method of excrement disposal is that now adopted by the Marquis of Northampton for the cottages on his estate at Castle Ashby. The receptacle is small, above the ground level, and immediately under the seat, of such a size as to require emptying about once a week for an ordinary family. The floor is cemented and sloped in such a manner that this receptacle is easily emptied through a hinged lid at the back with an ordinary spade. It is expected that the ashes will be thrown in at the hinged lid also, and when this is done, so that all liquid matter is soaked up by them, the result is perfect. A small quantity of dry earth may be thrown in just before emptying to soak up the liquid, and a little more left in after the pan is thoroughly cleansed. This closet is the most simple and effective that has been brought under the writer's notice, and only requires attention about once a week. The manure is very valuable for garden purposes, which is also an advantage, as even the smallest cottage in the country has usually its piece of garden ground.

Concerning other systems, the *pail system* is not to be despised, though it is not so simple as the preceding. The pail is apt to get very clogged and foul. If carefully attended to, it is efficient, and may in many cases be usefully adopted. There can be no doubt, however, that the *dry earth closet* is in many respects *the* closet for the country. It is by far the most efficient, and should certainly be used if the closet cannot be effectually cut off from the house.

This leads us to speak of the situation of the closet. In the country it is very frequently placed at the end of the garden, but there are many disadvantages in this. Delicate and elderly people ought not to face the weather whenever they require relief, and they are apt to put off such duties until further troubles may be produced. The closet is best

isolated from the house by a short, cross-ventilated passage with double doors, and then any of the three closets we have just named may be used; but if it is necessary to have a closet quite in the house, the earth closet should be adopted. The great drawback to earth closets is the constant attention they entail, owing to the necessity for the frequent renewal of dry earth. Though adopted in many places, they have often been discarded on this account. This ought not to be an insuperable difficulty. People should keep their servants well in hand. A man should be told off for this duty, and if he does not attend to it regularly, another should be employed in his stead.

As this book is intended for householders who have little if any technical knowledge, some other closets may be shortly mentioned to prevent their use and explain their dangers. The old common midden, uncemented and foul, is a source of pollution to the air, ground, and water in its neighbourhood. The same cemented is almost worse. The liquid does not drain off, the contents form a foul seething mass, and it is frequently only when it is absolutely unbearable that it is at last emptied. The same cemented and communicating with the ash-pit—into this the ashes are thrown, with the idea of soaking up the liquid portion and rendering it less offensive. Theoretically it is an improvement, and it is common in some country districts; but practically it is never anything but a nuisance, as the cesspool is always too large and the contents never sufficiently dry to prevent smell.

It is impossible in a short treatise to go into the different kinds of earth closets, ash closets, &c. Most earth closets now sold are very good and useful for distributing the earth over the soil matter, if it is not desirable that it should be done each time by hand. There are also cinder sifters invented for use in closets, by which the richer country people may benefit.

Slop-water.—Slop-water is a fertile source of trouble both in town and country. In town it clogs up the soil-pipe and creates objectionable smells; in the country it is thrown carelessly upon the ground to make its way to the nearest ditch or water-course. Slop-water in a town house is best disposed of by pouring it down a wide grating at the back of the house communicating with the main drain. In the country it may be carried by a drain to a small water-tight tank in the garden, whence it can be ladled out as occasion may require, or it may be distributed in common agricultural pipe drains under the garden by sub-irrigation.

The great drawback to this process used to be that, as only small driblets escaped at a time, they never went far along such drains; but by the use of Mr Field's flush tank this difficulty is now obviated. By means of this tank the small quantities are held up till the tank is full, when a self-acting syphon comes into play which discharges the whole contents at once, so that they are carried along the sub-soil drains for some distance. The flush tanks must be cleaned out periodically, and the drains will require re-laying after a certain time, or they will become permanently blocked. It may or may not be necessary to underdrain the ground also, this depending chiefly on the character of the soil. Care must of course be taken not to contaminate the drinking-water supply. This plan is so cleanly, so inexpensive, and so simple, that with very few exceptions it ought to be urged for almost universal adoption; and there is no doubt that the drain water thus applied is of great service to the crops.

A common plan of treating the slop-water in the country is to run it into the nearest brook. This is insanitary and dangerous, and ought to be prohibited by law.

Disinfectants.—The best disinfectant is fresh air or soap and water. What Mr Simon once characteristically called "vague chemical libations or powderings" of strongly smell-

ing substances calling themselves "disinfectants," take the place of these in the economy of many households. To mask one nasty smell by another is not true "disinfection;" and the proper plan is, when an unpleasant smell arises, to track it to its lair and root out its cause. In a healthy house there is no real occasion for disinfectants at all. If, however, occasion should arise for their use for household purposes, the best and simplest of the compounds now in use is "Sanitas," which has an agreeable smell and has certain antiseptic properties of its own. The use of disinfectants in sickness will be found fully described in the special chapter devoted to the subject in the companion volume, "Hints in Sickness: Where to Go and What to Do."

CHAPTER XI.

HEALTH RESORTS.

HEALTH resorts are divisible into two classes; *first*, those which depend for their celebrity on some peculiar beneficial characteristic of climate suitable for certain maladies; and *secondly*, those which owe their popularity to mineral waters found in the locality. Some, but comparatively few, offer for certain maladies, at least, a combination of the advantages stated above. Unfortunately there are a still larger number, where, although climate may suit an individual case, waters will not, and where although the waters may be beneficial, climate will not be. The choice therefore of a locality for an invalid is a more complicated question than it might appear at first sight.

The principal British and Continental "Health Resorts" which depend for their celebrity on climatic peculiarities may be classed under the following headings :—

Bracing Climates.—*British*—Aberystwith, Brighton (east end), Buxton, Clifton, Eastbourne, Filey, Harrogate, Llandudno, Malvern, Margate, Moffat, Ramsgate, Scarborough, Southport, Tunbridge Wells, Whitby. *Abroad*—Aix la Chapelle, Aix les Bains, Baden Baden, Bagnères de Luchon, Biarritz, Carlsbad, Franzensbad, Homburg, Marienbad, San Remo (the most bracing on the Riviera), Spa, Wildbad.

Exciting Climates. — *British* — Harrogate (high parts), Malvern Hills, Scottish Highlands. *Abroad* — Cauterets, Bagnères de Luchon, Bareges, Eaux Bonnes, Eaux Chaudes, the Engadine generally and St Moritz in particular; also a

the high Alps and Pyrenean stations not named above. Hummum R'viha, 50 miles from Algiers.

Relaxing Climates.—*British*—Bath, Brighton (west end), Bournemouth, Channel Islands, Cheltenham, Dawlish, Ilfracombe, Leamington, Matlock, Queenstown, Southsea, Tenby, Weymouth, Worthing, Sandown, Shanklin (less so than the other parts of the Isle of Wight). *Abroad*—Algiers, Aix la Chapelle (some parts), Bagneres de Bigorre, Dinan, Ems, Genoa, Kissingen, Kreuznach, Lisbon, Pfaffers, Vichy, Wiesbaden. On the Riviera, Bordighera, Mentone, and San Remo are less relaxing than other places.

Sedative Climates.—*British*—Dawlish, Hastings, Penzance, Sidmouth, St Leonards (not so much so as Hastings), Torquay, Undercliff, Ventnor. *Abroad*—Algiers, Como, Ems, Malaga, Naples, Pau, Rome, Venice, and the Riviera generally, Nice, Genoa, and San Remo being least sedative.

The above classification is formed on a consideration of *all* the various conditions which tend to modify the climate of any particular place, such as local position, altitude, neighbouring hills, rivers or sea, soil and geological characteristics, temperature, rainfall, direction of prevailing winds, and amount of sunshine. But such a classification, as indeed any classification, must be to a certain extent arbitrary, and the headings can only convey the leading characteristics of the climate as compared with other places. For it is difficult to determine the line at which a climate ceases to be bracing and becomes relaxing, and *vice versâ;* hence the climate bracing or relaxing to one person may be less so to others, or even to the same person in a different condition of health. Again a locality may be bracing at one season of the year, and the reverse at another. And one locality may present in a small space different varieties of climate. It must be recollected that the climate which will do good or harm is

often extremely localized. Not only may the wrong district be chosen, but the wrong town, the wrong part of a town, the wrong house, and even the wrong room. A place may be unexceptionable with regard to its general character and climate, but there may be and usually are many situations in that place, in which the benefits of the general climate may be more than neutralized by such causes as a crowded locality, low damp situations, eastern or northern aspect, imperfect ventilation, massive neighbouring buildings which radiate the heat, and bad sanitary arrangements. Many of the continental so-called "health resorts" are notorious for the latter defect, and it is absurd to expect the invalid Briton will regain health abroad, while he is being poisoned by the vitiated air of badly ventilated sleeping rooms, or by the escape of sewer gas from badly trapped closets and drains.

Conditionally that a fair position is chosen, and that the surrounding sanitary arrangements are satisfactory, persons suffering from the following diseases may resort to the places mentioned above with a confident expectation of being benefited by the change.

MINERAL WATERS.

As numerous invalids will require to use the mineral waters found in many of the localities, a few words on this subject are desirable before mentioning the places suitable for particular diseases. The ancient time is past, when mineral waters were regarded as simple units in which the mysticism of the healing power bubbled from the depths of the earth. Thanks to modern chemistry, we now know that mineral waters are complex medicinal agents, containing various salts, and sometimes gases mixed together. Water falling on the earth and percolating through it, dissolves what soluble parts it may come in contact with. Most spring waters contain

some minute proportion of saline ingredients, the principal being common salt and sulphate of lime. But the term *mineral water* is customarily reserved for those waters in which the saline matters are sufficiently potent to impart a disagreeable taste. Mineral waters again vary in temperature, from cold to nearly boiling. Therefore mineral waters are sometimes used for the sake of the salts they contain, sometimes for the gases they afford, and at other times *externally* as tepid, warm, or hot baths. Much of the good resulting to invalids frequenting the Spas of Europe depends more on the change of scene and air, the exercise taken, the mental rest obtained, and on the regular life observed, than on the actual use of the waters. As a rule it is incumbent on the invalid to give the greatest consideration to climate, and not to resort to a bad or unsuitable place for the sake of drinking waters which may be regarded as suitable. Most mineral waters may be imported, but climate cannot be imported. And although it is stated with some truth, that mineral waters are never so beneficial as when used at their source, still this should not lead to the sacrifice of climate for what in many cases would be a minor advantage.

Mineral waters may be classed under various and numerous heads, but the following is brief and sufficient for all practical purposes.—*viz.* 1. *Chalybeate* or *ferruginous.* 2. *Saline aperient.* 3. *Sulphurous.* 4. *Alkaline.*

Chalybeate or Ferruginous Waters.—Of these the principal sold are those of Harrogate, Pyrmont, Schawlbach, Spa, and St Moritz. Although iron waters are bottled for exportation, they do not keep very well; for when the bottle is opened, the iron, being generally in the form of a carbonate, decomposes, the carbonic acid gas escaping and the iron sinking to the bottom of the vessel. Imported iron waters are therefore not very strongly recommended.

Harrogate iron water contains a carbonate of iron, and is

useful for anæmia and for the complaints of young females. Two or three pints may be taken daily.

Pyrmont iron water contains carbonate of iron, with magnesia, lime, and other salts, among which is alumina. It is beneficial for anæmia and the complaints of young females, especially when accompanied by dyspepsia and slight diarrhœa. Dose, half-a-pint two or three times daily.

Schawlbach iron water contains carbonate of iron, and also a small proportion of sulphuretted hydrogen gas, and is therefore in some degree also a sulphurous water. It is useful in the same class of cases as Harrogate iron water, but being more nauseous has nothing to recommend it above the latter. Dose, two or three pints daily.

Spa iron water contains carbonate of iron with magnesia and other salts, also free carbonic acid. It is useful in the same class of cases as Pyrmont water, excepting when there is diarrhœa, as it exerts a greater action on the bowels. It should therefore be used in preference for anæmia and debility, and in the complaints of young females when accompanied by constipation. Dose, one to three tumblerfuls daily.

St Moritz iron water contains principally carbonate of iron, and is useful for the same maladies as Harrogate iron waters. Dose, two or three tumblerfuls daily.

Several other waters contain iron, as those of Franzensbad, Kissingen, and Desdames at Vichy, but as their activity depends principally on other constituents they are classed elsewhere.

Saline Aperient Waters.—Of these the principal sold are Adelheidsquelle (Bavaria), Birmensdorf, Friedrichshall, Hunyadi Janos, Kissingen, Carlsbad, Marienbad, Pullna.

Adelheidsquelle water contains a large proportion of common salt, with sulphate and carbonate of soda, and carbonic acid gas. It is not very strongly aperient, but is considered to be of great service by increasing all the secretions as well as those of the bowels. It is used chiefly for affections of

the skin, gout, rheumatism, and certain female complaints accompanied by discharges (whites). It is also useful for scrofula. The dose is from one to two bottles daily.

Birmensdorf water contains sulphate of magnesia and sulphate of soda with iron. It is a mild laxative, and is useful in liver complaints, jaundice, hæmorrhoids, and hypochondriasis. Dose, a tumblerful before breakfast.

Friedrichshall water contains a large proportion of sulphate of soda, sulphate of magnesia, chloride of magnesium, and common salt. It is a valuable, harmless, and efficacious aperient in all forms of constipation, and is much recommended as a laxative in cases of calculous disease. Dose, a wine glass to half a tumblerful, half an hour before breakfast. A little warm water added promotes speedy action.

Hunyadi Janos water contains a very large proportion of both sulphate of soda and sulphate of magnesia, with some chloride of soda and a minute proportion of iron and strontia. It is perhaps the best of all aperient waters, having the advantage over most others of being almost tasteless. It is recommended especially for habitual constipation, for persons of gouty habit, for disorders of the liver, for hæmorrhoids, and for organic diseases from fatty degeneration if a laxative is required. It is also a safe aperient for use during pregnancy. It may be taken for a length of time without injury, and it may be discontinued without inconvenience. A wine glassful may be taken at bedtime or in the morning. An equal quantity of warm water renders its action more speedy.

Kissingen water contains chloride of sodium, carbonate of lime, sulphate of magnesia, and a small proportion of iron. It is but slightly aperient, and is sometimes described and sold as an iron water. It is beneficial in the same class of cases as Adelheidsquelle water, especially when there is dyspepsia combined with debility. It is also useful in liver derangements, and in weakness with confined bowels pro-

ceeding from age or exhaustion. One bottle may be taken daily for a dose.

Carlsbad water contains sulphate of soda as the principal active ingredient, with carbonic acid gas. It is especially useful in congestion and other diseases of the liver, for gouty subjects, for threatenings of apoplexy, for constipation, and for obesity. From half a tumbler to two tumblers may be taken in the morning fasting. Carlsbad salts, which are made by evaporating the water, is a more portable form, and equally efficacious.

Marienbad water contains a large proportion of sulphate of soda with bicarbonate of soda, common salt, and carbonate of magnesia. The water is purgative and alkaline, and is chiefly used in maladies arising from too good living, gravel, gout, and derangement of the digestive organs in gouty habits of body. It is also reputed beneficial in uterine and female complaints generally. One bottle may be taken daily.

Pullna water contains sulphates of soda and magnesia. It is useful in the same class of maladies as Friedrichshall and Hunyadi Janos waters, and is to be preferred by those who also suffer from acidity of the stomach, and by females who suffer at the monthly period.

Sulphurous Waters.—The principal which can be procured are those of Aix-la-Chapelle, Bareges, Bonnes, and Harrogate. As with bottled ferruginous waters, so bottled sulphurous waters are not to be recommended, as they are liable to decompose, and become useless on exposure to the air.

Aix-la-Chapelle water contains various salts, among them being sulphuret of sodium, together with carbonic acid gas. It is more useful for bathing in than drinking, and has proved beneficial in rheumatism, skin affections, stiff joints, &c. Dose, a quart daily.

Bareges water also contains sulphuret of sodium, and is

useful in the same maladies as Aix-la-Chapelle waters. Dose, from two to four half-pint tumblers daily.

Bonnes water owes its properties chiefly to sulphuretted hydrogen gas. It is stated to be useful in asthma, catarrh, and diseases of the respiratory organs. But if so, its utility must depend on the salts it contains, and not on its sulphurous properties. It is not recommended for use, as sulphuretted hydrogen gas will not remain in a bottle after the cork is drawn, and indeed much of it escapes before. The dose is one quarter to one half a tumbler taken before breakfast.

Harrogate sulphurous water contains both sulphuretted hydrogen gas and sulphuret of sodium, the latter in a larger degree than any of the continental springs. It is also rich in other salts, so that it seems unnecessary for those requiring sulphurous water to obtain it from abroad, when they have better nearer at hand at home. Harrogate sulphur water has a great reputation for the cure of skin diseases, for indigestion, gout, rheumatism, and, as it contains iron also, for chlorosis and anæmia. Dose, from a tumblerful to a bottle daily.

Alkaline Waters.—The principal sold are those of Bethesda, Bussang, Ems, Homburg, Kissingen, Kreuznach, Tarasp, Woodhall.

Bethesda water contains bi-carbonates of lime and magnesia, with various other salts, and a minute proportion of iron. It is useful for kidney and bladder maladies. From eight to ten tumblers may be taken daily.

Bussang water contains carbonate of magnesia and sulphates of soda and lime, with also a minute proportion of iron. It is useful in dyspepsia accompanying kidney and bladder affections. Dose, two or three half-pint tumblers daily before meals.

Ems water is rich in bi-carbonate of soda, combined with salts of lime, magnesia, baryta, strontia, &c., and a minute

degree of iron. The water is prescribed for dyspepsia and sluggish liver, producing throat irritation; also in cases of chronic cough, with tenacious expectoration depending on digestive derangements. Two bottles may be taken daily.

Homburg water contains common salt and carbonate of lime as the principal ingredients, with carbonate of magnesia and traces of iron. There is also free carbonic acid gas. It is prescribed in cases of dyspepsia accompanying chlorosis, hysteria, and inactive liver. Dose, up to three tumblers daily.

Kissingen water has already been mentioned under saline waters. It is also an alkaline water, and may be used in the same ailments as Ems water, when greater action on the bowels is required. Dose, a bottle daily.

Kreuznach water contains common salt, chloride of calcium, iodides, bromides, and a small degree of iron. It is very useful in any form of scrofula, especially when the glands of the neck, or the eyes, or the glands of the bowels are affected. It has also a reputation for the cure of female discharges. Dose, a pint daily.

Tarasp water contains sulphate of soda, carbonate of soda, common salt, carbonate of lime, &c., with a little iron. The water being more aperient than most alkaline waters, is useful in cases of obesity, for enlarged liver and spleen, and for indigestion accompanied by pain, distension, and gaseous eructations. Dose, half-a-pint to a pint before meals.

Woodhall water contains iodides, bromides, and a minute proportion of arsenicum. It is especially useful in rheumatism, gout, neuralgia, obstinate skin diseases, especially those of a syphilitic character, and for goitre or Derbyshire neck. Dose, a tumblerful two or three times a day, or more if the bowels are constipated.

Miscellaneous Waters.—In addition to these ferruginous, aperient, sulphurous, and alkaline waters, others are imported and sold as *table* waters, which possess in a comparatively

infinitesimal degree some of the properties of the above. These are *Apollinaris* water, which is slightly alkaline from carbonate of soda. This is the most popular table water, and often proves invaluable in obstinate cases of digestion. It is pleasant and agreeable to the taste, and is preferable to ordinary water for table purposes. *Bellthal*, slightly alkaline from potash, lime, and magnesia. *Bilin*, which contains a larger proportion of soda. *Birresborn*, which contains the same salt. *Fachingen*, also chiefly alkaline from soda. *Gerolstein*, which contains some fourteen varieties of salts in minute quantities, and having iron, may be regarded as a tonic water. *Roisdorf*, the principal ingredient in which is common salt. *Saint Galmier*, containing bicarbonate of magnesia. *Seltzer*, also containing common salt, with soda, magnesia, and lime. *Wilhelm'squelle*, similar to *Gerolstein*. All these waters may be taken to promote digestion and correct acidity.

PLACES SUITABLE FOR PARTICULAR AILMENTS.

Anæmia, or that impoverished state of the blood which arises from overwork, anxiety, bad sanitary surroundings, and in females from over-nursing, requires a bracing climate and iron waters. In severe cases, Brighton or Eastbourne may be chosen, but if the person is stronger, Scarborough or Whitby, or if the malady has not made much progress, the Scottish Highlands. If the anæmia is of tropical origin or connected with enlarged spleen, Torquay is recommended for weak, Tunbridge Wells for stronger persons. On the continent there is Bagnères de Luchon—especially for females, Biarritz, Marienbad, Spa, St Moritz, and the Upper Engadine.

Apoplexy, *warnings of* (such as giddiness especially on stooping, fainty feelings, a sense of pressure, constriction or heat in the head, confusion of ideas, flushing of the face, noises in the ears, &c.), require a somewhat relaxing climate

and aperient waters, indications to be met at Bath, Cheltenham, Leamington in Great Britain; and abroad at Baden-Baden, Bagnères de Bigorre, Carlsbad (in the summer), Kissingen, and Marienbad.

Asthma will probably be benefited by the comparatively mild and equable climates of Dover, Hastings, St Leonards, Bournemouth, Ilfracombe, Southsea, Worthing, Ventnor; and abroad by Como, Pau, Geneva, and the Riviera generally.

Bladder, Chronic Affections of.—A slightly bracing climate is desirable, with alkaline waters. If the person is tolerably strong, Harrogate may be recommended, especially the lower parts of the town, where the climate is less bracing than on the heights. In other cases, Bath, Buxton, Cheltenham; and on the continent, Ems, Homburg, Kreuznach, Wiesbaden, and Vichy.

Bronchitis, Chronic.—This malady requires a mild, equable, and somewhat relaxing climate, such as may be found at Dover, Hastings, St Leonards, Bournemouth, and Sidmouth. During the summer Sidmouth may, however, prove too relaxing, and the same remark applies to Torquay. There is, however, at Ventnor a climate which is mild, yet to a certain extent less relaxing, and therefore more bracing than most southern localities in the British Isles. For very feeble or aged persons, Penzance may be recommended. Abroad there are Como, Pau, Venice, and the Riviera generally.

Chlorosis or Green Sickness, being the malady characterized by great anæmia, which often attacks young females about the age of puberty. As a general rule a bracing climate and ferruginous waters are required. Therefore Scotland, Scarborough, Whitby, Malvern, Tunbridge Wells, or for weaker girls, Eastbourne or Bath may be resorted to. On the continent there are Baden Baden, Ems, Homburg, Kreuznach, Marienbad, Spa.

Constipation.—Scottish Highlands, Scarborough, Harrogate (especially if there are piles), and Cheltenham or Leamington

for weakly persons; on the continent, Homburg, Carlsbad, Marienbad, Kissengen, all the latter places fulfilling the desired indications, both as regards climate and waters.

Consumption.—If the malady is attended with dyspeptic symptoms, experience shows that Sandgate may be resorted to. If there is tendency to *hæmoptysis*, or spitting of blood, Hastings, Worthing, Sidmouth, Torquay, Bournemouth, Ilfracombe, or Queenstown in Ireland. Abroad there is Como, Pau, Venice, and San Remo, Bordighera and Cannes, in preference to the other Riviera stations. If the patient can proceed for a longer distance, Algiers and Egypt. Recently, elevated mountain places have been much lauded as curative of lung disease, and when such malady is rather *suspected* than confirmed, a trip to the Scottish Highlands may be productive of benefit, especially in the summer and autumnal seasons. But notwithstanding all that has been said of the advantages of consumptives resorting to high Alpine stations, it may be questioned if the growing practice is not one of those "fashions of physic," which must sooner or later die out. St Moritz in the Engadine has been particularly lauded as beneficial for consumptives. The barometric pressure at this elevated locality is 24°, whereas that of the air of the English coast is 30°, and this diminution of atmospheric density is said to be favourable to diseased lungs. The climate is, however, like all mountain climates, exhilarating and exciting, and *certainly cannot be fitted for those who have any tendency to spitting of blood*, although it may prove so to those of phlegmatic temperament with sluggish circulation and inexcitable nervous system, and who have *no* tendency to spitting of blood. Moreover, the general state of health may be too low to allow of sufficient power of reaction against the cold of a mountain climate, and such a condition should prevent any consumptive proceeding to an elevated position. If consumptives derive any benefit from mountain climates, it is

really the pure air of an elevated and thinly populated locality which is productive of such benefit. St Moritz and other places of the kind are far better suited to anæmic and chlorotic than to consumptive patients.

Diabetes.—In the first stages of this malady a slightly bracing climate, such as Ramsgate, Margate, Brighton, or Eastbourne, will generally prove beneficial. In the more advanced stages a somewhat relaxing locality is more desirable, such as Bournemouth, Torquay, the Channel Islands, and the Isle of Wight. On the continent, Bagnères de Bigorre, Biarritz, Ems, Kissingen, may be resorted to first, and at a later date, Como, Lisbon, Malaga, Naples, and the Riviera.

Dysentery and Diarrhœa.—A mild, equable, and somewhat relaxing climate is generally desirable. Bournemouth, Ilfracombe, Eastbourne, Brighton, Southsea, and the Isle of Wight may be mentioned. If, as is sometimes the case, there is much nervous irritability, the more sedative climates of Penzance or the Channel Islands are to be recommended. When convalescence is advancing, Tenby on the coast and Tunbridge Wells inland, may be resorted to for the summer and autumn. If there is in addition any liver affection, Bath or Cheltenham. Abroad, the Riviera for very weakly persons, and for stronger persons, and especially when there are alternations of diarrhœa and constipation, Kissingen, where the mineral waters in small quantities have rather a constipating effect, and the reverse in larger doses. On the continent Aix les Bains presents a desirable climate in the autumn, with a mineral astringent alum water. For tropical diarrhœa, Biarritz may be advised; Malaga has also proved beneficial. On the Riviera, Cannes or San Remo would be most desirable.

Dyspepsia.—Dover, Folkestone, Southsea, and Eastbourne may be tried. If connected with torpidity of the liver, Cheltenham and Leamington. If from sedentary pursuits, Scarborough, Brighton, Clifton, the Scottish Highlands, or the

Malvern Hills. On the continent, Carlsbad, especially if there is constipation, and Ems or Vichy, especially if there is great acidity. If the dyspepsia is connected with or dependent on female irregularities, or with hysteria, an elevated station such as St Moritz, where there are also iron waters, would be desirable.

Fat, *accumulation of.*—A course of exercise on the Scottish or Malvern Hills, accompanied by a course of Hunyadi Jànos water, with care in avoiding fatty and saccharine articles of diet, will probably prove as efficacious as strict Bantingism. Or the same system may be pursued at Leamington or Cheltenham, drinking the water of those places, or on the continent at Carlsbad. Homburg and Vichy waters have also a reputation for the reduction of obesity.

Fever, *recovery from.*—Almost any of the localities mentioned under "Bracing" (p. 180) will be beneficial in promoting convalescence from fevers and other exhausting diseases. Aberystwith, Llandudno, and Matlock may be specially recommended.

Gall Stones.—In Great Britain the climate and waters of the following places are most suitable, viz., Bath, Cheltenham, Leamington. On the continent, Carlsbad, Vichy, Marienbad, and, for delicate persons, Ems.

Gout.—Harrogate, Leamington, Bath, Buxton, Cheltenham, present suitable climates and waters. Hastings and Torquay may also be recommended for aged persons. On the continent, strong middle aged people should go to Carlsbad, and weaker people to Vichy, Ems, or Baden Baden (where there is lithia in the water). Lean and decrepid persons are usually much benefited at Homburg or Kissingen. Aix la Chapelle, Wiesbaden, and Wildbad have a somewhat inferior reputation. Baden Baden and Vichy for waters, and San Remo for climate, are most beneficial in gout.

Gravel.—The best places in England both as regards

climate and waters are Cheltenham, Leamington, Bath and Harrogate. On the continent, Carlsbad and Vichy.

Kidney Affections.—In most affections of this organ, Bath or Brighton will be found desirable residences, and on the continent, Aix la Chapelle, Baden Baden, San Remo, Wildbad, Algiers, and in some cases, Carlsbad. But kidney maladies are so numerous and complex, that the advice of a medical man should always be sought.

Liver Affections.—For simply sluggish liver arising from sedentary life, the Scottish Highlands or the Malvern Hills. For enlarged liver, the result of too good living, or residence in tropical climates, Cheltenham, Leamington, and Bath. If there is accompanying diarrhœa, Ilfracombe, Bournemouth, or Sidmouth. Abroad for stout people, Carlsbad, Marienbad Franzensbad. If there is congestion of the liver, Carlsbad, Marienbad, or Kissingen. For fatty liver, Carlsbad, Marienbad, Homburg, Eger, and Ems, the latter two when there is tendency to biliary calculi. On the Riviera, Mentone appears best suited to liver complaints.

Neuralgia and Nervous Affections.—These complaints generally require sedative climates, such as Hastings and St Leonards, Ilfracombe, Bournemouth, and Ventnor in the Isle of Wight. Abroad, Aix les Bains, Wildbad, Bordighera, and Spa have the greatest reputation for such maladies.

Piles.—These troublesome ailments depend on a number of causes, of which constipation, congestion of the liver, and sedentary occupation are among the principal. Piles therefore can only be cured or relieved by first finding out the cause, and then using the remedies applicable to the cause. Speaking generally, piles are benefited at Cheltenham, Leamington, Bath, and Harrogate in England, and at Carlsbad, Homburg, Marienbad, Spa, Wiesbaden on the Continent.

Rheumatism, Lumbago, Sciatica require an equable and slightly relaxing climate, with aperient waters and alkaline,

stimulating, or sulphurous baths. The first indications are met at Torquay, Queenstown, Bournemouth, and Ventnor, while both are afforded at Bath, Cheltenham, and Leamington. Buxton and Harrogate have also a reputation, partly from climate, partly from waters. So have the salt baths of Droitwich and Nantwich. On the continent there are Aix la Chapelle, Aix les Bains, Bareges, Bagnères de Luchon, Baden Baden, Franzensbad (with its mud baths), Carlsbad, and for muscular rheumatism the hot baths of Wiesbaden and Wildbad. Vichy is also to be recommended when there is accompanying acidity and dyspepsia. Naples, San Remo, and Cannes are also beneficial in most forms of rheumatism.

Scrofula.—Ramsgate, Margate, Tunbridge Wells, Malvern Hills. If accompanied by glandular swellings, Dover, Sandown in summer, Ventnor or Hastings in winter. Aberystwith may also be recommended in the summer, and Queenstown at other seasons. Abroad, Aix la Chapelle and Aix les Bains, Wiesbaden, Wildbad, the Swiss Alpine stations in the summer, and San Remo or some other Riviera locality in the cold weather.

Skin Diseases are very likely to be benefited by saline baths as obtainable at Droitwich, by sulphur baths as given at Harrogate, and by mixed saline baths as used at Bath or Cheltenham. But skin diseases depend on a number of causes (such as dyspepsia and habit of body) affecting the general health, and therefore the treatment of skin affections must be directed to the cause rather than to the effect, and the locality and baths must be chosen accordingly.

Throat Affections.—As a general rule, the localities suitable for bronchitis are equally desirable for throat affections. In the British Isles this applies even more forcibly than on the Continent, where Lisbon, Naples, and San Remo have acquired a questionable reputation as being more curative of throat ailments than of bronchial or lung affections.

Womb Diseases, and Female Complaints.—These affections usually require a bracing climate, with slightly aperient and ferruginous waters. In Great Britain there are Moffat in Dumfriesshire, Scarborough, Whitby, Filey, Harrogate, Malvern, Cheltenham, Brighton, Bath, and Eastbourne— all affording a suitable climate and waters. Of the two latter places (Bath and Eastbourne), the former is desirable if there is accompanying dyspepsia; the latter, if the patient cannot bear the more bracing climates of the north. Abroad, Aix la Chapelle, Baden Baden, Carlsbad, Homburg, Ems, Kreuznach, Marienbad, and Spa have attained a certain celebrity as beneficial in such cases.

THE WATER CURE.

The water cure originated under a guiding notion that disease of the most different nature was caused by an acrid humour in the blood, and that the skin was the organ by which it was to be removed. By the constant application of water, as by poulticing, it is possible to induce a series of boils or local eruptions, which the peasant Priesnitz, who afterwards attained considerable celebrity as a curer of disease, taught were *crises* connected with the malady treated. While admitting that the water cure is in many instances productive of great benefit, it must be stated that it is not the general *panacea* which some enthusiasts have asserted it to be. Much of the benefit derived from the treatment pursued at hydropathic establishments must be attributed to the *regimen* as regards hours, diet, and exercise made incumbent on the patients. With such adjuvants, there are, undoubtedly, many diseases which are more benefited than they would be from any other system. Still, people should not rush off blindly to hydropathic establishments, under the idea that such places are temples of health. There are cases which may be benefited by the

hydropathic treatment, and there are, perhaps, a larger number of cases which certainly will not be benefited by such treatment; and often a medical man can only decide on an intimate knowledge of the individual and his malady.

Water Drinking.—The hydropathic treatment consists mainly in drinking water and in taking baths of various descriptions. The drinking of pure water aids digestion by acting as a solvent on the food; but if taken in large quantities, it dilutes the gastric juice, and therefore impairs the digestive powers. The inference is, that large quantities of water should be avoided both immediately before meals and while digestion is going on, or for three or four hours after meals. The systematic drinking of cold water at other periods assists the tissue changes constantly going on in the system, and helps both in the building up and breaking down which is perpetually progressing in the body. Or, in other words, the tissues are washed out, and the secretions increased. All this is well known at hydropathic establishments, where there is generally a medical officer quite competent to advise as to when and how each patient should drink water. For although general rules may be mentioned as above, individual cases may require some modification thereof.

Baths.—Drinking water, however, is only one item in the programme, and not such an important item as the bathing. The external use of water in the shape of baths is both physiologically and therapeutically the most important. The *cold* bath acts by abstracting heat. Its first effect is to chill, but if not continued too long—the cutaneous nerves being also stimulated—reaction ensues, and the body glows from increased circulation of blood, while as a consequence the absorption of oxygen by the lungs is quickened, and the appetite is augmented. But if a cold bath is continued too long, depression instead of reaction ensues, the fingers become shrivelled and white, blood is forced from the surface into the interior, and any

weak organ in the body suffers from the strain. Similar remarks apply to the *shower* bath, which being more sudden and forcible should only be used by strong persons. The tepid bath from 85° to 90° has little appreciable effect on moderately strong people, being neither stimulating nor depressing, but on weakly persons with bad circulation it acts as the cold bath, and should therefore be used in preference by such persons. The warm bath from 96° to 104° causes increased frequency of pulse and redness of the skin ; while the hot bath from 102° to 110° is followed by greater frequency of the pulse, increased skin redness, and profuse perspiration, and if indulged in to excess causes faintness, drowsiness, and lethargy. The hot air bath acts still more vigorously in the same manner. In other words, the cold bath drives a moderate amount of blood from the surface, but if continued too long there is no reaction, and internal congestions ensue ; while the hot and warm baths draw blood to the surface, and if continued too long denude the internal organs, especially the brain, of blood. It is therefore at once evident how important such agencies may be made in the treatment of disease. But this is not all. There are packing in wet sheets, local, foot, and other baths, or tepid baths followed by shower baths, by which a combined calming and stimulating effect may be produced ; and there are the Russian and Turkish baths, which may be regarded as an *heroic* or forcible method of removing impurities from the system by way of the skin. It would be impossible except in a large work to mention a tithe of the multitudinous methods in which water may be used, or a tithe of the legion of maladies in which, properly used, it is beneficial.

It must therefore suffice to give some leading indications of the diseases in which the water cure is beneficial. These are—

1. Digestive derangements, especially those arising from too free living, and particularly if associated with sensations of

fulness about the bowels or with a hypochondriacal condition. 2. Habitual constipation, especially if combined with indigestion. 3. Chronic rheumatism, the variety attacking the muscles being usually most benefited. 4. Most kinds of chronic skin diseases. 5. Metallic poisoning, especially that arising from mercury.

Mineral Baths.—The above applies to simple water baths, but both sea bathing and mineral baths demand a few words. Sea water baths are more stimulating than plain water, owing to the salts contained in solution. The sea is also more equable in temperature than fresh water. Sea water baths may therefore be regarded as a general tonic for those in moderately good health, rather than a curative agency. The same remark also applies to saline springs such as Droitwich and Nantwich, the principal ingredient in which is chloride of sodium or common salt. These salt baths are chiefly used for retarded convalescence after a serious illness, for affections of a gouty or rheumatic nature, and for some chronic skin diseases. But there are many other mineral baths of reputed efficacy as containing very different ingredients. Among these are sulphurous water baths, also chiefly used for cutaneous maladies. In the carbonic acid gas baths of Spa, the gas adheres to the surface of the body in bubbles, and is spoken of as exciting and stimulating to the skin. Then there are the moor or mud baths of Franzensbad and Teplitz, made with peat earth stirred up in water, and beneficial for rheumatism and some forms of paralysis. Also baths of the leaf of the pine —*Pinus sylvestris*—the odour of which is delicious, but the medicinal value doubtful. It must, however, be recollected that many authorities deny that any mineral matter is absorbed by the skin; and if any is absorbed it is certain that it is only an infinitesimal quantity. The real virtues of mineral baths therefore depend, like fresh water baths, on their temperature, and on the manner in which they are used,

plus the extra stimulation of the skin, due to the effects of the salts they contain on the surface of the body.

THE MILK CURE.

As the Ancients mostly pursued a pastoral life, and therefore doubtless consumed large quantities of milk, their opinion regarding milk as a food is entitled to respect, and this opinion may be gleaned from Homer, who states, "feeders on milk are the most honest of men." By the light of modern science we now know that milk is indeed the only model food, containing in itself all that is necessary for the nourishment of the body. On the authority of Sir William Jenner, one pint of good milk is equal to a mutton chop. The nutritive qualities of milk are perhaps never more forcibly demonstrated than when taken warm after fatigue of either body or mind. Some portion appears to be digested and assimilated immediately, and the prompt influence of its restorative qualities will soon convince those who think that under such circumstances they require alcohol, of the superior advantages of taking milk. It is also a great restorative in disease, and for this purpose it is not sufficiently used. It would probably be better for numbers of our sick if we imitated more frequently the Tartar tribes, who although only having mares' milk, limit the dietary of their sick to that fluid, or to preparations from it.

The milk cure, as applied to certain diseases, consists in allowing the patient no other nourishment, except perhaps a little dry bread. Still, however simple such treatment appears, its conduct requires a considerable amount of knowledge, care, and attention. For although milk contains all the necessary elements of human food in the desired proportions, yet it is not always digested well by diseased persons. Patients when they begin to take it often declare it does not agree with them. This, however, is no reason why the treatment

should be discontinued, but rather that the milk should be examined as to quality, and if necessary taken in a different manner, or quantity. For instance, persons may object to milk as causing what they term "biliousness," which arises from the milk being regarded as a mere drink instead of the main article of food, and the consequent indulgence in other viands. Again, when milk is received into the stomach, it is "curdled" by the gastric juice; or in other words, a peculiar nutritive substance found to perfection in milk and known as *casein* is precipitated. If too large masses of *casein* are allowed to accumulate in the stomach the result is indigestion—a condition which often occurs in children and infants, who being overfed throw up the curdled milk in large masses. Again, milk may not agree from its being rendered deleterious by the animal from which it is derived having eaten poisonous herbage, especially the meadow saffron or colchicum. Or milk may be rendered impure or soured from the growth of a microscopical fungus in it—the *oidium lactis*—the origin of which is obscure, but may probably be due to dirty vessels, or to mixture of the milk with dirty water. Lastly, milk may acquire metallic impurities from being kept in lead or zinc vessels. When the milk cure is adopted, all such matters must be taken into consideration, the next most important point being to drink the quantity of milk decided upon in small proportions and as often as convenient, rather than in large draughts at longer stated intervals. Then there is the question whether it should be taken cold, tepid, warm, or hot. In weak stomachs the digestibility of milk depends considerably on temperature. When there is much nervous prostration, as in fevers, it should be taken warm or even hot. Given to such patients cold, it will probably be complained of as lying heavy on the stomach and as causing acidity. But as a general rule it is best to let patients drink it tepid. It may also be mentioned that with children especially, a fourth proportion of lime water added

to milk will cause it to agree well, when it does not do so without such addition. This occurs when there is extraordinary acidity of the stomach, which the lime water corrects.

Under such of the precautions as above which may be necessary, a purely milk diet is almost certain to be beneficial in such maladies as chronic diarrhœa and dysentery, especially in that form of these diseases which arises during residence in tropical climates; in the atrophy or wasting of children, especially when connected—as it most frequently is—with knotty enlargement of the bowels and chronic diarrhœa; in chronic inflammatory affections of the bladder; and in severe cases of sickness during pregnancy. In all kinds of scurvy, too, milk is the best diet. In such diseases as those mentioned above, milk may be taken, if well digested, to the extent of a gallon *per diem*.

Other maladies for which the milk treatment has been much recommended are *diabetes*, and "Bright's disease" or *albuminuria*. It would, however, appear that these maladies are best treated by skimmed milk, from which the fatty matter is separated with the cream. Butter-milk has also been successfully used in the same affections, and has been regarded as a "sovereign remedy" in typhoid fever. Before, however, adopting the milk treatment for such severe maladies, it would be always desirable to obtain the advice of a medical man.

THE GRAPE CURE.

The "grape cure" or *cure de raisin* was first proposed by Lefevre in Russia about the year 1845. Then for some time the head-quarters of the remedy was at Meran in the Tyrol. At present there are many places in the vine countries between the Alps and the Rhine where the treatment is practised. It consists in taking large quantities of grapes daily, some physicians allowing nothing else either as food or

drink for weeks, except perhaps a little dry bread. Other physicians do not insist on any particular diet, or rather on no diet, believing the grapes to be so satisfying that food will not be wanted or wished for by the patient. The invalid begins with two or three pounds of grapes daily, the quantity being divided into three portions, eaten at the breakfast, dinner, and supper hours. After a few days the amount is gradually increased until four or five pounds are consumed. The effects are said to be repellent of noxious matter from the blood, and to resemble in many respects the results of the water cure. But Lersch considered grapes and raisins to be compounds analogous to mineral waters—to be, in fact, "mineral water of an organic nature!" We certainly know that ripe grapes are cooling, antiseptic, antiscorbutic, and in large quantities diuretic and laxative. The benefit derived from the treatment is probably partly in consequence of the qualities named above, and partly a result of the change of climate and mode of life adopted by those undergoing the grape cure. For the fruit should be eaten in the open—*sub jove frigido*—and those who would reap the full benefit are desired "to forego all luxury, sleep in the peasant's crib, sit upon his bench, avoiding even anything in the shape of comfort. The grape alone for food (except perhaps a little dry bread), the grape alone for drink."

Lefevre recommended the treatment for all functional nervous affections which resist the routine methods generally employed; for chest affections and consumption; for chronic liver maladies, especially when due to an excess of wine or spirits; theorizing that the potash salts in the grapes supplied the elements which the wine in the process of manufacture had lost. For the same reason the grape cure, or at least a modified form of the treatment, is extremely beneficial in any malady which may be aggravated by or complicated with scurvy. The diuretic and laxative properties of grapes also render them suitable for any dropsical affection connected

with the liver or spleen. They are also highly beneficial for bowel complaint of a scorbutic nature. But the fact is, the grape cure, like many other "cures," has been too much vaunted as a panacea for all ailments, while, as before mentioned, much of the reputed benefit is derived from the climate in which the grapes grow. Still there are maladies as noted above, in which a modification of the grape treatment is highly desirable. Lastly, although almost any person, suffering from almost any malady, may consume plenty of grapes with benefit, no one should essay the grape treatment in its entirety without having his case well examined into by a competent medical man.

CHAPTER XII.

SANITARY POWERS AND DUTIES OF THE CITIZEN.

CIVILIZED life is now so complicated an affair that the health of an individual is by no means a matter which his own care and caution will suffice to safeguard. As a member of a community, he is subject to physical and social disturbances which the carelessness or recklessness of neighbours may inflict upon him. It has for many generations past been necessary, therefore, to forbid by law the performance of certain acts or the omission of certain precautions. A person may catch an infectious disease through the improper exposure of another who is suffering from that disease; he may get blood-poisoning from an offensive or imperfect drain; he may suffer discomfort, if not actual sickness, from nuisances of a number of kinds which his neighbour may create. Accordingly the law steps in and lays down certain rules which every citizen must obey under penalty of a money fine or even of imprisonment. So much ignorance exists as to the legal powers and duties of individuals with regard to sanitary matters, that it has been thought well to add a chapter on this subject to a book which deals with health in all its many and various phases.

Nuisances.—First, then, as to "nuisances," which are more or less the experience of everybody.

By sec. 91 of "The Public Health Act," 1875, which is the law governing sanitary matters throughout England and Wales, with the sole exception of the Metropolis, a "nuisance" is defined as—

1. Any premises in such a state as to be a nuisance or injurious to health :

2. Any pool, ditch, gutter, water-course, privy, urinal, cess-pool, drain, or ashpit, so foul or in such a state as to be a nuisance or injurious to health :

3. Any animal so kept as to be a nuisance or injurious to health :

4. Any accumulation or deposit which is a nuisance or injurious to health :

5. Any house or part of a house so overcrowded as to be dangerous or injurious to the health of the inmates, whether or not members of the same family :

6. Any factory, workshop, or work place not kept in a cleanly state, or not ventilated in such a manner as to render harmless, as far as practicable, any gases, vapours, dust, or other impurities generated in the course of the work carried on therein, that are a nuisance or injurious to health, or so overcrowded while work is carried on as to be dangerous or injurious to the health of those employed therein :

7. Any fire-place or furnace which does not, as far as practicable, consume the smoke arising from the combustible used therein, and which is used for working engines by steam, or in any mill, factory, dyehouse, brewery, bakehouse, or gas-work, or in any manufacturing or trade process whatsoever; and any chimney (not being the chimney of a private dwelling-house) sending forth black smoke in such quantity as to be a nuisance.

These are nuisances liable to be dealt with summarily in the manner provided for by the Act:

Provided—*First.* That a penalty shall not be imposed on any person in respect of any accumulation or deposit necessary for the effectual carrying on any business or manufacture, if it be proved to the satisfaction of the Court that the

accumulation or deposit has not been kept longer than is necessary for the purposes of the business or manufacture, and that the best available means have been taken for preventing injury thereby to the public health.

Secondly. That where a person is summoned before any Court in respect of a nuisance arising from a fire-place or furnace which does not consume the smoke arising from the combustible used in such fire-place or furnace, the Court shall hold that no nuisance is created within the meaning of this Act, and dismiss the complaint, if it is satisfied that such fire-place or furnace is constructed in such manner as to consume, as far as practicable, having regard to the nature of the manufacture or trade, all smoke arising therefrom, and that such fire-place or furnace has been carefully attended to by the person having the charge thereof.

Inspectors of Nuisances.—The powers with which the Legislature has entrusted Sanitary Authorities in respect to these and other conditions injurious to health are varied and extensive, and the steps to be taken preliminary to the exercise of those powers devolve to a very large extent upon two Officers, the Medical Officer of Health and the Inspector of Nuisances. Of these the Inspector has perhaps the greater contact with the people, and hence it would be difficult to over-estimate his importance if the duties properly attaching to his office are efficiently performed. To him complaint is commonly first made of nuisances or other unlawful conditions existing upon the complainant's or other premises. He comes down upon the purveyor whose stock includes unwholesome food apparently intended for human consumption; he in general obtains samples of food, drink, and drugs to be tested for adulteration, and he requisitions the services of the Medical Officer of Health in cases having a medical bearing.

Inspectors of Nuisances are appointed strictly by the Local

Sanitary Authorities, and so far as regards their special duties may be divided into two classes—those appointed simply under the Public Health Act of 1875, or some local Act, and those the details of whose appointments made pursuant to the law are regulated by a General Order of the Local Government Board. The Board are empowered on the application of the Authority to repay to them out of a fund specially provided by Parliament for the purpose, half of the salary of the Inspector if the terms of his appointment appear satisfactory, and in all cases of such application the Authority have to produce evidence that the arrangements which they propose for the discharge of the duties are such as may reasonably be expected to conduce to efficient administration and supervision. Such evidence must shew among other things that the officer is not so young as to be unqualified from inexperience, or on the other hand so advanced in years as to be disqualified by old age and infirmity; that his antecedents (if any) in the public service are satisfactory; that he does not suffer from pecuniary embarrassment, and that any other office or occupation which he may be permitted to hold or engage in is not of a nature to interfere with or militate against the proper performance of his duties as Inspector. Thus an innkeeper would not be allowed to hold office as Inspector under the Order, neither would a clerk as Inspector under the Authority to whom he is clerk, but it is common and convenient for the Inspector to hold also the surveyorship under the same Authority. There are two Orders—one for appointments for Urban Districts, which is dated the 10th of March 1880, and the other for appointments for Rural Districts, dated the 13th of March 1880, which regulate the duties required of an officer whose appointment is sanctioned by the Local Government Board. Unfortunately the Board have no power to prescribe duties for Inspectors of Nuisances to Authorities who do not seek repayment from the Parliamentary Grant, and who are therefore at

liberty to determine the extent of their officer's action. This is much to be regretted, for it is undeniable that some Authorities evince a complete want of an effective sense of sanitary propriety; and whether, as in some cases, from ignorance, or, as in others, from unwillingness to make a necessary expenditure, which would only prove to be the wisest of economy, they put off what they regard as the evil day of improvement, until the occurrence of an outbreak of some spreading disease —easily preventable, but difficult to stamp out—excites public feeling, some works mainly directed strictly to the occasion are undertaken, and the hands of the Inspector are for a little while full. With such an Authority the office is for the most part a sinecure, for although legally bound to make an appointment they give but a nominal salary, and consequently to it corresponds the amount of work done. Between these two extremes are many stages, and some Authorities, although not in receipt of Government assistance towards the salary, have elected—to their credit it must be said—to adopt for their officer the duties prescribed by the Local Government Board.

Duties of Local Authority as to Nuisances.—Having thus seen what constitute nuisances from the sanitary point of view, and also the status of the officials appointed to carry the law into effect, it will now be convenient to notice the powers and duties which are possessed by or devolve upon the Local Authorities to deal with such nuisances and with other conditions liable to be generally objectionable and troublesome, and which the Authorities may empower or direct their Inspector to exercise on their behalf. It may possibly be thought that the list of matters presented below is very extended and includes conditions scarcely likely to arise; but it must be borne in mind that the law is intended to reach conditions obtaining in the lowest circumstances as well as those in which money and influence rule,

and that not a few of these are quite undreamt of by many persons in a higher sphere. Thus the inconveniences which the provisions respecting cellar dwellings, and such like, are intended to meet, apply primarily to localities in which very often a whole family occupy a single room, and the questionable morality and general "lowness" of the majority of the inhabitants is only equalled by the unwholesomeness of the premises and the lack of common decency in the accommodation. But the same provisions apply also to a better class of house in which, owing to the value of ground, the "half-sunk basement" occurs. Again a tenant's health may suffer from insanitary conditions, the result on the one hand of the negligence or callousness of a rapacious landlord, or on the other hand of the selfishness or carelessness of an unneighbourly neighbour, and for these remedies must be provided. Or he may suddenly find the sparkling little brook from which his drinking supply is derived turbid and stinking, from some cause beyond his reach, as it may be beyond his district, and here he may effectively invoke the aid of his Authority. The Legislature does not, however, provide only for the sins of commission or omission of individuals. It regards as equally possible that even an Authority may neglect their duty, and to meet this a still higher power must be available to stir the defaulting Authority into activity.

In looking at the powers and duties on both sides we will regard first the provisions as to nuisances generally, and then the special enactments designed for particular cases.

Inspection of District.—It is the duty of the Sanitary Authority, under section 92 of "The Public Health Act, 1875," to have their district examined from time to time, to ascertain whether nuisances exist, and to receive and act upon reports made to them thereon by their officers.

Complaints.—Besides the official reports, a complaint of a nuisance may be made to the Authority by any person ag-

grieved thereby, but if not, then it must be vouched for by *two* inhabitant householders, or by the relieving officer, or by any constable or police officer of the district (sec. 93). Complaint may also be made direct to a Justice. In this case it may be made by a person aggrieved, or by *any* inhabitant, or any owner of premises within the district.

Power of Entry.—*Its Object.*—On the Authority receiving a complaint, their first duty is to satisfy themselves as to its justness or otherwise, and their knowledge on this point must be acquired by examination of the premises. This introduces us to a very special power on the part of the Authority by virtue of which the Englishman's castle loses its proverbial impregnability. This power is one of entry upon any premises, and is conferred as regards nuisances in general by sec. 102, and specially as regards drains, water-closets, earth-closets, privies, ashpits, and cesspools by sec. 41, and as regards water supply by "The Public Health (Water) Act," sec. 7. Admission may also be claimed by the Local Authority to see that their notices of abatement of nuisances are carried out, or their requisitions for execution of works complied with, or if not to execute all necessary works themselves.

Who may Enter.—This power of entry is, as regards general nuisances and water supply, given to the Authority or any of their officers, but in the latter case is exercisable also by any person authorised *in writing* by the Authority, while in the case of drains, &c., the Authority may, *on a written complaint*, empower their Surveyor or Inspector of Nuisances to enter. When the complaint is made by a private person direct to a Justice, the court may address their admission order to any constable or other person whose powers and restrictions are then similar to those of an officer of the Authority (sec. 105).

Hours of Entry.—The power of entry thus conferred must be exercised between 9 A.M. and 6 P.M, except in the case

of a business, in which case the examination may be made at any hour when such business is in progress or is usually carried on.

Enforcement of Power of Entry.—If admission for any of the purposes above mentioned is refused by the person in charge of the premises, complaint of the same may be made on oath before a Justice by any officer of the Authority after notice to such custodian, and the Justice may make an order requiring him to admit the Authority, and if he cannot be found may make a further order giving them power to enter. Any such order holds good until all requisite works are done. The penalty for refusing to obey the order of Court is £5 (sec. 103).

It will not be necessary in this place to give details of the exact procedure by which a Local Authority can obtain and insist upon the abatement of a nuisance. Ample powers are however given to them for this purpose by the Public Health Act.

Defaulting Authority.—If the Authority neglects its duty in regard to nuisances—as for instance by omitting to do things which may be necessary, or failing to attend to repeated complaints, they may be reported by any person interested, to the Local Government Board, and that Board, if satisfied of such default, may authorise any police officer in the district to take the regular proceedings and exercise the usual power of entry. Hence if admission be refused the police must obtain a Justice's warrant of admission, or if necessary, of authority to force an entrance.

SPECIAL INSANITARY CONDITIONS AND THEIR REMEDIES.

Drainage.—If a house is without effectual drainage the Sanitary Authority may require the owner or occupier to connect it with their sewer if within 100 feet of the house; or if

not, then with some covered cesspool or other receptacle, the works to be subject to the surveyor's approval. In default of compliance the Authority may do what is necessary themselves. A new house may not be built in an Urban District without effectual drainage under a penalty of £50. If the Authority deem a drain, though sufficient for the house, not convenient for their system of sewerage, they may close it, but they must substitute an effectual drain for it. A house may not be built over a sewer of an Urban Authority without their consent, under a penalty of £5, and 40s. a day after they have given notice.

Privies, Water-closets, Earth-closets, and Ashpits.—A house may not be built or rebuilt without proper privy or closet accommodation and a covered ashpit, under a penalty of £20. If an existing house is without proper accommodation in these respects, the Authority may require the owner or occupier to provide it, and in default do the work and recover from the owner. In a house intended as a factory, separate accommodation must be provided for each sex, under a penalty of £20, and 40s. a day. The penalty for allowing the contents of any water-closet, privy, or cesspool to overflow or soak therefrom is 40s., and 5s. a day.

Power to examine Drains, Closets, &c.—On a *written* complaint that a drain, water-closet, earth-closet, privy, ashpit, or cesspool is a nuisance, the Authority may with, or in case of emergency without, notice to the occupier empower the Surveyor or Inspector of Nuisances to enter the premises with or without assistants, and cause the ground to be opened and examine the drain, &c. If no nuisance is found, the Authority must close the ground and make good any damage. Otherwise the Authority may proceed as in a case of nuisance. The penalty for non-compliance with the Authority's order of abatement is 10s. a day.

Refuse Matter, Manure, &c.—If an Authority undertakes to

remove refuse and cleanse closets, ashpits, &c., they or their agents must be allowed to do so, unless an occupier elects to dispose of his own refuse, in which case he must keep it so as not to be a nuisance. But if he requests the Authority in writing to remove his refuse, &c., they are bound to do so within seven days, except they make reasonable excuse, under a penalty of 5s. a day. If the Authority does not undertake or contract for the work, they may make bye-laws imposing the duty on occupiers. An Urban Authority may also make bye-laws for the prevention of nuisances from snow, filth, dust, ashes, and rubbish.

In an Urban District the Inspector may require the owner of any manure, dung, soil, filth, or other offensive or noxious matter, or the occupier of the premises on which it exists, to remove it within twenty-four hours, and in default of compliance the Authority may remove it, sell it to defray expenses, and hand over the balance (if any) to the owner. The Authority also may by public notice require the periodical removal of stable refuse. The penalty for default is 20s. a day.

Foul Ditches.—If a ditch or water-course forming or lying near the boundary is injuriously offensive, a Justice may, on the complaint of the Authority, direct the execution of the necessary works, and decide as to who shall do them, and as to costs.

Bakehouses.—Every bakehouse must have a separate privy and ashpit, and a cistern which does not serve a water-closet, and no drain which carries fæcal matter may open into it. Penalty, 40s., and 5s. a day. No premises unfit on sanitary grounds as a bakehouse may be used as such, under a penalty on summary conviction of 40s. for first offence, and £5 for any subsequent one. No person may sleep in a bakehouse, in a place having a population of over 5000 persons. The Medical Officer of Health has power of entry into a retail bakehouse at all reasonable times by day and night.

Filthy Houses.—If a house is so filthy or unwholesome as to be injurious to health, or requires cleansing to prevent or check infectious disease, the owner or occupier on notice from the Authority must cleanse it accordingly, under a penalty of 10s. a day. The action of the Authority must be taken on the certificate of the Medical Officer of Health or of two medical practitioners.

Animals.—In an Urban District keeping pigs in a dwelling-house so as to be a nuisance, or suffering stagnant water to remain in a cellar, renders the offender liable to a fine of 40s., and 5s. a day, and bye-laws may be made by the Authority regulating the keeping of animals on any premises.

Uninhabitable Houses may be closed by a Justice until rendered fit for habitation.

Overcrowding.—On two convictions taking place within three months relative to the same premises, irrespective of ownership, a Justice may direct the closing of the house for such period as he may deem necessary.

Water Supply.—*Waste and Fouling.*—When the Authority undertake to supply water they are invested with the general powers of a water company for preventing waste and fouling the supply.

Compulsory Provision.—When a house is without a proper supply the Authority may require the owner to provide it if it can be obtained at a cost of 2d. a week, or at a reasonable cost, the reasonableness to be determined by the Local Government Board. A Rural Authority, however, is only bound to see to the sufficiency, &c., of the supply in the case of occupied dwelling-houses ("Public Health Water Act, 1878"), except in cases where danger arises to the health of the inhabitants from the insufficiency or unwholesomeness of the existing supply, and a general scheme is required and the supply can be got at a reasonable cost.

An appeal may be made against an order of a Rural Authority on any or all of the following grounds :—

1. That the supply is not required; or

2. That the time limited by the notice for providing the supply is not sufficient; or

3. That it is impracticable to provide the supply at a reasonable cost; or

4. That the Authority ought themselves to provide a supply of water for the district or contributory place in which the house is situate, or to render the existing supply wholesome; or

5. That the whole or part of the expense of providing the supply, or of rendering the existing supply wholesome. ought to be a charge on the district or contributory place.

The appeal is made by memorial to the Authority, to whom it must be addressed within twenty-one days after service of their second notice, the final decision resting with a Justice, or, if the fifth or fourth objections are made, with the Local Government Board.

Fouling Water by Gas Washings or Products or by any act connected with the manufacture or supply of gas, renders the offender liable to a penalty of £200, and, after notice from the Authority or the owner of the water, £20 a day, recoverable in any of the superior courts.

Polluted Wells, if the water in them be unfit for drinking or domestic purposes, may be closed by a Justice permanently or temporarily, or he may order that the water be used only for certain purposes. On default of the person to whom the order is addressed, the Authority may be authorized to do the work and recover from such person.

Cellar Dwellings may not now be built, and an existing cellar in which term is included any underground room) may not be used separately as a dwelling unless it is at least 7 feet high in every part, 3 feet of which must be above ground, unless it has an area of 2 feet 6 inches along its entire frontage and 6 inches below the floor level, unless it is effectually drained, unless it has a proper closet and ashpit as an appurtenance,

and unless it has a proper fire-place and flue and window. Penalty for contravention, recoverable from the letter, 20s. a day after notice from the Authority. After two convictions in respect of the same cellar, a Justice may close such cellar for such time as he may deem necessary.

Common Lodging-Houses.—A house may not be kept as a common lodging-house unless registered as such by the Authority, who may refuse to register it unless it is certified by one of their officers as fit for the purpose, and they may make bye-laws for fixing the number of lodgers, the separation of the sexes, the cleanliness and ventilation of the house, giving notice to the Relieving Officer, and to the Medical Officer of Health, of cases of fever or infectious disease, and generally for the well-ordering of the house. Any officer of the Authority has right of *free entry* at all times. Penalty for not properly reporting the inmates or the cases of infectious disease, £5, and 40s. a day during default.

Lodging-Houses.—Local Authorities may, when empowered by the Local Government Board, make bye-laws—

1. For fixing or varying the number of lodgers.
2. For the registration of the houses.
3. For the inspection of the houses.
4. For enforcing drainage, privy accommodation, cleanliness, and ventilation.
5. For the cleansing and lime-washing of the premises and paving of courtyards.

Offensive Trades.—These are any trades which operate noxiously or offensively, but especially blood-boiling, bone-boiling and crushing, fellmongering, soap-boiling, tallow-melting, tripe-boiling, and slaughtering, and these may not be newly established without the Authority's consent. Complaint of nuisance in existing businesses must be made by the Medical officer of Health, or two medical men, or any ten inhabitants. The penalty on conviction before a Justice, to whom the case must

be taken by the Authority, is £2 to £5, and any subsequent offences double the preceding penalty up to £200. But conviction will not follow if it can be shown that the offender has used the best practicable means of abating the nuisance, or preventing or counteracting the effluvia. Where the cause of nuisance lies outside the district, the Authority have the same powers as in other nuisances.

Unsound Meat.—A Medical Officer of Health or Inspector of Nuisances may at all reasonable times examine any animal, carcase, meat, poultry, game, flesh, fish, fruit, vegetables, corn, bread, flour, or milk, intended for the food of man, whether exposed or not, and if he regards it as unfit for such use, he may seize it, and carry it before a Justice, who if satisfied of its unfitness may order its destruction and impose a penalty of £20, or, without fining the offender, imprison him for a term not exceeding three months. The penalty for preventing the examination or removal of the articles by the officer is £5.

Infectious Diseases.—*Infected Premises, Bedding, and Clothing.*—The owner or occupier may be required to disinfect and cleanse under a penalty of 1s. to 10s. a day, but the Authority may themselves disinfect and cleanse the houses of poor persons, with their consent, free of charge. Infected articles of bedding, clothing, &c., may be destroyed by the Authority, and replaced by others, or compensation allowed.

A disinfection chamber and also an ambulance may be provided by the Authority for use without charge.

Removal of Infected Person to Hospital.—If an infectious patient is without proper accommodation, and the authorities of a hospital are willing to receive him, a Justice may, on a medical man's certificate, direct his removal to the hospital. Penalty for disobedience or obstruction, £5.

Exposure of Infected Persons and Things.—Any person who exposes himself while suffering from infectious disease in any place or conveyance open to the public, and in the case of a conveyance enters it without the conductor's or driver's

knowledge, or who so exposes an infectious patient, or exposes or parts with infected things, is liable to a penalty of £5, and in the case of the conveyance, to make good any loss he may have occasioned. The owner or driver of a vehicle is not bound to carry an infected person until a sufficient compensation is paid, but if he does undertake the carriage, he must immediately afterwards disinfect the conveyance, under a penalty of £5.

Letting Infected Houses or Lodgings.—Any person who lets a house or lodging in which an infectious patient has been, without previously disinfecting it and everything in it to the satisfaction of a medical man, or who on being questioned as to the existence of infectious disease therein within six weeks previously, knowingly gives a false answer, is liable to a penalty of £20, or in the latter case, to imprisonment for one month.

Other Nuisances.—As householders know to their cost, there are other nuisances than those contemplated by the Public Health Act. Indeed, any act which unwarrantably interferes with the enjoyments by a person of his rights or of his property, amounts in law to a nuisance. Many of these nuisances may be suppressed by a simple application to a police constable. Others require an application to the police courts, while others again can only be remedied by application to the county courts, or to the High Court of Justice, according to their magnitude.

The various nuisances are classified below under the different Authorities which have power to suppress them—1. Police Constables; 2. Police Courts; 3. Courts of Justice.

1. By Police Constables.

Abusive language.
Baiting animals.
Betting in public places, streets, &c.
Careless or furious driving.
Cock-fighting.
Collecting a crowd in street.
Defacing buildings.
Discharging guns, &c., in public places.
Depositing goods in streets.
Disorderly persons who may be ejected from the house.
Displaying obnoxious advertisements.
Drunk and disorderly people.
Exposing goods for sale in parks and other privileged places.
Extinguishing street lamps.
Indecent exposure of the person.

Knocking at doors or ringing bells.
Lighting fireworks or bonfires in streets.
Musicians in principal streets.
Obscene language in streets.
Obstructing the footways.
Obstructing the traffic.
Playing games in streets.
Posting placards, &c., without leave.
Removal of dust and offensive matter during prohibited hours.
Selling obscene books and pictures in streets.
Sliding in streets.
Stone-throwing.
Stray or mad dogs.
Throwing rubbish and refuse into street.
Unlicensed public conveyance.

2. By Police Courts.

Among those which require application to a Police Court are, besides the sanitary nuisances already spoken of :—

Carrying on unlawful trades.
Disorderly houses.
Gaming and betting houses.
Keeping explosives or dangerous goods without a licence.
Lotteries.

3. By Courts of Justice.

Other nuisances can only be abated by a civil action in County Courts if they are of small degree, otherwise in the High Court. Of such may be classed the following :—

Damaging river banks or intercepting water course.
Encroachment on highways, &c.
Injuries from furious driving or riding.
Injuries to commons.
Keeping ferocious or mischievous animals.
Overhanging lamp, &c.
Neglecting to fence in property properly, or protect wells, shafts, sewers, &c., or to provide against dangerous paths.
Negligently allowing a horse to run away and so cause injury.
Publishing injurious advertisements.
Pulling down boundary wall, &c.

Exceptions and Explanations.—A private person cannot bring an action to abate a nuisance which is public in its nature—as church bell-ringing—unless he proves that it affects him more than the rest of the neighbouring community.

A person cannot go on his neighbour's property to prevent a nuisance, but he is justified in doing so to abate a nuisance, provided he cannot put a stop to it by any other means.

A person, although he comes to a nuisance, may have it abated. But some necessary trades, although they may prove a nuisance to neighbouring owners of property where the trade is carried on, yet if they be carried on in a legitimate manner, so as to cause as little injury as possible, cannot be abated.

CHAPTER XIII.

NAMES AND ADDRESSES OF SANITARY OFFICIALS.

It often happens that the perplexed householder wants to know the name and address of the person to whom he ought to apply for information and help, or to whom he desires to address a complaint. No general list of urban sanitary inspectors, with their precise postal addresses, has heretofore been published, and it is thought useful, therefore, to print in the following pages a list of such officers which has been compiled expressly for this work. The names and addresses of the inspectors in rural sanitary districts are not given, because, as a rule, these will, in sparsely populated areas, be sufficiently well known throughout the district. The list of urban sanitary inspectors has been prefaced by a more elaborate table, giving the chief sanitary officials of the thirty-nine Vestries and District Boards who now exercise sanitary powers over the Metropolis.

METROPOLITAN SANITARY OFFICIALS

(ARRANGED IN ORDER OF DISTRICTS).

District (D) or Parish (P).	Clerk's Name and Office Address.	Medical Officer of Health.	Inspector of Nuisances.	Analyst.
Battersea. See Wandsworth D.				
BERMONDSEY (P.)	J. Harrison, Town Hall, Spa Road, Bermondsey, S.E.	John Dixon, M.D., 133 Jamaica Road, S.E.	Henry Thomas, Town Hall, Spa Road, S.E.	Dr John Muter, The Laboratory, Kennington Road, S.E.
Bethnal Green: See St Matthew, Bethnal Green.—Bloomsbury: See St Giles and St George, Bloomsbury D.—Camberwell: See St Giles, Camberwell P.				
CHARLTON, ELTHAM, KIDBROOKE, LEE, AND PLUMSTEAD (D.)	G. Whale, Woodstock Road, Burnt Ash.	For Charlton—Herbert Leopold Bernays, 13 Charlton Villas, Charlton.	Edwin Light, Old Charlton.	Vacant.
		For Eltham—David King, M.D., Eltham.	George Hunt, Eltham Green.	
		For Kidbrooke and Lee—Herbert Campbell Burton, 22 Lee Terrace, Lee.	Mr Brigden, Woodstock Road, Burnt Ash.	
		For Plumstead—William Clunie Wise, M.D., Gothic Lodge, Plumstead.	C. P. Ginger, Plumstead.	
CHELSEA (P.).....	J. Eisdell Salway, Vestry Hall, King's Road, Chelsea, S.W.	Edward Seaton, M.D.	G. C. Sherborne, Vestry Hall.	Edward Seaton, M.O.H.
Christchurch: See St Saviour, Southwark D.—Clapham: See Wandsworth D.—Clerkenwell: See St James and St John, Clerkenwell.—Covent Garden, St Paul: See Strand D.—Deptford, St Paul, and St Nicholas: See Greenwich D.—Eltham: See Charlton, &c., D.				
FULHAM (D.) ..... Comprising Fulham and Hammersmith Parishes.	Thomas E. Jones, Broadway, Hammersmith, W.	Nicholas Constantine Collier, Capstone House, Hammersmith.	A. A. Croucher, 7 Aspenlea Road, Fulham. J. W. Marsh, 52 Averill Street, Fulham. R. Chamberlen, 3 Glenthorne Road, Hammersmith.	R. H. Davies.

GREENWICH (D.)..... Comprising St Nicholas and St Paul, Deptford, Greenwich, and Hatcham.	James Spencer, 141 Greenwich Road, Greenwich, S.E.	For Deptford — Henry William Roberts, Wickham Terrace, Lewisham High Road. For Greenwich—H. N. Pink, 5 Romney Terrace, Greenwich.	Thomas Borsbery, 2 Payne Street, Deptford. Thomas Corden, 80 Calvert Road, East Greenwich.	Vacant.
HACKNEY (D.)..... Including Stoke-Newington.	Richard Ellis, Town Hall, Hackney Street.	John William Tripe, M.D., 232 Richmond Road, Hackney, E.	Inspector—William Sortwell, 9 Retreat Place, South Hackney. Assistant Inspectors—Samuel C. Legg, Gayhurst Road, Dalston; Samuel Punter, 4 Loddiges Road, Hackney.	J. W. Tripe, M.D., M.O.H.
Hammersmith. See Fulham D.				
Hampstead. See St John, Hampstead P.				
HOLBORN (D.).....	S. W. Hopwood, Town Hall, Gray's Inn Road, W.C.	Septimus Gibbon, 36 Finsbury Pavement, E.C.	G. C. Peacock, Town Hall, Gray's Inn Road.	Professor Redwood.
Horsleydown, St John: See St Olave D.—Islington: See St Mary, Islington P.—Kensington: See St Mary, Abbots, Kensington P.—Kidbrooke: See Charlton, &c., D.—Knightsbridge: See Westminster D.				
LAMBETH.....	H. J. Smith, Vestry Hall, Kennington Green, S.E.	Walter Verdon, M.D., 410 Brixton Road, S.W.	John Baxter, 2 Walnut Tree Walk, Kennington Road, S.E. George Coxhead, 4 Walnut Tree Walk, Kennington Road, S.E. Richard Emblin, 51 Treherne Road. Robert Bott, 10 Talma Road, Brixton, S.W.	Dr John Muter, The Laboratory, Kennington Road, S.E.
Lee. See Charlton, &c., D.				
LEWISHAM (D.)..... Comprising Lewisham, Penge, and Sydenham.	H. S. Winnett, Catford.	Frederick Eachus Wilkinson, Battle Cottage, Sydenham.	Henry Broadbridge. Henry Shaw. Jonathan Buteher.	Charles Heisch.
LIMEHOUSE (D.)..... Comprising Limehouse, Ratcliff, Shadwell, and Wapping.	Thomas W. Rateliff, White Horse Street, Commercial Road, E.	George Arthur Rogers, 164 High Street, Shadwell, E.	George Hurlock and Thomas Stace, Board Offices, White Horse Street, E.	G. A. Rogers, M.O.H.
LONDON, CITY OF.....	H. Blake, Sewers Office, Guildhill, E.C.	William Sedgwick Saunders, M.D., 13 Queen Street, Cheapside.	J. Payne, T. Saltmarsh, and F. G. Puxty, Sewers Office, Guildhall.	

District (D) or Parish (P).	Clerk's Name and Office Address.	Medical Officer of Health.	Inspector of Nuisances.	Analyst.
LONDON, PORT OF	Sir John B. Monckton, The Guildhall, E.C.	William Collingridge, M.D., Port of London Sanitary Offices, King William Street, Greenwich.	W. H. Lewis, William Gilles, Henry Spadacini, W. Baillie, Port of London Sanitary Offices, King William Street, Greenwich.	———
Marylebone. See St Marylebone.				
MILE END OLD TOWN, Hamlet.	Millner Jutsum, Vestry Clerk, Vestry Hall, Bancroft Road, Mile End Road, E.	Matthew Corner, M.D., 113 Mile End Road.	Mr Leshaw, Vestry Hall, Bancroft Road, E.	M. Corner, M.O.H.
Newington. See St Mary, Newington P.				
PADDINGTON (D.).....	Frank Dethridge, Vestry Hall, Harrow Road, W.	James Stevenson, M.D., 466 Edgeware Road.	Thomas Reeves Clifford, 8 St Mary's Square. Charles John Biorn, 3 Dartington Terrace.	A. W. Stokes.
Penge. See Lewisham D.				
Plumstead. See Charlton, &c., D.				
POPLAR (D.)	W. H. Farnfield, 117 High Street, Poplar, E.	Northern Division—Russell Main Talbot, 155 Bow Road, E. Southern Division—Francis Mead Corner, Manor House, East India Road, E.	W. A. Shadrake, 8 Hind Street, Poplar. W. T. Harrison, 11 Alfred Street, Bow. C. W. Raymond, 24 Lawrence Road, Bow.	W. C. Young.
Putney: See Wandsworth D.—Ratcliffe: See Limehouse D.—Rolls, Liberty of the: See Strand D.				
ROTHERHITHE (P.).....	Jas. J. Stokes, 82 Paradise Street, Rotherhithe, S.E.	Josephus Shaw, M.D., 24 Plough Road, Rotherhithe.	Joseph Edwards, 90 Paradise Street, Rotherhithe.	Dr John Muter, The Laboratory, Kennington Road, S.E.
St Anne, Soho: See Strand D.—St Clement, Danes: See Strand D.—St George, Bloomsbury: See St Giles and St George, Bloomsbury D.				
ST GEORGE, HANOVER SQUARE (P.)	J. H. Smith, Mount Street, Grosvenor Square, W.	Wm. Henry Corfield, M.D., 10 Bolton Row, Mayfair.	Mr Snook, Pimlico Road, S.W.	W. H. Corfield, M.D., M.O.H.

ST GEORGE-IN-THE-EAST (P.)	T. G. Harrison, Vestry Hall, Cable Street, St George-in-the-East, E.	Brougham Robert Rygate, 126 Cannon Street Road.	Wm. Rains, Vestry Hall, Cable Street.	W. C. Young.
ST GEORGE THE MARTYR, SOUTHWARK (P.)	Alexander Miller, Vestry Hall, 81 Borough Road, S.E.	Thos. Hy. Waterworth, M.D., 221 New Kent Road.	Mr Smith and Mr Edwards, Vestry Hall, Borough Road.	Dr John Muter, The Laboratory, Kennington Road, S.E.
ST GILES AND ST GEORGE, BLOOMSBURY (D.) Comprising the Parishes of St Giles in the Fields and St George, Bloomsbury.	John Henry Jones, 197 High Holborn, W.C.	Samuel Robt. Lovett, 13 Great Russell Street, W.C.	J. Robinson, W. H. Bond, 197 High Holborn.	Prof. Redwood.
ST GILES, CAMBERWELL (P.)	George W. Marsden, Vestry Hall, Peckham Road, S.E.	John Syer Bristowe, M.D., 11 Old Burlington Street, W.	D. M'Kay, S. Fisher, J. H. Stevenson, J. Sedgley, Vestry Hall, Peckham Road, S.E.	A. J. Bernays, Acre House, Brixton Rise, S.W.
St Giles in the Fields. See St Giles and St George, Bloomsbury D.				
ST JAMES AND ST JOHN, CLERKENWELL.	Robert Paget, Vestry Hall, 58 Rosoman Street, Clerkenwell, E.C.	Jno. Wm. Griffith, M.D., 50 Camberwell Grove, S.E.	Frederick Cheshire, 60 Rosoman Street. W. F. Thain, 152 Pentonville Road.	Prof. Redwood.
ST JAMES, WESTMINSTER (P.)	Harry Wilkins, Vestry Hall, Piccadilly.	Jas. Edmunds, M.D., 8 Grafton Street, W.	W. H. Watson, E. Brooks, Vestry Hall, Piccadilly.	Jas. Edmunds, M.D., M.O.H.
St John, Clerkenwell. See St James and St John, Clerkenwell.				
ST JOHN, HAMPSTEAD (P.)	Thos. Bridger, Vestry Hall, Haverstock Hill, Hampstead, N.W.	Edmund Gwynn, M.D., 6 Hampstead Hill Gardens.	George Allan Smith, Vestry Hall, Haverstock Hill.	Chas. Heisch.
St John, Horsleydown :—See St Olave, Southwark D. St John, Westminster :—See Westminster D.				
ST LEONARD, SHOREDITCH (P.)	Enoch Walker, Town Hall, Old Street, E.C.	Hy. Gawen Sutton, 9 Finsbury Square.	Hugh Alexander, Town Hall, Old Street.	Thos. Stevenson, M.D., 45 Gresham Road, Brixton, S.W.
ST LUKE, MIDDLESEX (P.).	G. W. Preston, Vestry Hall, City Road, E.C.	Frederick Wm. Pavy, M.D., F.R.S., 35 Grosvenor Street, W.	G. R. Eadds, Vestry Hall, City Road.	F. W. Pavy, M.D., M.O.H.
St Margaret, Westminster. See Westminster D.				
ST MARTIN-IN-THE-FIELDS (P.)	G. W. Murnane, Vestry Hall, St Martin's Place, W.C.	John Jose Skegg, 29 Craven Street, Strand.	Wm. Cooke, Vestry Hall, St Martin's Place.	C. W. Heaton.

District (D) or Parish (P).	Clerk's Name and Office Address.	Medical Officer of Health.	Inspector of Nuisances.	Analyst.
ST MARY ABBOTTS, KENSINGTON (P.)	George C. Harding, Town Hall, Kensington, W.	Thos. Orme Dudfield, M.D., 8 Upper Phillimore Place, W.	Special Inspector—Richard C. Rudman, Town Hall. Inspectors—*North West Division*, Thos. Gaylard. *Central*, Jas. W. Wightman. *North East*, Wm. Middleweek. *South*, Thos. Abbott, Town Hall.	Ed. L. Cleaver.
ST MARY, ISLINGTON (P.)..	W. F. Dewey, Vestry Hall, Upper Street, Islington, N.	Chas. Meymott Tidy, M.B., 3 Mandeville Place, Manchester Sq.	Superintendent—Henry Isaac Collingwood. Inspectors—Jas. Burney Pain, Geo. West, Jas. Jarvis Jordon, Charles Turle Wilson, Vestry Hall.	C. M. Tidy, M.O.H.
ST MARYLEBONE (P.).....	W E. Greenwell, The Court House, Marylebone Lane, W.	Alex. Wynter Blyth, The Court House.	Geo. Windle, Thos. Lloyd Lightfoot, Simon Westcott, The Court House, E.	A. W. Blyth, F.C.S., M.O.H.
St Mary-le-Strand. See Strand D.				
ST MARY, NEWINGTON (P.)	L. J. Dunham, Vestry Hall, Walworth Road, S.E.	Wm. Tiffin Iliff, M.D., 37 Kennington Park Road.	Alfred Long, Vestry Hall.	Dr John Muter, The Laboratory, Kennington Road, S.E.
ST MATTHEW, BETHNAL GREEN (P.)	Robert Voss, Vestry Hall, Bethnal Green, E.	Geo. Paddock Bate, M.D., 2 Northumberland Houses, Hackney, and 412 Bethnal Green Road, E.	J. W. Burrows, West Street, Bethnal Green, E. W. W. Burrows, J. Lapworth, Vestry Hall.	Alf. W. Stokes.
St Nicholas, Deptford. See Greenwich D.				
ST OLAVE, SOUTHWARK (D.) Comprising the Parishes of St Olave, St John Horsleydown, and St Thomas.	Edric Bayley, 86 Queen Elizabeth Street, Southwark, S.E.	Jas. Northcote Vinen, M.D., St John's, Southwark.	John Munro, 86 Queen Elizabeth Street.	J. N. Vinen, M.D., M.O.H.
ST PANCRAS (P.).....	T. E. Gibb, Vestry Hall, Pancras Road, St Pancras, N.W.	Shirley Forster Murphy, 158 Camden Road, N.	W. Rouch, Vestry Hall.	Thos. Stevenson, M.D., 45 Gresham Road, Brixton, S.W.

St Paul, Covent Garden :—See Strand D. St Paul, Deptford :—See Greenwich D.

ST SAVIOUR, SOUTHWARK (D.) Comprising the Parishes of St Saviour and Christ Church.	W. H. Atkins, 3 Emerson Street, Bankside, S.E.	Robert Blanchi, 25 Stamford Street, Blackfriars, S.E.	Thos. Buckworth.	Dr Bernays.
St Thomas, Southwark :—See St Olave, Southwark D. Savoy, Precinct of :—See Strand D. Shadwell :—See Limehouse D. Shoreditch :—See St Leonard, Shoreditch P. Soho :—See Strand D. Southwark, Christ Church :—See St Saviour D. Southwark, St George the Martyr :—See St George the Martyr P. Southwark, St John Horsleydown :—See St Olave D. Southwark, St Olave :—See St Olave D. Southwark, St Saviour :—See St Saviour D. Southwark, St Thomas :—See St Olave D. Stoke Newington :—See Hackney D.				
STRAND (D.)..... Comprising the Parishes of St Anne, Soho, St Clement Danes, St Mary-le-Strand, St Paul, Covent Garden, The Liberty of the Rolls, and the Precinct of the Savoy.	Thos. M. Jenkins, 5 Tavistock Street, Covent Garden, W.C.	Conway Evans, M.D., 5 Tavistock Street, Covent Garden.	W. Hearne, G. Mitchell, 5 Tavistock Street, Covent Garden.	C. H. Plesse, 2 Cassiobury Road, Fulham, S.W.
Streatham :—See Wandsworth D. Sydenham :—See Lewisham D. Tooting Graveney :—See Wandsworth D.				
WANDSWORTH (D.) ..... Comprising the Parishes of Battersea, Clapham, Putney, Streatham, Tooting Graveney, and Wandsworth.	Arthur Alex. Corsellis, Battersea Rise, Wandsworth, S.W.	East Battersea—Wm. H. Kempster, M.D., Oak House, Battersea. West Battersea—Jos. Oakman, The Priory, Battersea.	Daniel Richards, 3 Spencer Street, Battersea.	Dr John Muter, The Laboratory, Kennington Road, S.E.
		Clapham — John M'Donogh, 15 Clapham Park Road.	Arthur Southam, The Paragon.	
		Putney—Alex. Walker, Hotham House, Putney.		
		Streatham and Tooting — Field Flowers Sutton, Balham Hill.	George Phimister, Surveyor's Office, Endlesham Road, Balham.	
		Wandsworth—Geo. Ed. Nicholas, M.D., Church Row, Wandsworth.	John Hollis, 14 West Hill Terrace, Merton Road, Wandsworth.	
Wapping. See Limehouse D.				
WESTMINSTER (D.)..... Comprising the United Parishes of St Margaret and St John the Evangelist, and the Hamlet of Knightsbridge.	John Harris, Town Hall, Caxton Street, Westminster, S.W.	Barnard Holt, 14 Savile Row.	St Margaret's — Chas. Jos. Hughes, 100 Horseferry Rd. St John's—Owen Williams, 61 Grosvenor Road. Knightsbridge — Thos. Lightfoot, 20 High Road, Knightsbridge.	A. Dupré, Ph.D., Westminster Hospital, Broad Sanctuary, Westminster, S.W.
Westminster, St James. See St James, Westminster P.				
WHITECHAPEL (D.)	A. Turner, 15 Great Alie Street, Whitechapel, E.	Jos. Loane, 1 Dock Street.	J. Battram, R. S. Wrack.	W. C. Young.

NAMES AND ADDRESSES OF SANITARY INSPECTORS IN URBAN SANITARY DISTRICTS.

District.	Name and Address.
Aberavon, Glamorgan.	David Thomas, Powell's Court, Abcravon.
Aberdare, Glam.	John Evans, Aberdare.
Abergavenny, Monmouthsh.	Jonathan Haigh, Victoria St., Abergavenny.
Abergele and Pensarn, Denb.	A. Jones, Lloyd's Cottage, Pensarn.
Abersychan, Mon.	Enoch Cooke, Abersychan.
Abertillery, Mon.	Jas. M'Bean, Abertillery.
Aberystwith, Cardigan.	Rees Jones, School Lane, Aberystwith.
Abingdon, Berks.	Geo. Winship, Abingdon.
Abram, Lanes. ...	John Smith, Abram Brow, Abram.
Acerington, Lanes.	Robert Cooper, 69 Stanley Street, Acerington.
Aeton, Middx. ...	I. Smith, 4 Belgrave Villas, Avenue Rd., Aeton.
Adlington, Lanes.	T. Farnworth, Adlington.
Aldershot, Hants.	George Carter, Victoria Road, Aldershot.
Alfreton, Derbyshire.	Thomas Parsons, Alfreton, Derbyshire.
Allerton, Lancs.	Andrew Fraser, Allerton Road, Halewood.
Alnwiek and Cannongate, Northumberland.	Geoffrey Wilson, Narrow Gate, Alnwiek.
Altofts, Yorks. ...	Benj. Leathley, Altofts.
Alton, Hants. ...	J. Barlow, High St., Alton.
Altrineham, Ches.	Duncan Cumming Moody, Peter St., Altrineham.
Alvaston & Boulton, Derbyshire.	Charles Greatorex, Alvaston.
Alverstoke, Hants.	Charles Joseph Easton, Forton Rd., Alverstoke.
Amble, N'humb.	George Beattie, Amble.
Andover, Southampton.	Alfred Durkess, Andover.
Arlcedon & Frizington, C'land.	Richard Wilson, Frizington.
Arundel, Sussex.	Jas. Robertson, Arundel.
Ashborne, Derbyshire.	Thomas Burton, Butchery, Ashborne.
Ashby - de - la - Zouch, Leicestershire.	John Salisbury, Ashby-de-la-Zoueh.
Ashby Woulds, Leieestershire.	S. Heward, Ravenstone, nr. Ashby-de-la-Zoueh.
Ashford, Kent. ...	A. S. Robinson, Ashford.
Ashton-in-Makerfield, Lanes.	Wm. Chalmers, Ashton-in-Makerfield.
Ashton-under-Lyne, Lancs.	J. Kelsall, Wellington Rd., Ashton-under-Lyne.
Aspull, Lancs. ...	William Clark, Holly House, Aspull.
Astley Bridge, Lanes.	Joseph Bullough, 1 Eden St., Sharples.
Aston Manor, Warwickshire.	Benjamin Bolt, 7 Thomas St., Aston Manor.
Atherton, Lanes.	Edward Manley, The Public Hall, Atherton.
Audenshaw, Lancs.	George Slack, Audenshaw, Lancs.
Audley, Staffs. ...	Robert Rigby, Audley.
Austonley, Yorks.	Isaac Sykes, Wood, near Holmfirth.
Awre, Gloucestershire.	Jas. Playsted, Blakency.
Aylesbury, Bucks.	Henry Howes, Aylesbury.
Bacup, Lancs. ...	James Tattersall, Higher Tong, Baeup.
Baildon, Yorks....	Joseph Henry Ward, Westgate, Baildon.
Bakewell, Derbyshire.	William Smith, Bakewell.
Bala, Merioneth.	Wm. James, High St., Bala.
Baldock, Herts.	Thomas Raban, Baldock.
Balsall Heath, Worcester.	Edward William Elkin, Lime Grove, Balsall.
Bampton, Devon.	Hermon Bolt, Railway Hotel, Willard, Devon.
Banbury, Oxon, & Northampton.	Daniel Dixon, Town Hall Buildings, Banbury.
Bangor, Carn. ...	J. Gill, 1 Frondirion Ter., Bangor.
Barking Town, Essex.	Frederick Martin, Local Board Office, Barking.
Barkisland, W. R., Yorks.	Joseph Hoyle, Post Office Buildings, Barkisland.
Barmouth, Merioneth.	Hugh Jones, Porkington Terrace, Barmouth.
Barnard Castle, Dur. and Yorks.	Roger Wall (no information).
Barnet, Herts and Middlesex.	Wm. Henry Mansbridge, High St., Barnet.
Barnsley, Yorks.	George Savage, Barnsley.
Barnstaple, Devon.	George Yeo, Boatport St., Barnstaple.
Barrow-in-Furness, Lanes.	Charles Nicholson, Barrow-in-Furness.
Barton, Eeeles, Winton & Monton, Lanes.	T. Lee, 389 Bishton Ter., Liverpool Rd., Barton.
Barton-upon-Humber, Line.	Alexander Stamp, Barton-upon-Humber.
Basingstoke, Southampton.	Harry Budden, 2 Wilton Place, Basingstoke.

District.	Name and Address.
Bastow, Derbyshire.	Joseph Eades, Bastow.
Bath, Somerset.	H. G. Montagu, 3 Victoria St., Grosvenor, Bath.
Batley, Yorks.	Armitage Colbeck, Mount Pleasant, Batley.
Battle, Sussex.	Jas. Melancthon Farr, St Mary's Villas, Battle.
Beaconsfield, Bucks.	Frank Bryan, Amersham.
Beaumaris, Anglesey.	Evan Thomas, Castle St., Beaumaris.
Beccles, Suffolk.	Alfred G. Love, Smallgate St., Beccles.
Beckenham, Kent	George Roots, Beckenham.
Bedford, Beds.....	George Steers, 69 Wellington Street, Bedford.
Bedlingtonshire, Nor'mberland.	Geo. Fenwick, Bedlington.
Beeston, Notts....	William Walker, Middle Street, Beeston.
Belgrave, Leicestershire.	William Pole, 8 Elm St., Belgrave.
Belper, Derby.....	John Sims, Queen Street, Belper.
Benfieldside, Durham.	John Dixon, Shotley Bridge.
Benwell & Fenham, N'humb.	Tom Dawson, Adelaide Terrace, Benwell.
Berwick-on-Tweed, N'hum.	John Cruden, Berwick-on-Tweed.
Bethesda, Carnarvon.	Richard Owen Williams, Pen-y-bryn, Bethesda.
Beverley, Yorks.	J. S. Vickers and George Sugdon, Beverley.
Bewdley, Worcestershire.	Milson White, 2 Park Lane, Bewdley.
Bexley, Kent.....	Edmund Reeve Boulter, Lion Rd., Bexley Heath.
Bicester, Oxon....	Alfred Clements, Launton Road, Bicester.
Biddulph, Staffs.	Thos. Whitehurst, Bradley Green, Biddulph.
Bideford, Devon.	Robert Chipman (Police Supt.), Bideford.
Billinge, Lancs...	H. Darlington, Billinge.
Bilston, Staffs.....	Walter Hughes, Caledonia Street, Sydney Village.
Bingley, Yorks. (Urban Dist.)	Thomas Bottomley, Rutland Street, Bingley.
Bingley, Yorks. (Improvement Co'missioners).	Walker Crowther, Regent Street, Bingley.
Birkdale, Lancs.	James Williams, Town Hall, Birkdale.
Birkenhead, Cheshire.	John W. Smith, Oxton.
Birkenshaw, Y'rks	Jn. Whittall, Birkenshaw.
Birmingham, Warwick.	Thomas Hastings Dale, 1 White Villas, Winson Green Road, Birmin'm.
Birstal, Yorks. ...	Robert Stone, Birstal.
Bishop Auckland, Durham.	Henry Dowson, Bishop Auckland.
Bishop Stortford, Hertford.	Alfred Cass, Bishop Stortford.
Bisley, Glonces.	J. Austoe, Bisley, Stroud.
Blackburn, Lancs.	Wm. G. Prebble, 154 Fox Terrace, Preston New Road, Blackburn.
Blackpool, Lancs.	Francis M'Donald, 7 Cocker St., Blackpool.
Blackrod, Lancs.	Thomas Hibbert, Lee Lane, Horwich.
Blaenavon, Monmouthshire.	John Gill, Llanover Road, Blaenavon.
Blandford Forum, Dorsetshire.	Charles William Wills, Damory St., Blandford.
Blaydon-on-Tyne, Durham.	Michael Hawdon, Winlaton, Blaydon-on-Tyne.
Bodmin, Cornwall	William John Jenkins, St Nicholas St., Bodmin.
Bognor, Sussex...	Wm. L. Barrett, Bognor.
Bollington, Cheshire.	Joseph Hill, Shrigley Road, Bollington.
Bolton, Lancs. ...	William James, 23 Rose Hill, Bolton.
Bonsall, Derbyshire.	Joseph Bunting, Bonsall, near Matlock, Bath.
Bootle-cum-Linacre, Lancs.	Wm. Blake, 11 Kenilworth St., Bootle-cum-Linacre.
Boston, Linc.....	John Stephenson, Boston.
Bournemouth, Southampton.	Maurice O'Connel, Oxford Road, Bournemouth.
Bowdon, Cheshire	James Ward, Priory St., Bowdon.
Bowness, Westmorcland.	Thomas Gibson, Bowness.
Bradford, Lancs.	D. Scott, Bradford, Lancs.
Bradford-on-Avon, Wilts.	Charles Septimus Adye, Bradford-on-Avon.
Bradford, Yorks.	James Chambers (no information).
Braintree, Essex	Henry Glithero, Braintree.
Brampton and Walton, Derbyshire.	Alfred Cupit, New Brampton.
Brandon and Byshottles, Durham.	Richard Gardner, Langley Moor.
Brecknock, Brecknock.	Rhys Davies, Camden Villas, Brecon.
Bredbury and Romiley, Cheshire.	Joseph Parry, Romiley, near Stockport.
Brentford, Mid'x.	George Miller, Ealing Road, Brentford.
Bridgend, Glamorgan.	Evan Williams, Dunraven Place, Bridgend.
Bridgnorth, Salop	William Simms, St John's Street, St Leonards.
Bridgwater, Somerset.	George Laffan, Bridgwater.
Bridlington, Y'ks.	Samuel Dyer, Bridlington.

District.	Name and Address.
Bridport, Dorset.	Frederick Cooper, North Allington.
Brierfield, Lanes.	Robert Townsley, 19 Victoria Street, Nelson.
Brierley Hill, Staffs.	Josiah W. Beckley, High Street, Brierley Hill.
Brigg, Lanes.....	Ch. Hornsby, Brigg, Lanes.
Brighouse, Yorks	Brierley Denham, Commercial St., Brighouse.
Brighton, Sussex	Henry Howes, Newington Lodge, Buckingham Pl. *Assistants*— James Somerville, 51 St Mary Magdalene St. J. Skinner, 57 Lewes St. Thomas Ashdown, 68 Southover Street. W. Longland, 17 Stanley Street. Walter Denman, 28 Islingwood Place. Robert Norrish, 9 Cuthbert Road.
Bristol.....	Joseph Yeates, 13 Clarence Place, Bristol.
Briton Ferry, Glamorgan.	James Davies, 51 Clements Terrace, Briton Ferry.
Broadstairs and St Peters, Kent	Charles Andrews, Claremont House, Broadstairs.
Bromborough, Cheshire.	William Thomas Stead, Bromborough.
Bromley, Kent....	Henry Abrams, Westmoreland Road, Bromley.
Bromsgrove, Worcester (Town).	John Bevan, The Hollies, Worcester Road, Bromsgrove.
Bromsgrove, Worc'st'r (Country).	Christopher J. Milton, Bromsgrove.
Broseley, Salop.	George Stevenson, Iron Bridge, Madeley.
Brotton, Yorks.	Ambrose Wootton Cross, Skelton.
Broughton, Line.	James Inman Bird, Broughton.
Brownhills, Staffs.	John Siddalls, High Street, Brownhills.
Brynmawr, Breconshire.	Joseph Wilson, Somerset Street, Brynmawr.
Buckingham, Bucks.	Richard White Munday, Chandos Road, Buckingham.
Budleigh, Salterton, Devon.	William Henry Wells, High Street, Budleigh, Salterton.
Buglawton, Cheshire.	Thomas Brown, Crossley Hall, Buglawton.
Builth, Brecon....	Abram Davies, Builth.
Bulkington.	E. Cuthbert, Bulkington.
Burgess Hill, Sussex.	E. Brown, Local Board Office, Burgess Hill.
Burley, Yorks.....	James Stradling, Burley-in-Wharfedale.
Burnham, Somerset.	John Henry Palmer, 6 Prews Ter., Burnham.
Burnley, Lanes.	C. Slater, 64 Manchester Road, Burnley.
Burslem, Staffs.	C. Burgess, 49 Stanley Street, Burslem.
Burton-on-Trent, Derby & Staffs.	Joseph Buxton, Derby Road, Burton-on-Trent.
Bury, Lanes.....	William Wilkinson, Bury, Lanes.
Bury St Edmunds, Suffolk.	John Edward Morris, Bury St Edmunds.
Buxton, Derbyshire.	Thomas Andrew Croghan, 37 Market St., Buxton.
Caerleon, Monmouth.	William Harris, Caerleon.
Calne, Wiltshire.	John William Carpenter Church Street, Calne.
Calverley, Yorks.	Joseph Gott, Calverley.
Camborne.....	Thomas Negus, Tehidy Road, Camborne.
Cambridge, Cambs.	Thomas Crowhill, Grafton Street, Cambridge.
Cannock, Staffs.	John Peake, Cannock.
Canterbury, Kent.	Charles Richardson, High Street, Canterbury.
Cardiff, Glamorganshire.	Joseph George Gover, Cardiff.
Cardigan, Cardigan and Pembrokeshire.	Joseph Rhys James, Even's Lane, Cardigan.
Carlisle, Cumberland.	Thomas Morant Compton, 44 Lorne St., Carlisle.
Carlton, Notts....	William Walker, Beeston.
Carmarthen, Carmarthen.	John Williams, Friars Park, Carmarthen.
Carnarvon, Carnarvon.	R. Lloyd Jones, Church Street, Carnarvon.
Carshalton.	Thos. Lockwood Heward, New Walden.
Cartworth, Yorks.	Isaac Sykes, Wood, near Holmfirth.
Castleford, Yorks.	Samuel Harrison, Welbeck Street.
Castleton-by-Rochdale, Lanes.	Robert Leach, Rochdale Road, Castleton.
Chadderton, Lancs.	William Gill Adkinson, York Street, Oldham.
Chard, Somerset.	John White, Silver Street, Chard.
Charlton Kings, Gloucestershire.	J. Villar, jun., Mordiford Lodge, Charlton Kings.
Chatham, Ken .	Charles Day, New Road, Chatham.
Chatteris, Cambs.	William Seward Ruston, Chatteris.
Chelmsford, Essex.	Edwin Earthy, Chelmsford.
Cheltenham, Gloucester.	J. Halford Long, 15 St Paul's Parade, Cheltenham.

District.	Name and Address.
Chepstow, Mon.	Richard Thorn, Chepstow.
Cheshunt, Herts.	Lewis Dewey, Turner's Hill, Cheshunt.
Chester, Cheshire.	Hugh Wharton, 118 St Anne Street, Chester.
Chesterfield, Derbyshire.	Robert Ramsden, Chesterfield.
Chesterton, Cambs.	John Tunwell, Chesterton.
Chichester, Sussex.	James Kerwood, Chichester.
Childwall, Lancs.	Andrew Fraser, Allerton Road, Halewood.
Chilvers Coton, Warwickshire.	Wm. Henry Spencer, Coton Road, Chilvers Coton.
Chippenham, Wilts.	John Lightfoot, Chippenham.
Chipping Norton. Oxon.	John Mace, Chipping Norton.
Chipping Wycombe. Bucks.	Vacant.
Chiswick, Middlesex.	William Boorman, Cranbrook Villa, Heathfield Gardens, Turnham Green.
Chorley, Cheshire.	William Barlow, Chorley, Cheshire.
Chorley, Lanes.	William Cunliffe, 2 Back Street, Chorley.
Christchurch, Mon.	George Tweedy, 6 Eves-Well Terrace, Manidee.
Church, Lanes....	Robert Naisbitt Hunter, 368 Blackburn Road.
Churwell, Yorks.	Jas. Wm. Oliver, Churwell.
Cirencester, Gloucester.	John Williams, 7 Laurel Villas, Cirencester.
Claines, Worcestershire.	Jas. Sheppard, Hampton Villa, Ombersley Road, Claines.
Clay Lane, Derbyshire.	Thomas Blackwall, Ashover.
Clayton-le-Moors, Lancs.	John Whittaker, Clayton.
Clayton, Yorks.	Edmund Ward, Clayton.
Clayton West, Yorks.	Thomas Lee, Oxspring.
Cleator Moor, Cumberland.	Henry Rothery, Frizington Road, Cleator Moor.
Cleckheaton, Yorks.	Alfred Holdroyd, Northgate.
Cleethorpes.	Henry Borman Coulbeck, Cleethorpes.
Clee with-Weelsby, Line.	Shepherd Coulson, Weelsby.
Clevedon, Som....	Henry Taylor, Chapel Hill, Clevedon.
Clitheroe, Lancs.	Henry Whitlow, 49 Moor Lane, Clitheroe.
Cockermouth, Cumberland.	Robert Simon Marsh, Cockermouth.
Colchester, Essex.	William Steggles, 13 Short Wyno St., Colchester.
Coleford, Glouc.	J. A. Henderson, Gloucester Rd., Coleford.
Colne and Marsden, Lanes.	John Mallinson, Keighley Rd., Colne.
Compton Gifford, Devon.	John Moule, Compton Gifford.
Congleton, Cheshire.	Percy John Sheldon, Chapel St., Congleton.
Consett, Durham.	William Rippon, Parliament St., Consett.
Conway, Carn. ..	T. B. Farrington, Conway.
Coseley, Staffs....	John Mills, Coseley.
Cottingham, Yorks.	George D. Stephenson. *Asst. Inspt.*, J. B. Ellis (no information).
Coventry, Warwick.	William G. Wright, 10 Bishop St., Coventry.
Cowpen, N'humb.	Thomas Maddison, Blyth.
Cramlington, N'thumb'land.	Edward Kell, Cramlington.
Crediton, Devon.	James Tozer, Crediton.
Crewe, Cheshire.	Samuel Stockton, 161 Nantwich Rd., Crewe.
Criccieth, Carn....	John Jones, Cardigan.
Crompton, Lancs.	John Mawson, Crompton. *Asst.*, William Holt, Crompton.
Croston, Lancs....	Thurstan Whittle, Croston.
Crowle, Linc. and Yorks.	John Johnson Cranidge, Crowle.
Croydon, Surrey.	E. Mitchell, 8 Catherine St. *Assts.*, J. Clifford, C. Richardson, J. Swain, A. Stanley.
Crumpsall, Lanes.	Geo. Craig, Fountain St., Cheetham Hill.
Cuckfield, Sussex.	Wm. Beach, Hayward's Heath.
Cumberworth and Cumberworth Half (Upper Division), Yorks.	Thos. Ellis, Cumberworth.
Dalton-in-Furness, Lancs.	Thomas Procter, Union St., Dalton.
Darlaston, Staffs.	J. Yates, Foster St., D'rl'st'n
Darlington, Durham.	T. A. Atkinson, Cleveland Dairy, Darlington.
Dartford, Kent....	H. Mungeam, Dartford.
Dartmouth, Dev.	E. H. Back, Dartmouth.
Darton, Yorks....	R. F. Braithwaite, Darton.
Daventry, Northampton.	George Foster, Daventry.
Dawdon, Dur. ...	J. Nicholson, Marlborough St., Seaham Harbour.
Dawley, Salop....	George Stevenson, Iron Bridge, Madeley.
Dawlish, Devon.	Charles Tapper, Priory Terrace, Dawlish.
Deal, Kent.	Alfred Dryland, 19 Blenheim Road, Deal.
Denbigh, Denbyshire.	Robert Roberts, Park St., Denbigh.

District.	Name and Address.
Denby, Yorks. ...	Wilson Howard, Denby Dale.
Denholme Gate, Yorks.	Jonathan Austin, Ann St., Denholme.
Denton, Lanes....	J. T. Braithwaite, Denton.
Derby, Derbyshire.	Arthur Clarke, Ford St., Derby.
Devizes, Wilts....	William Hayward, Northgate St., Devizes.
Devonport, Dev.	John Rowe, 10 Waterloo St., Devonport.
Dewsbury, Yorks.	Cyrus Blackburn, Princes St., Dewsbury.
Diss, Norfolk. ...	James Alger, Diss.
Dodworth, Yorks.	N. Matthews, Dodworth.
Dolgelly, Merioneth.	William Jones, Cemlyn House, Dolgelly.
Doncaster, Yorks.	John Thompson, 32 Catherine St., Doncaster.
Dorchester, Dorset.	William Chick, West Fordington.
Dorking, Surrey.	George Somers Mathews, Vincents Rd., Dorking.
Dover, Kent.....	Frederick Sims, Biggin St., Dover.
Downham Market, Norfolk.	James Long, Downham Market.
Dresden, Staffs.	Thomas Jones, Carlisle St., Dresden.
Drighlington, Yorks.	William Garforth, Drighlington.
Droitwich, Worcestershire.	Charles Headen, Droitwich.
Dronfield, Derbyshire.	John Broomhead, Dronfield.
Droylsden, Lancs.	Robert Rain, Fairfield Road, Droylsden.
Dudley, Worcester.	William M'Leod, 3 Priory St., Dudley.
Dukinfield, Ches.	Joseph Summerfield (no information).
Dunstable, Bedfordshire.	Benjamin George, Dunstable.
Durham, Durham.	James Coldwell, Hallgarth St., Durham.
Dwygyfylchi, Carnarvon.	Bernard Massey, Penmaenmawr.
Ealing, Middx. ...	Charles Jones, 5 Windsor Road, Ealing.
East Barnet Valley, Herts and Middlesex.	Frederic I. Rumble, Kent Villa, York Rd., New Barnet.
Eastbourne, Sussex.	Walter Grant, Eastbourne.
East Cowes, Isle of Wight	Joseph Chinchen, Castle Street, East Cowes.
East Dereham, Norfolk.	Wm. Henry Nankwell, East Dereham.
East Ham, Essex.	James Cozens, School House, East Ham.
East Molesey, Surrey.	Wm. Goodall, Grove Road, East Molesey.
East Retford, Notts.	Jas. Dove Parker, Carolgate, Retford.
East Stonehouse, Devon.	Richard Giles, Adelaide Street, Stonehouse.
EbbwVale, Brecknock and Mon.	Thomas Thomas, Victoria Road, Ebbw Vale.
Eccleshill, Yorks.	Thos. Hutton, Moor Side Road, Eccleshill.
Edmonton, Middlesex.	John Harrison, Church Street, Edmonton.
Egremont, Cumberland.	Samuel Braithwaite, Egremont.
Elland, Yorks.....	John Mortimer, Elizabeth Street, Elland.
Ellesmere, Salop.	John Green, Ellesmere.
Ely, Cambs.	John Bowen.
Emley, W. R., Yorks.	John Parker, Emley, near Wakefield.
Enfield, Middlesex.	Andrew Munro, 2 Lime Villas, Chase Side, Enfield.
Epsom, Surrey...	Joseph Rake Harding, Worple Road, Epsom.
Erith, Kent.....	Wm. Egerton, Lessness Heath.
Eton, Bucks.....	John Whitehouse, Vale Cottage, Windsor Road, Slough.
Evesham, Worcester.	Thomas John Blanchard, High Street, Evesham.
Exeter, Devon....	James Watson, 18 Bedford Circus.
Exmouth, Devon.	Isaac Rake, Bieton Place, Exmouth.
Eye, Suffolk.....	William Rampling, Eye.
Failsworth, Lancashire.	Joseph Allen, 203 Peel Ter., Dob Lane, Failsworth.
Fairfield, Derbyshire.	William Berresford, Fairfield.
Falmouth (Boro'), Cornwall.	Wm. Henry Tresidder, Kohinoor Place, Falmouth.
Falmouth (Parish), Cornwall.	Edwin Dinner, Basset Pl., Budock.
Fareham, Southampton.	John Rosevear, Fareham,
Farnham, Surrey.	Sidney Stapley, Farnham.
Farnley Tyas, Yorks.	Thos. Julian, Glen Farm, Farnley Tyas.
Farnworth, Lancs.	Thomas Entwistle, Durley Street. Farnworth.
Farsley, Yorks....	Wtlliam John Watkins, Bryan Street, Farsley.
Faversham, Kent.	Thomas Ware, 33 West Street, Faversham.
Featherstone, Yorks.	James Baldwin Fearnley, Featherstone.
Felling, Durham.	John Brown Makepeace, Haveloek St., Felling.
Fenton, Staffs....	Samuel Arthur Goodall, Raglan Street, Fenton.

District.	Name and Address.
Festiniog, Merioneth.	David Griffith Davies, Four Crosses, Festiniog.
Filey, Yorks.....	Richard Jesse Stevenson, Filey.
Finchley, Middlesex.	Geo. Wm. Brumell, Elm Park Road, Finchley.
Fleetwood, Lanc.	Matthew Smith, Gaulter, Fleetwood.
Flint, Flintshire.	William Edwards Bithell, Castle Street, Flint.
Flockton, W. R., Yorks.	Ephraim Beaumont, Flockton.
Folkestone, Kent.	R. Shoobridge, Coolinge Street, Folkestone.
Frome, Somerset.	William Roberts Stow, Frome.
Fulstone, Yorks.	Thomas Beaumont, Rye Croft, Scholes.
Fulwood, Lanes.	James Bibby, Victoria Road, Fulwood.
Gainsborough, Linc.	Charles Taylor, Spring Gardens, Gainsborough.
Garston, Lanes...	Thos. Broughton, Garston.
Gateshead, Durham.	William Jours, Ord St., Gateshead. *Assistant*, R. Hunter, Bankwell Lane.
Gildersome, Yks.	John Naylor, Grove Cottage, Gildersome.
Gillingham, Kent.	Charles Edward Taylor, Railway Street, New Brompton.
Glastonbury, Somerset.	Joseph Day, Benedict Street, Glastonbury.
Glossop, Derbyshire.	Samuel Dane, Shrewsbury Street, Glossop.
Gloucester, Gloucester.	George Allen, Gloucester.
Godalming, Surrey.	George Turner, Moss Lane, Godalming.
Godmanchester, Huntingdonsh.	John Bushforth, Godmanchester.
Golcar, Yorks. ...	William Haigh, Wellhouse, Golcar.
Gomersal, Yorks.	Matthew Currie, Gomersal, near Leeds.
Goole, Linc. and Yorks.	John Frederick Hedley, Goole.
Gorton, Lancs. ...	Alfred Charles Hindle, Hyde Road, Gorton.
Grange, Lancs. ...	William Harrison, Grange.
Grantham, Lincs.	James Barnacle, Great Gonerby.
Grasmere, Westmoreland.	William Baldry, Beech Cottage, Grasmere.
Gravesend, Kent.	Arthur Henry Lukes, Market Pl., Gravesend.
Greasbrough, Yorks.	Fred. John Dewsnap, Greasbrough.
Great Crosby. Lanes.	Wm. Dyson, York Road, Great Crosby.
Great Driffield, Yorks.	Thomas Sandles, Eastgate Street, Driffield.
Great Grimsby, Linc.	William Moody, Wood Street, Great Grimsby.
Great Harwood, Lancs.	R. Chippendale, Russell Place, Great Harwood.
Great Yarmouth, Norfolk and Suffolk.	Pat. O'Connor, 76 Nelson Road South, Great Yarmouth.
Greetland, Yorks.	Geo. Bateman, Washington Cottage, Greetland.
Guildford, Surrey	Wm. G. Lower, 106 High Street, Guildford.
Guisborough, Yorks.	J. S. Hyslop, Fountain Street, Guisborough.
Guiscley, Yorks.	Adam Earl, Guiseley.
Gunthwaite and Ingbirchworth, Yorks.	Thomas Lee, Oxspring.
Hadleigh, Suffolk	Ed. S. Downs, Hadleigh, Suffolk.
Halifax, Yorks...	David Travis, Queen's Road, Halifax.
Halstead, Essex.	G. H. Matthews, Halstead.
Ham Common, Surrey.	William Warner, Ham Common.
Hampton Wick, Middlesex.	Richard T. Elsam, Hampton Wick.
Handsworth, Staffs.	John Loach, Nineveh Rd., Handsworth.
Handsworth, Yks.	John Hardcastle, Handsworth, Woodhouse.
Hanley, Staffs....	John Wright and Charles Lewis, Hanley.
Harborne, Staffs.	Wm. H. Worrall, High Street, Harborne.
Hardingstone, Northampton.	Sam. Brown, 54 Oxford Street, Far Cotton.
Harrogate, High and Low, W.R., Yorks.	Wm. Chipchase, Victoria Baths, Harrogate.
Harrow, iddx.	Frederick Naylor Cowell, Park Lodge, Harrow.
Hartlepool, Durham.	Js. Galloway, 46 Frederick Street, Hartlepool.
Harwich, Essex...	No information.
Haslingden, Lancs.	Richard Barnes, Radcliffe Street, Haslingden.
Hastings, Sussex	Wm. C. Inskipp, 5 Portland Place, Hastings.
Haughton, Lancs.	Josiah Moores, Haughton.
Havant, Hants....	Anthony C. Lewis, Havant.
Haverfordwest, Pembroke.	Police Superintend. John Williams, Police Statn.
Haverhill, Essex and Suffolk.	Robert Coates, Haverhill.
Haworth, Yorks..	James Redman, Bolle Isle.
Hay, Brecknocks.	David Morgan, Hay.
Haydock, Lancs.	William Cowley, New Boston, Haydock.
Hayle, Cornwall.	George G. Robinson, Commercial Road, Hayle.

District.	Name and Address.
Hayward's Heath, Sussex.	William Beach, Hayward's Heath.
Heage, Derbyshire.	John Barlow, Ripley Road, Heage.
Heanor, Derbysh.	John Holbrook, Heanor.
Heath Town or Wednesfield Heath, Staffs.	Bernard Murphy, Frederick Street, Heath Town.
Heaton Norris, Lancs.	Thos. Haynes, Cranbourn Road, Heaton Moor, Heaton Norris.
Hebburn, Durham	William Waugh, Tennant Street, Hebburn.
Hebden Bridge, Yorks.	Emmett Smith, Hebden Bridge.
Heckmondwike, Yorks.	Tom Gledhill, Church St., Heckmondwike.
Hedon, Yorks....	Robert Leak, jun. Hedon.
Helston, Cornwall	William Oates, Wendron Street, Helston.
Hendon, Middx.	Henry A. Purvis, Alcester House, Hendon.
Henley, Oxon.....	H. Malcolmson, Northfield End, Henley-on-Thames.
Hepworth, W. R., Yorks.	Thomas Beaumont, Ryc Croft, Scholes.
Hereford, Herefordshire.	Basil B. Bridgwater, Berrington St., Hereford.
Herne Bay, Kent	J. Jefferies, 3 St George's Terrace, Herne Bay.
Hertford, Hertfordshire.	Joseph Wray, Hertford.
Heston and Isleworth, Middx.	J. I. Smith, Norman Villas, Bath Road, Hounslow.
Hexham, Northumberland.	Robert Grieves, 7 Hextol Terrace, Hexham.
Heywood, Lancs.	Thos. Ludlam, 13 William Street, Heywood.
Higher Bebington, Cheshire.	George M. Lloyd, Kerfield Terrace, New Ferry.
Hinckley, Leicester & Warwick	Wm. Turnbull, Hinckley.
Hinderwell, Y'ks.	W. Jefferson, Hinderwell.
Hindley, Lancs...	J. Dean (no information).
Hipperholme, Yorks.	John Sykes, Lane End Green, Hipperholme.
Hitchin, Herts....	George Farrer, Hitchin.
Holbeach, Linc...	Thompson Dowse, Holbeach, Linc.
Hollingworth, Cheshire.	S. E. Kettlewell, Taunton Road, Ashton-under-Lyne.
Holme, Yorks.....	Isaac Sykes, Wood, near Holmfirth.
Holme Cultram, Cumberland.	Robert Stubbs, Abbey Town.
Holyhead, Anglesey.	Rees Lloyd Davies, 27 Cross St., Holyhead.
Holywell, Flintshire.	Edward M. Evans, "Trosy-Maes," Holywell.
Honiton, Devon...	J. S. Plucknett, Honiton.
Honley, Yorks...	J. Whitworth, Honley.
Hoole, Cheshire...	William Grice, Hoole.
Horbury, Yorks...	Wm. H. Kendall, Westfield Villa, Horbury.
Horfield, Gloucestershire.	Charles Chorley, Ventnor, Berkeley Rd., Horfield.
Horncastle, Linc.	Zechariah Boulton, 61 North St., Horncastle.
Hornsea, Yorks.	John Barr, East Gate, Hornsea.
Hornsey, Middlesex.	Charles Dean, Woodside Cottage, Southwood Lane, Highgate, N.
Horsforth, York.	William Henry Parken, Long Row, Horsforth.
Horsham, Sussex.	George Pullen, Richmond Terrace, Horsham.
Horwich, Lancs.	Thomas Curwen, High Rid Farm, Horwich.
Houghton-le-Spring, Durh'm.	Robert Humphrey, Houghton-le-Spring.
Hove, Sussex. ...	James King, Town Hall, Hove.
Howdon, Northumberland.	Joseph Paul, Jarrow-on-Tyne.
Hoylandswaine, Yorks.	Samuel Yardley, Hoylandswaine.
Hucknall Torkard, Notts.	William Swann.
Hucknall-under-Huthwaite, Notts.	John William Hick, Hucknall-under-Huthwaite.
Huddersfield, Yorks.	Edwin George Kirk, Huddersfield.
Hunsworth, Yorks.	Geo. Speight, East Bierley, near Bradford, Yorks.
Huntingdon, Huntingdonshire.	Samuel Beresford, Huntingdon.
Hurst, Lancs. ...	Joseph Heys, 76 Hillgate Street, Hurst.
Huyton with Roby, Lancs.	Joseph Worrall, Local Board Office, Huyton.
Hyde, Cheshire.	John Shawcroft, 14 James Street, Mottram Road, Hyde.
Hythe, Kent. ...	Thomas Miller, Hythe.
Idle, Yorks.	Joel Kington, High Street, Idle.
Ilfracombe. Devon.	George Sommers Reed, Wilder Road, Ilfracombe.
Ilkeston, Derbyshire.	Thomas Evans, South Street, Ilkeston.
Ilkley, Yorks. ...	Jonathan Hamsworth, West Parade, Ilkley.
Ince-in-Makerfield, Lancs.	Benjamin Howgate, 41 Ince Green Lane, Ince.
Ipswich, Suffolk.	George Moss, Portman's Walk, Ipswich.
Ivybridge, Dev'n.	John Cole, Ivybridge.
Jarrow, Durham.	Edward Batey, Park Road, Jarrow.

District.	Name and Address.
Kearsley, Lanes.	Thomas Alfred Martin, 39 Bolton Road, Kearsley.
Keighley, Yorks.	Isaiah Holmes, 40 Ivy Street, Keighley.
Kendal, Westmoreland.	Daniel Goddard, Kendal.
Kenilworth, Warwickshire.	Francis Pickard Trepess, 29 St Nicholas Church Street, Warwick.
Keswick, Cumberland.	Wm. Hodgson, 2 Stanger Street, Keswick.
Kettering, Northamptonshire.	Joseph Rains, Gas Street, Kettering.
Kidderminster, Worcestershire.	William West, 46 Lorne Street, Kidderminster.
Kidsgrove, Staffs.	James Booth, Kidsgrove.
Kings Lynn, Norfolk.	John Hall, Kings Lynn.
Kingston-upon-Hull.	Joseph Osborne, 11 Park Street Crescent, Park Street, Hull.
Kingston-on-Thames, Surrey.	Wm. Cook, Wood Street, Kingston-on-Thames.
Kington, Hereford.	Henry Wishlade, Duke Street, Kington.
Kirkburton, Yorks.	William Smith, Kirkburton.
Kirkby Lonsdale, Westmoreland.	John Kemp, Kirkby Lonsdale.
Kirkham, Lancs.	William Riding, Kirkham, Lancs.
Kirkheaton, Yorks.	Thomas Peace, Kirkheaton.
Kirkleatham, Yorks.	Jas. Howcroft, Coatham.
Kirklington-cum-Upsland, Yorks.	John Lupton, Leeming Lane, Kirklington.
Knaresborough and Tentergate, Yorks.	Gilbert Archey, Knaresborough.
Knighton, Radnorshire.	Henry Anthony, Knighton.
ampeter, Cardigan,	Thomas Moore, Station Terrace, Lampeter.
Lancaster, Lancashire.	Isaac Smith, Leonard Gate, Lancaster.
Lathom, Lancs.	Robert Spencer, Hall Lane, Lathom.
Launceston, Cornwall.	John Dawe, St Thomas, Launceston.
Leadgate, Durham.	Thomas Smith Longstaff, Leadgate.
Leekhampton, Gloucestershire.	William Moorman, Rose Cottage, Croft Street, Leekhampton.
Leeds, Yorks. ...	John Newhouse, 64 Belle Vue Road, Leeds.
Leek, Staffs.....	Robert Farrow, 4 Ford Street, Leek.
Lees, Lanc.	William Hulme, Lees.
Leicester, Leicestershire.	Western Sub-District, Sergeant Buxton.
Leicester, Leicestershire.	Eastern Sub-District, Sergeant Brayley, Police Station.
Leigh, Lanc.....	William Norbury, Charles Street, Leigh, Lanc.
Leominster, Hereford.	Joseph Cox, 1 Cox Buildings, Broad Street, Leominster.
Lepton, Yorks. ...	Henry Wilby, Bottany.
Levenshulme, Lanc.	Ed. Smith, 2 St Peter's Terrace, Levenshulme.
Lewes, Sussex....	John Longridge, Leighside Lodge, Lewes.
Leyland, Lanes...	Thos. Fowler Hutchinson, Peel House, Leyland.
Leyton, Essex....	William Benson, Leyton.
Lichfield, Staffs.	Jos. Edward Catherwood, Frog Lane, Lichfield.
Lillington, Warwickshire.	William Bradford, New Cribbington.
Lincoln, Lincolnshire.	William Burrell Whitton, Newland Street, West.
Lindfield, Sussex	William Beach, Hayward's Heath.
Linthwaite, Yorks.	Luke Beaumont, Milnsbridge.
Liskeard, Cornwall.	John Kendall, Fairley Cottages, Liskeard.
Litherland, Lanc.	John Pearson, Sefton Road, Litherland.
Littleborough, Lanc.	John W. Webster, Littleborough.
Little Crosby, Lanc.	John Lovelady, Little Crosby.
Littlehampton, Sussex.	Harry Howard, Littlehampton.
Little Hulton, Lanc.	George Jones, Clegg's Lane, Little Hulton.
Little Lever, Lanc.	Samuel Empsall, High Street, Little Lever.
Little Woolton, Lanc.	William Wilkinson, Woolton.
Liverpool, Lanc.	Henry Fitzpatrick, 34 Woodville Terrace, Liverpool.
Liversedge, Yorks.	David Womersley, Roberttown, Liversedge.
Llandilo, Carmarthen.	William Hinkin, Llandilo.
Llandovery, Carmarthen.	John Jones, Broad Street, Llandovery.
Llandudno, Carnarvon.	Daniel Edwards, Pennant House, Lloyd Street, Llandudno.
Llanelly, Carmarthen.	William Thomas Rees, Llanelly.
Llanfairfechan.	Robert Williams, Llanfairfechan.
Llanfrechfa Upper, Mon.	James Wallace, Upper Cwmbrau, Pontypool.
Llangollen, Denbigh.	Thomas Kenrick Jones Ross Place, Llangollen.

Distrlet.	Name and Address.
Llanidloes, Montgomery.	Richard Evans, Long Bridge St., Llanidloes.
Loftus, Yorks. ...	Thomas William Stainthorpe, Loftus.
Long Eaton, Derbyshire.	John Sheldon, Long Eaton.
Longridge.	James Kirby.
Long Sutton, Linc.	Matthew Green Thrower, Long Sutton, Linc.
Longton, Staffs.	Wm. Clement, Longton.
Longwood, Yorks.	Luke Beaumont, Milnsbridge.
Loughborough, Leicestershire.	William Palmer Claridge, Park St., Lougborough.
Louth, Line.	Thomas Wilkinson Wallis, Gospel Gate, Louth.
Lower Bebington, Cheshire.	Miles Pilling Elsby, Acre Road, Lower Bebington.
Lower Brixham, Devon.	Edward Clarke, New Rd., Lower Brixham.
Lower Mitton, Worcestershire.	Andrew Glover, jun., Bridge St., Stourport.
Lowestoft (with Mitford and Lothingland Rural), Suffolk.	William James Rayment, Richmond Cottage, Kirtley, Lowestoft.
Luddenden Foot, Yorks.	John Coekroft, Hollins, near Luddenden Foot.
Ludgvan, Cornwall.	William Bear, Crowlas, Ludgvan.
Ludlow, Salop....	Oswald Speakman, Steventon, near Ludlow.
Luton, Bedford.	J. C. Whitehead, Luton.
Lyme Regis, Dorset.	J. Jerrard, Lyme Regis.
Lymington, Hants.	George Wort, Carlton Gardens, Lymington.
Lymm, Cheshire.	James Mort, Booth's Hill, Lymm.
Lynton, Devon.	William Squire, Ilkerton, Lynton.
Lytham, Lanc.	Thomas Whiteside, "The Lodge," Lytham.
Macclesfield, Cheshire.	William Jenkins, 39 Roe Street, Maeclesfield.
Madeley, Salop.	George Stevenson, Iron Bridge, Madeley.
Madron, Cornwall.	James Newton, Church Town, Madron.
Maesteg, Glamorgan.	William Ynyn Davies, 4 Queens Street, Maesteg.
Maidenhead, Berks.	Thos. Nash, Maidenhead.
Maidstone, Kent.	Charles Beale, 35 John Street, Maidstone.
Maldon, Essex....	Henry Francis Christie, Maldon.
Malmesbury, Wilts.	Joseph Hanks, Westport.
Malton, Yorks....	John Lawton Webster, New Malton.
Malvern, Worcestershire.	No information.
Malvern Link. Worcestershire.	Henry George, Malvern Link.
Manchester, Lanc.	Andrew Thomas Rook, Town Hall.
Mansfield, Notts.	Edmund Gabriel Goodacre, Rock Terrace, Mansfield.
Mansfield Woodhouse, Notts.	John Bowler, Mansfield Woodhouse.
March, Cambs. ...	Henry Grounds, March.
Margate, Kent....	Albert Latham, C.E., Canterbury Road, Margate.
Market Harboro', Great & Little Bowden, Leicester and Northampton.	Frederick Dixon Clark, Little Bowden.
Market Rasen, Linc.	William Marshall, Waterloo Rd., Market Rasen.
Marlborough, Wilts.	Jas. Mould, "The Green," Marlborough.
Marple, Cheshire.	Charles Hague, Hawk Green, Marple.
Marsden, Yorks.	James Wood, Owlers, Marsden.
Maryport, Cumberland.	Ralph Stokoe, Harbour Office, Maryport.
Masham, Yorks.	John Pickersgill, Masham, near Bedale.
Matlock, Derbyshire.	George Wheeldon Wright, Matlock Town.
Matlock, Bath and Scarthin Nick, Derbyshire.	Edward Gregory, Within District.
Melksham, Wilts.	David Mackenzie, Melksham.
Meltham, Yorks.	George Taylor, Brow, Meltham.
Melton Mowbray, Leicestershire.	John Daft, Thurman's Cottages, Nottingham Road, Melton Mowbray.
Merthyr Tydfil, Glamorgan.	Timothy Martin, 356 Penydarran Road, Merthyr Tydfil.
Methley, Yorks.	Joseph Charlesworth, Methley.
Mexborough, Yorks.	Varah Lockwood, 13 Church St., Mexboro'.
Middlesbrough, Yorks.	J. Reed, Middlesbrough.
Middleton and Tonge, Lane.	James Ogden, Fielding Street, Middleton.
Middlewich, Cheshire.	W. Drinkwater, Wheelock Street, Middlewich.
Midgley, Yorks...	Emmett Smith, Burnley Road, Mytholmroyd.
Midsomer Norton, Somerset.	Aubrey Wm. Js. Catley, Midsomer Norton.
Milford, Pembroke.	William Simmons, Hakin.

District.	Name and Address.
Millom, Cumberland.	Henry Waye, Barrow-in-Furness.
Milnrow, Lanc...	J. Ashworth, Local Board Office, Equitable Buildings, Milnrow.
Milton, next Sittingbourne, Kent.	Henry William Clarke, Milton.
Milverton, Warwick.	John Bricknell, Guy's Cliffe Rd., Milverton.
Mirfield, Yorks...	Frederick H. Hare, Mirfield.
Mold, Flint.....	I. Jones, High St., Mold.
Monk Bretton, Yorks.	George Batty, Monk Bretton.
Monmouth, Mon.	Philip Endell Wanklyn, Dixton, Mon.
Morley, Yorks....	Geo. Brooksbank, Wesley Street, Morley.
Morpeth, Northumberland.	T. S. Sanderson, Bullers Green, Morpeth.
Mossley, Lanc., Yorks, and Cheshire.	James Haynes, Mossley.
Moss-side, Lanc.	Th. Vickers, Moss-side.
Mottram in Longdendale, Chesh.	Samuel Elson Kettlewell, Taunton Rd., Ashton-under-Lyne.
Mountain Ash, Glamorgan.	J. Lewis, 10 Duffryn St.
Much Wenlock, Salop.	George Stevenson, Iron Bridge, Madeley.
Much Woolton, Lanc.	Thomas Webster, Allerton Road, Much Woolton.
Nantwich, Chesh.	H. Gentry, Nantwich.
Neath, Glamorgan.	William Whittington, Eringallt, nr. Neath.
Nelson, Lanc.....	Wm. Dent, 1 Hanover Terrace, Nelson.
Neston and Parkgate, Cheshire.	James Morris, Neston.
Nether Thong, Yorks.	Isaac Sykes, Wood, near Holmfirth.
Newark - upon - Trent.	Geo. Horspool, Newark.
Newbiggin - by - the-Sea, Northumberland.	John Peel, Newbiggin.
Newbold and Dunston, Derbyshire.	John Allen, Newbold Moor.
Newbury, Berks.	B. Sargent, Bartholomew Street, Newbury.
Newcastle - on - Tyne, Northumberland.	William Tunstall Clarke, Newcastle-on-Tyne.
Newcastle-under-Lyme, Staffs.	Daniel Wheat, Newcastle-under-Lyme.
Newhaven, Suss.	Robert Dewdney, 3 Devon Terrace, Newhaven.
Newington, Yorks	W. H. Knowles (no information).
New Malden, Surrey.	Thos. L. Heward, Acacia Grove, New Malden.
Newmarket, Cambs. and Suffolk.	William Johnson, Granby Street, Newmarket.
New Mills, Derby and Chester.	John Warren, Torr Top, New Mills.
Newnham, Gloucestershire.	John Harris, Newnham.
Newport, Mon....	Henry Williams, 13 Canal Parade, Newport, Mon.
Newport, Salop...	Geo. B. Hammonds, Vauxhall, Newport, Salop.
Newport, Isle of Wight.	F. W. B. Waterworth, 6 Quay Street, Newport, I.W.
Newquay, Cardigan.	Thomas Davies, Victoria Place, Newquay.
Newquay, Cornwall.	John Bunt, 3 Acland Terrace, Newquay.
Newton Heath, Lanc.	C. K. Lawton, 655 Oldham Road, Newton Heath.
Newton-in-Mackerfield, Lane.	Richard Brierley, Newton-in-Mackerfield.
Newton and Llanllwchaiarn, Montgomery.	John Price, Poole Road, Newtown, Montgomery.
Norden, Lanc.....	Edmund Rothwell, Norden.
Normanby, Yorks.	Jas. Bulmer, Normanby.
Normanton, Yks.	Alan Irvine, Woodhouse Road, Normanton.
Northallerton, Yorks.	William Wilkinson, North End, Northallerton.
Northam, Devon.	William Ward, Northam.
Northampton, N'hamptonsh.	Robert Dykes, 2 Mount Street, Northampton.
North Bierley, Yorks.	John Firth, Wibsey, near Bradford.
North Darley, Derbyshire.	Francis Rae Wain, Darley Dale.
Northfleet, Kent.	Samuel Honeycombe, The Hill, Northfleet.
Northowram, Yorks.	Wm. Dean, Copley Street, Haley Hill, Halifax.
North Walsham, Norfolk.	Edwin Joseph Simpson, North Walsham.
Northwich, Chesh.	James Court (not stated).
Norwich, Norfolk.	Anthony Denny, Mousehold, Norwich.
Nottingham, Notts.	Wm. Richards, Plantagenet Street, Nottingham.
Nuncaton, Warw.	John Moreton, Nuncaton.
Oakworth, Yorks.	M. Hartley, Oakworth.
Okehampton, Devon.	Isaac Yeo, Okehampton, Devon.
Oldbury, Worcestershire.	G. H. Robbins, 1 Spring St., Langley, Oldbury.
Oldham, Lane....	J. Walton, Oldham, Lane.
Openshaw, Lane.	A. Stansfield, Openshaw.
Ormsby, Yorks...	G. Moses, North Ormsby.
Ormskirk, Lanes.	Thomas Stuart, 49 Burscough St., Ormskirk.

District.	Name and Address.
Orrell, Lanes. ...	James Gaskell, Beacon View, Orrell.
Ossett-cum-Gawthorpe, Yorks.	Walter Hirst (no information).
Oswaldtwistle, Lanes.	Richard Hall, 31 New Lane, Oswaldtwistle.
Oswestry, Salop.	W. J. Hodgson, Preston.
Otley, Yorks.....	George Bolton, Otley.
Ottery St Mary, Devon.	Robt. Squire, Kings Arms Hotel, Ottery St Mary.
Ouudle, Northampton.	John Sanders Clarke, Oundle.
Ovenden, Yorks.	W. Galbraith, Illingworth.
Over Darwen, Lanes.	W. H. Marsden, Belgrave Square, Over Darwen.
Oxenhope, Yorks.	John Akeroyd, Lower Town, Oxenhope.
Oxford, Oxfordshire.	Thomas Hull, Leckford Road, Oxford.
Oystermouth, Glamorgan.	William Clement, Oystermouth.
Padiham and Hapton, Lancs.	John Gregson, Green Terrace, Hapton.
Padstow, Corn....	J. F. Clemow, Padstow.
Paignton, Devon.	Thomas George Walters, Winner St., Paignton.
Panteg, Mon. ...	J. Goodenough, Sherborne Villa, Panteg.
Pemberton,Lanes.	John Somers, Lamberhead Green, Pemberton.
Pembroke, Pembroke.	K. W. Ladd, Prospect Place, Pembroke Dock.
Penarth, Glam....	T. Meazey, Bromfield Place, Penarth.
Penistone, Yorks.	Wm. Marsh, New House.
Penrith, Cumberland.	Thomas Pollock, Penrith.
Penryn,Cornwall.	W. H. Dunstan, Penryn.
Penzance, Corn.	N. C. Whear, Penzance.
Peterborough, Huntingdon, & N'hamptonsh.	John William Walshaw, Cromwell Rd., Peterborough.
Phillack, Corn....	Hannibal Tredinnick, Commercial Rd., Hayle.
Pickering, Yorks.	John Westmoreland, Pickering.
Plymouth, Devon.	James Clegg, Cobourg Street, Plymouth.
Pontefract,Yorks.	J. Heseltine, Pontefract.
Pontypool, Mon.	E. T. Stephens, Clarence Street, Pontypool.
Pontypridd,Glam.	Edward Rees, Porth.
Poole, Dorset. ...	Henry Miller, Longfleet.
Portland, Dorset.	John Stone, Easton, Portland.
Portsmouth, Hants.	John J. W. Moody, London Road, Southsea.
Poulton, Bare, & Torrisholme, Lancs.	John Bond, 21 Lord St., Morecambe.
Prescot, Lancs....	Alfred Dickinson, Market Place, Prescot.
Preston, Lanes....	W. H. Hulme, John Cave, J. H. Moss (no information).
Prestwich, Lancs.	James Whitehead,Chester Bank, Prestwich.
Pudsey, Yorks....	Joseph Town, Church Lane, Pudsey.
Pwllheli, Carn....	Wm. Hughes, Pwllheli.
Quarry Bank, Staffs.	Thomas Pateshall, High St., Quarry Bank.
Queensbury, Yorks.	R. Smith, Amblethorne, near Halifax.
Quickmere, Middle Div.,Yorks.	John Nuttall,Lees Terrace.
Quorndon,Leicestershire.	Joseph Bates, Quorndon, Leicestershire.
Radcliffe, Lancs.	Edward Pearson, 30 Green St., Radcliffe.
Radstock, Som....	Tom Martin, Radstock.
Rainford, Lancs.	G. Pennington, Rainford.
Ramsbottom, Lancs.	W. Parkinson, 89 St Andrews Place, Bolton St., Ramsbottom.
Ramsey, Huntingdonshire.	Frederick Harbor, Ramsey.
Ramsgate, Kent.	E. S. May, 12 Plains of Waterloo, Ramsgate.
Rastrick, Yorks.	Jonathan Selby, Little Woodhouse.
Ravensthorpe, Parish of Mirfield, Yorks.	Thos. Hemingway, Sackville St., Ravensthorpe.
Rawdon, Yorks.	William Marshall, Far-Well-Hill, Rawdon.
Rawmarsh,Yorks.	George Train, Rawmarsh.
Rawtenstall, Lancs.	Wm. Pickles, Harcholme, Clouchfold.
Reading, Berks.	W. H. Robertson, 37 Hatherley Rd., Reading.
Redcar, Yorks....	Matthew Armitage, 2 West Terrace, Redcar.
Reddish, Lancs.	Edward Sykes, Castle St., Edgeley.
Redditch, Warwick & Worces.	Thomas William Baylis, Redditch.
Redruth, Corn....	Robert James, Short Row, Redruth.
Reigate, Surrey.	Job Heath Apted, High St., Reigate.
Rhyl, Denbigh and Flint.	William Freeman, Town Hall, Rhyl.
Rhymney, Brecknock and Mon.	William Lloyd Marks, Rhymney.
Richmond,Surrey.	Henry Hunt, Vineyard, Richmond.
Richmond,Yorks.	Supt. Thomas Graham, Newbiggin, Richmond, Yorks
Ripley,D'byshire.	Charles Shelton, Ripley.
Ripon, Yorks. ...	Samuel Harrison, Ripon.
Risca, Mon.....	George Charles Giles, Risca.

District.	Name and Address.
Rishton, Lanc....	Richard Grimshaw, High Street, Rishton.
Rishworth, W. R. York.	Allen Heap, Temple Ter. Rishworth.
Rochdale, Lancs.	James Schofield, 21 Boundary Street, Rochdale.
Rochester, Kent.	William Deane, 12 Boley Hill, St Nicholas, Rochester.
Romford, Essex.	Jonas Turvey, Market Place, Romford.
Romsey, Hants and Wilts.	George Summers, Town Hall, Romsey.
Ross, Hereford...	Henry Digwood, The Crofts, Ross.
Rotherham, Yrks.	Charles Edward Parkin, Broom Terrace, Rotherham.
Rothwell, Yorks.	Francis Burton Worth, Rothwell.
Rowley Regis, Staffs.	Henry Robert Harper, Hawes Lane, Rowley Regis.
Roxby-cum-Risby, Linc.	Erastus Smith, Roxby, near Brig, Linc.
Royal Leamington Spa, Warwick.	William Henry Austin, 2 Leam Street, Leamington.
Royton, Lanc.....	George Morton, Royton.
Rugby, Warwick.	Thomas John Chater, Rugby.
Rugeley, Staffs...	John Hatchett, Rugeley.
Runcorn, Chesh.	John Parry, 22 Brackley Street, Runcorn.
Rusholme, Lanc.	John Baguley, 13 Dickenson Road, Rusholme.
Ruskington, Linc.	John Cock, Ruskington.
Ruthin, Denbigh.	Charles Goodman Jones, Ruthin.
Ryde, I. of W., Southamptou.	John Matthews Daish, Pembroke Villa, West Street, Ryde.
Rye, Sussex	Joseph Adams, Market Street, Rye.
Ryton, Durham.	Thomas Pritchett Salter, 3 Ashfield Terrace, Ryton-on-Tyne.
Saffron Walden, Essex.	William Dickinson, Saffron Walden.
St Albans, Herts.	George Ford, Victoria Road, St Albans.
St Anne's-on-the-Sea, Lanc.	William Allwood Lloyd, "The Drive," St Anne's-on-Sea.
St Austell, Cornwall.	Benjamin Julyan Nott, 14 Bodmin Road, St Austell.
St George, Gloucester.	Stephen Sweet, Newchurch, St George.
St Helens, Lanc.	James Hart, C.E., and 2 *Assistants*, Town Hall.
St Helens, Isle of Wight.	Edward John Vinter, Sea View.
St Ives, Huntingdon.	Henry Cope, St Ives, Hunts.
St Ives, Cornwall.	John Noall, St Ives, Cornwall.
St Mary Church, Devon.	William Delf Bowden, 9 Fore Street, St Marychurch.
St Neots, Huntingdon.	Gerald Watts, Eaton Socon.
St Thomas the Apostle, Devon.	Samuel Churchward, 42 Cowick St., St Thomas.
Salcombe, Devon.	Edward Cole, Buckley, Salcombe.
Sale	James Alcock, 4 School Road, Sale.
Salford, Lanc.....	William Wilkinson, and 5 *Assistants*, Town Hall.
Salisbury, Wilts...	James White, 12 Harcourt Place, Fisherton.
Saltburn-by-the-Sea, Yorks.	John Mitchell Bottomley, Coatham, Redcar.
Saltley, Warwick.	Joseph Payne, Park Road, Saltley.
Sandal Magna, Yorks.	John Kassell, near Railway Station, Sandal.
Sandbach, Cheshire.	Amos Wood, Sandbach.
Sandgate, Kent.	James W. Drayner, Gilbert Cottages, Sandgate.
Sandown, I. of W., Hants.	James Henry Gray, Sandown.
Sandwich, Kent.	Wm. Matthew Horace Felton, King Street, Sandwich.
Scammonden, W. R., Yorks.	George Taylor, Meltham.
Scarborough, Yorks.	Arthur Finlay, 53 Trafalgar Street East.
Scholes (Joint), W. R., Yorks.	Thomas Beaumont, Rye Croft, Scholes.
Scaford.	Henry Cox. 12 Brook St., Polegate.
Seaton, Devon....	Emanuel Wills Gush, Seaton.
Sedgley, Upper, Staffs.	Edward Thomas Handly, 10 High Holborn, Sedgley.
Seghill, Northumberland.	Adam Dodds, Seghill.
Selby, Yorks.....	Thomas Mallinson, Selby.
Sevenoaks, Kent.	Samuel Edward Sharman, The Vine, Sevenoaks.
Shaftesbury, Dorset.	James Soppitt, Motcombe.
Shanklin, I. of W., Hants.	Wm. Lush, Salem Road, Shanklin.
Sheerness, Kent.	Henry Wm. Stringfellow Sheerness.

District.	Name and Address.
Sheffield, Yorks...	*Chief*—Sampson Morley; *Food*—Jonathan Wood; *Smoke Nuisance*—Sam. Brown; *District Inspectors*—Wm. Brummer, Patrick O'Connell, Henry Rummings, and John Poole, Health Office.
Shelf, Yorks.....	John Currer Whittham, Shelf.
Shelly, Yorks.....	Thos. Ellis, Cumberworth.
Shepley, Yorks...	Thomas Ellis, Cumberworth.
Shepton Mallet, Somerset.	John Hardisty, Shepton Mallet.
Sherborne, Dorset.	Benjamin Brett, Sherborne.
Shildon and East Thickley, Durham.	Thomas William Laycock, Shildon.
Shipley, Yorks....	John Smith, 9 Weston Street, Shipley.
Shirley and Freemantle, Southampton.	William Horley, Church Street, Shirley.
Shoreham, New, Sussex.	William Thompson, New Shoreham.
Short Heath, Staffs.	J. Walker, Sandbeds, Shortheath, near Wolverhampton.
Shrewsbury, Salop.	Daniel Waters, Shrewsbury.
Sidmouth, Devon.	Alexander Martin, High Street, Sidmouth.
Silsden, Yorks....	Robert Harger, Embsay, near Skipton.
Sittingbourne, Kent.	William L. Grant, 85 High Street, Sittingbourne.
Skelmanthorpe, W. R., Yorks.	Thomas Ellis, Cumberworth.
Skelmersdale, Lane.	William Corns, Skelmersdale.
Skelton, Yorks...	Ambrose Wootton Cross, Skelton.
Skipton, Yorks....	Robert Harger Embsay, near Skipton.
Slaithwaite, Yks.	George Taylor, Meltham.
Sleaford, Line.....	Jesse Clare, Sleaford.
Slough, Bucks....	J. Baker, High St., Slough.
Smallthorne, Staffs.	James Watkin, 1 Bleak Street, Burslem.
Smethwick, Staffs.	James Asbury, 3 Holly Street, Smethwick.
Soothill, Nether, Yorks.	Squire Booth, Earls Heaton.
Soothill, Upper, Yorks.	John Pease, Shaw Cross, Hanging Heaton, near Dewsbury.
Southampton, Hants.	William John Tubbs, 10 Castle Street, Belvoir Town, Southampton.
South Blyth, N'humberland.	William Winship, Waterloo Villas.
Southborough, Kent.	William Harmer, 3 Fern Terrace, Southborough.
South Cave and Wallingfen, Yorks.	Robert Bruce, South Cave.
South Crosland, Yorks.	Joseph Senior, Netherton.
South Darley, Derby.	George Gregory, Winster.
Southend, Essex..	Wm. E. Bridgland, Dorle Lodge, Southend.
Southgate, Middlesex.	R. Collins, Ethel Cottage, Chase Road, Southgate.
South Gosforth, N'humberland.	Charles James Baff, Gosforth.
South Hornsey, Middlesex.	Henry Abrams, 23 Arthur Road, South Hornsey.
South Molton, Devon.	William Manning, South Molton.
Southowram, Yorks.	William Clayton, Park Gate, Southowram.
Southport, Lane.	Wm. Beeston, Southport. *Assistant*, James Muir, Southport.
South Shields, Durham.	Joseph Johnson Hindmarsh, South Shields.
South Stockton, Durham and Yorks.	Stephen Edgar Thorrold, South Stockton.
Southwick, Durham.	J. G. Reah, Local Board Offices, Southwick.
Southwold, Suffolk.	Wm. H. Porter, Town Hall, Southwold.
Sowerby, Yorks...	D. Lumb, Swat, Sowerby, Mytholmroyd.
Sowerby Bridge, Yorks.	John Suteliffe, Hanover Street, Bolton Brow, Sowerby Bridge.
Soyland, W. R., Yorks.	John Wadsworth, Bridge Terrace, Ripponden.
Spalding, Line...	D. Crampton, 45 Double Street, Spalding.
Spennymoor, Durham.	John Coldwell, Spennymoor.
Stafford, Staffs...	William Baker, Stafford.
Staines, Middlesex.	William Antcliff Watson, High Street, Staines.
Stainland with Old Lindley, Yorks.	Joseph Shaw, Cross Field, Stainland.
Stalybridge, Lane. and Cheshire.	Joseph Oliver, Wakefield Road, Stalybridge.
Stamford, Line. and N'hampton.	Horace Wright, jun., 1 St Peters St., Stamford.
Standish with Langtree, Lane.	Thomas Bentham, Church Street, Standish.
Stanhope, Durham.	William Morley, East Gate.
Stapleton, Gloucestershire.	James Payne Curtis, Stapleton.

District.	Name and Address.
Stevenage, Herts.	Morton Pickett, Stevenage.
Stockport, Cheshire and Lanc.	Jacob Marshall and John Cragg, Court House.
Stocksbridge, Yorks.	James Smith, Haywood Park.
Stockton, Durham.	J. M. Garry, 23 Palmerston Street, Stockton.
Stoke-upon-Trent, Staffs.	Edward William Howell, Stoke-upon-Trent.
Stone, Staffs.....	John J. Chapman, Stone.
Stourbridge, Worcestershire.	Henry Williams, Victoria Street, Stourbridge.
Stowmarket, Suffolk.	Frederick Brett, Stowmarket.
Stow-on-the-Wold, Gloucestershire.	Joseph Yann, Stow-on-the Wold.
Stratford-upon-Avon, Warwickshire.	Henry Coombs, West St., Stratford-on-Avon.
Street, Somerset..	J. B. Gifford, 8 Goswell Terrace, Street.
Stretford, Lanc...	Thomas Hill, Lostock Place, Stretford.
Stroud, Glouces.	William C. Kirby, Stroud.
Sudbury, Essex and Suffolk.	Frederick Giles Cross, Sudbury.
Sunderland, Durham.	Wm. McKay, Corporation Hospital Lodge.
Surbiton, St Marks, Surrey.	S. Mather, Paragon Grove, Surbiton Hill.
Sutton, Surrey....	James Keal, Robin Hood Lane, Sutton.
Sutton-in-Ashfield, Notts.	Thos. Whitehead, Sutton-in-Ashfield.
Sutton Bridge, Linc.	John Daniel Dawson, Sutton Bridge.
Swadlincote, Derbyshire.	Robert Cartwright, Swadlincote.
Swaffham, Norf'k	John Copland, Swaffham.
Swanage, Dorset.	Joseph Parsons, Swanage,
Swansea, Glamorgan.	John Thomas, Henrietta Street, Swansea.
Swindon, New Town, Wilts.	John William Jolliffe, 22 Sheppard St., Swindon.
Swindon, Old Town.	Thomas V. H. Davison, 3 North Street, Old Swindon.
Swinton, Yorks...	James Craeroft Haller, Local Board Offices, Swinton.
Swinton and Pendlebury, Lanc.	James Coleman, 4 Victoria Terrace.
Tamworth, Staffs. and Warwick	Joseph Knight, junior, Utkinton.
Tarporley, Cheshire.	George Chas. Strawbridge, 23 Alma Street.
Taunton, Somerset.	Thomas Wheeler, Waldegrave Rd., Teddington.
Teddington, Middlesex.	

District.	Name and Address.
Teignmouth, Devon.	Charles Henry Northcott, Coombe Road, West Teignmouth.
Tenby, Pembroke.	Henry T. Morley, Tenby.
Tenterden, Kent.	Joseph Skinner, Tenterden.
Tetbury, Gloucestershire.	James Mann, Tetbury.
Tettenhall, Staffs.	Jonathan Hulland, Tettenhall.
Tewkesbury, Gloucestershire.	Wm. H. Gray, High St. Tewkesbury.
Thame, Oxon. ...	William Watts Hewland, Thame.
Thetford, Norfolk and Suffolk.	Charles Farrow, White Hart Street, Thetford.
Thornhill, Yorks.	James Peace, Thornhill.
Thornton, Yorks.	Thos. Howard, Thornton.
Thurlstone, Yorks.	Jas. Wagstaff, Millhouse.
Thurmaston, Leicester.	Henry Sarson, Thurmaston South.
Thurstonland, Yorks.	Sidney Armitage, Stocksmoor.
Tickhill, Yorks...	Robert Angelo Rawson, Sunderland St., Tickhill.
Tipton, Staffs.....	Henry Corns, 124 Dudley Port, Tipton.
Tiverton, Devon.	William Rowe, Barrington Street, Tiverton.
Todmorden, Lanes. and Yks.	Henry Blackburn, Nutclough, Hebden Bridge.
Tonbridge, Kent.	William Noot, Pembury Road.
Tong, Yorks.....	Matthew Outhwaite, Tong Street, Tong.
Torquay, Devon	Chas. Macmahon, 11 Trafalgar Terrace, St Mary Church Road.
Torrington, Devon.	Joseph Vickery, Great Torrington.
Totnes, Devon ...	Supt. Jas. Clark, High St.
Tottenham, Middlesex.	Frederick Thos. Poulson, Tottenham.
Tow Law, Durham.	Wm. Garraway, Tow Law, Darlington.
Towyn, Merioneth.	Owen Williams, Aberdovey.
Toxteth Park, Lane.	Jeffery Austin Hall, Lark Lane.
Trawden, Lanc...	Jonathan Hartley, Trawden.
Tredegar, Brecknock and Mon.	John Williams, Tredegar.
Tring, Herts.....	William Baines, Tring.
Trowbridge, Wilts.	William Henry Stanley, Trowbridge.
Truro, Cornwall.	William Clemens, Daniel Street, Truro.
Tunbridge Wells, Kent and Sussex.	William Brentnall, Tunbridge Wells.
Tunstall, Staffs....	Samuel Moss, King Street, Tunstall.

District.	Name and Address,
Turton, Lanc.....	James Parkinson, Station Road, Turton.
Twickenham, Middlesex.	Alfred Harwood, 26 London Road, Twickenham.
Tyldesley with Shakerley, Lanc.	Henry Morris, Croft Place, Elliot Street, Tyldesley.
Tynemouth, N'thumberland.	John M'Queen, North Shields.
Uckfield, Sussex.	Thomas Avis, Uckfield.
Ulverstone, Lane.	Joseph Elijah Jackson, Ulverstone.
Upholland, Lane.	John Fineh, Upholland.
Upper Mill, Yks.	Jas. Frederick Whitehead, Spring Bank, Upper Mill.
Upperthong, Yorks.	Isaac Sykes, Wood, near Holmfirth.
Usk, Mon.	John Mason, Market St.
Uxbridge, Middlesex.	James Williams, Waterloo Road, Uxbridge.
Ventnor, I. of W., Southampton.	William Brooker, Park View Cottages, Upper Ventnor.
Wakefield, Yorks.	Joseph Budworth Food, Warrangate, Wakefield.
Walker, Northumberland.	William Myers, Walker.
Wallasey, Cheshire.	Jas. Thomas Lea, Liscard Street, Liscard.
Wallingford, Berks.	Samuel Goldsmith, Reading Road, Wallingford.
Wallsend, Northumberland.	George Hollings Wallsend.
Walmer, Kent.....	James Branford Strong, Walmer.
Walsall, Staffs ...	Chas. William Stephens, Bridge St., and George Warlow Harries, Broxwich.
Walsoken, Norfolk.	James Trott, 1 Prince St.
Waltham, Holy Cross, Essex.	Charles William Wiggs, Waltham Abbey.
Walthamstow, Essex.	George Bestall Jerram, Longsight House, West Avenue, Walthamstow.
Walton-le-Dale, Lane.	Thomas Moxham, School Lane End, Walton-le-Dale.
Walton-on-the-Hill, Lane.	Edwin Smith, Breeze Hill, Walton-on-the-Hill.
Walton-on-the-Naze, Essex	Edward Forster Harvey, Walton-on-the-Naze.
Wanstead, Essex.	Andrew Duan, Local Board Offices.
Wantage, Berks.	James Dormer, Wantage.
Ware, Herts.....	Thomas Cook, Ware.
Wareham, Dorset.	George Hobbs, jun., Wareham.
Warley, Yorks....	Thomas Wade, Mount Tabor Halifax.
Warminster, Wilts.	Jabez Adams, Warminster.
Warrington, Lanes. and Cheshire.	Ralph Norman, Town Hall. *Assistant*, John Church, Town Hall.
Warsop, Notts.....	Robert Bowler, Warsop.
Warwick, Warwickshire.	Francis Pickard Trepess, Warwick.
Waterloo, with Seaforth, Lanes.	Joseph Wharton, 21 The Mews, Waterloo with Seaforth.
Watford, Herts...	Henry Williams, 23 King Street, Watford.
Wath-upon-Dearne, Yorks .	Henry Thomas, West St., Wath-upon-Dearne.
Wavertree, Lancs.	Robt Crowther. 65 Wavertree Road, Wavertree.
Wednesbury, Staffs.	Thomas Tibbitts, Albert Street, Wednesbury.
Wednesfield, Staffs.	Joseph Tomkys, High St., Wednesfield.
Wellingborough, Northampton.	John Askham, 1 Church Way, Wellingborough.
Wellington, Salop.	Henry John Taylor, Haygate Road, Wellington, Salop.
Wellington, Somerset.	Edwin Thomas Howard, Wellington, Somerset.
Wells, Norfolk...	William Leggatt, Wells.
Wells, Somerset.	Charles Brown, 17 Chamberlain Street, Wells, Somerset.
Welshpool, Montgomery.	John Potter, Welshpool.
West Bromwich, Staffs.	Thomas Richards, Hawkes Land, West Bromwich.
Westbury-on-Severn, Gloucester.	John Cornelius Cadle, Westbury-on-Severn.
West Cowes (I. W.), Southampton.	James Albert Sargeant, Bernard Road, West Cowes.
West Derby, Lanes.	John Lazzaroni, 26 Highfield Road.
West Ham, Essex.	William Horn, Cedars Road, Stratford.
West Houghton, Lanes.	Thomas Bolton, 8 Cemetery St., West Houghton.
Weston-super-Mare, Somerset.	Henry Hillman, 5 Beach Road, Weston-super-Mare.
West Worthing, Sussex.	Alfred Lindup, 7 Warwick Place, Worthing.
Weymouth and Melcombe Regis, Dorset.	Robert Andrews Ayles, Weymouth.
Wheatley, Oxon.	Lea Turner, 18 James Street, Cowley Road, Oxford.
Whickham, Durham.	John Dinsdale, Whickham.
Whitby, Yorks....	Thos. Keat Scott, Whitby

District.	Name and Address.
Whitchurch and Dodington, Shropshire.	Richd. Baxter, Alkington.
Whitefield, Lanc.	James Schofield, 22 Blakeley Street, Whitefield.
Whitehaven, Cumberland.	Robert Bertram, 12 Woodville Terrace, Whitehaven.
Whitley and Monkseaton, Northumberland.	Richard Arthur Worswick, Front Street, Whitley.
Whitley, Upper, W. R., Yorks.	George Parker, Height, Whitley, Upper.
Whittington, Derbyshire.	James Kirk, New Whittington.
Whittlesey, Cambs.	John Hill, Church Street, Whittlesey.
Whitwick Leicestershire.	S. Heaward, Ravenstone, near Ashby-de-la-Zouch.
Whitwood, Yorks.	J. Thornton, Rhodes St., Whitwood Mere.
Whitworth, Lancs.	Frederick Rodley, Todmorden.
Widnes, Lancs....	John Dixon, Wellington Street, Widnes.
Wigan, Lancs. ...	James Ridge, Borough Courts.—*Assist.*, Henry Meadows, do.
Wigton, Cumberland.	Thomas Tiffen, Water St., Wigton.
Willenhall, Staffs.	John Haines, Bilston, Street, Willenhall.
Willesden, Middlesex.	William Francis Fordham, 167 Carlton Road, Kilburn.
Willington, Durham.	John Cook, Durham.
Willington Quay, Northumberland.	Peter Williamson Thompson, 2 Philipson Street, Willington Quay.
Wilmslow, Cheshire.	Mark Wood, Hawthorn Grove, Wilmslow.
Wilsden, Yorks...	Joseph Ward, Main St., Wilsden.
Wilton, Wilts.....	Alfred Whitehorn, Wilton.
Wimbledon, Surrey.	Thos Mason, Local Board Office, Wimbledon.
Winchester, Hants.	Wm. Gamon, 3 Westerham Villas, Winchester.
Windermere, Westmorland.	Benjamin Browne, Windermere.
Windsor (New), Berks.	Thos. Vincent Davison, C.E., Grove Road.
Winsford, Cheshire.	Joseph Warlng, Winsford.
Winterton, Linc.	G. Ryall, no information.
Wirksworth, Derbyshire.	John Simpson, jun., St John St., Wirksworth.
Wisbech, Cambs.	Jas. Balding, 15 Lynn Rd.
Witham, Essex...	Stephen Carter, Witham.
Withington, Lancs.	Isaac Willcock, Lapwing Farm, Withington.
Witney, Oxon.	Thos. Andrews, High St.
Wivliscombe, Somerset.	Lacy Collard, Wiveliscombe.
Wokingham, Berks.	Edward Lane, Rose Street, Wokingham.
Wolborough, Devon.	Lewis Stevens, Hollycot, Wolborough.
Wolverhampton, Staffs.	Samuel Blanton, 28 Evans Street, Wolverhampton.
Wombwell, Yorks.	John Robinson, Wombwell.
Woodford, Essex.	William Holloway, Horn Lane, Woodford.
Wooldale, Yorks.	Isaac Sykes, Holmfirth.
Woolwich, Kent.	J. Carty, Brewer Street.
Worcester, Worcestershire.	William Pacy, Worcester.
Workington, Cumbs.	Wm. Liddle Eaglesfield, 7 Belleisle Place.
Worksop, Notts...	Sampson White, 31 Sandy Lane.
Worsborough, Yorks.	Henry Wilkinson, Ardsley.
Worthing, Sussex.	Walter Horne, Graham Road.
Wrexham, Denbigh.	David Higgins, Holt Road.
Wrotham, Kent...	Edward Batt, Clegitt's Cross, Borough Green.
Wuerdle and Wardle, Lancs.	James Brierley, Overseer's Office, Smallbridge.
Yeadon, Yorks.....	John Croft, Yeadon.
Yeardsley-cum-Whaley, Chesh.	John Kirk, Whaley Bridge.
Yeovil, Som.	Stephen Harris, Yeovil.
Ynyscynhaiarn, Carnarvon.	Robert Griffith, Portmadoc,
York, Yorks.....	Jonathan Atkinson, Lawrence Row, York.
Ystradyfodwg, Glam.	John Watkins Jones, Ynishir.

INDEX.