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HEALTH IN  
OUR HOMES

BY

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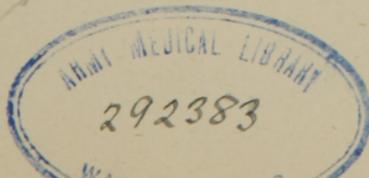
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"HEALTH OF OUR CHILDREN," ETC.



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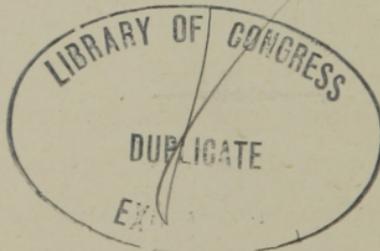
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## PREFACE.



IT is assumed at the present day that the causes of many of the most fatal diseases which attack man are living germs or organisms, and that unless those agents are introduced into the body, the diseases in question cannot be brought into existence. While this theory is yet to be established by patient microscopic study, many of the conditions which are essential to the development and diffusion of contagious and infectious diseases are known and have been clearly defined. Facts are not wanting to prove that infectious diseases depend very largely upon bad sanitary conditions, and that for protection, man must rely on his own efforts. There is an infinite number of other diseases which, while they do not originate in the manner of those mentioned, are measurably affected and owe much of their virulence to baneful influences, such as foul air, lack of cleanliness, and defects of a like character common among the ignorant, thoughtless, and neglectful. The health of a man, and that of his family, is, to a very great

degree, in his own keeping. By sanitary precautions, much of the sickness which many experience might be prevented. On the following pages, in a series of talks as it were, some of the most glaring faults which exist in many homes, and the measures of relief demanded, will be described. It is earnestly hoped that the reader will be convinced of the value of the protective remedies advised. They are easily applied, promote health, contribute to comfort, and promise immunity from many diseases.

AUTHOR.

# CONTENTS.



	PAGE
CHAPTER I. . . . .	I
Population-density and mortality.—The nearer people live to each other, the shorter their lives.—Cleanliness and disinfection.—Ignorance and neglect characterize many people.—Diphtheria due to foul surroundings.—Its liability to reappear where it has once existed.—Responsibility of landlords.—Evil effects of bad drainage.—Safety from infectious diseases largely secured by reasonable precaution.—Thorough cleanliness an imperative necessity.	
CHAPTER II. . . . .	7
The care of the cellar.—The walls should be impervious to water.—Dryness and cleanliness of the utmost importance.—Thoroughly ventilate on every pleasant day.—How to dry the air without heat.—Burn sulphur in it once a week.—A musty smell within a house unmistakable evidence of danger.—Disinfection alone promises safety.	
CHAPTER III. . . . .	12
The infinite importance of pure air.—The most potent causes of physical evils.—Foul air and typhus fever.—The value of pure air as a protection against infection.—A terrible experience with yellow fever.—Sunshine indispensable to perfect health.—“Black hole of Calcutta.”—Poisonous effects of impure air.—Consumption and its potent curative agent.	

	PAGE
CHAPTER IV. . . . .	19
Ventilation. — Purity of air must be maintained even at the expense of heat. — The baneful practice of many mothers. — How soon the air of an average-sized room may be made unhealthy by one occupant. — Death rate among the poorer classes. — Simple means of securing ventilation without draughts. — Catarrhal affections and their causes. — Consequences of neglect. — That feather-bed.	
CHAPTER V. . . . .	26
Heating. — Open grates inadequate. — Serious defects in the usual heating-appliances. — Cast-iron furnaces unfit for use. — A large furnace and moderate fire. — Fresh and pure air only for the air-chamber. — Dry air unhealthy. — Cold-air box. — Its situation and construction. — The management of stoves and furnaces. — Dangers from cracks and imperfect joints.	
CHAPTER VI. . . . .	30
Heating continued. — System of steam. — By hot-water pipes. — The most perfect method of heating. — How a pure and even temperature may be obtained. — The plan advised by an American architect. — Every part of a house should be equally warmed. — Cold currents along the floors. — Faults which are not uncommon. — Double windows. — Movable panes in storm windows necessary.	
CHAPTER VII. . . . .	35
Grave dangers from escaping coal gas. — An agent ever to be dreaded. — The immediate effects of the poison. — Slow poisoning often attributed to other causes. — Sad cases to illustrate the deadly nature of coal gas. — Economizing fuel at the expense of health. — Look well to back dampers. — Safety demands constant watchfulness.	

	PAGE
CHAPTER VIII. . . . .	39

Overheated apartments. — Poor ventilation commonly an associate evil. — Tenement houses. — How many people live. — Keep children out of the kitchen. — The baneful effects upon them of excessive heat. — The grievous faults of some mothers. — The health of their little ones ruined by wanton neglect. — The nursery. — Its temperature. — Ventilation. — Necessary precautions.

CHAPTER IX. . . . .	43
---------------------	----

The kitchen and dining-room. — Why they should be uncarpeted. — Wall-papers generally inimical to health. — The development of germs. — A thorough spring cleaning. — Repairing. — Never put new paper over old. — A common fault to be avoided. — Why some houses are unhealthy. — Neglect invites disease. — To make home healthy have due regard for seeming trifles.

CHAPTER X. . . . .	47
--------------------	----

Sleeping-rooms. — The temperature to depend upon the health of the occupant. — The indispensable sponge-bath. — Ventilation. — Deadly coal gas in the sleeping-apartment. — Kerosene oil and illuminating gas. — Pernicious effects of a lamp burned low. — Cleanliness here as everywhere imperative. — Gas fixtures. — Purity of air. — Carpets. — Substitutes by far healthier.

CHAPTER XI. . . . .	52
---------------------	----

Sleeping-rooms continued. — Grievous faults in modern houses. — The furnishings of sleeping-apartments. — Rigid simplicity advised. — Bedsteads. — Mattresses. — Feather-beds absolutely forbidden. — Springs. — Bed-clothing. — Offensive coverings in use. — Pillows. — Night-dresses. — Underclothing for night wear. — Ventilation. — Plants render the air impure at night. — Not to be permitted in sleeping-rooms.

	PAGE
CHAPTER XII. . . . .	56
Bathrooms and sleeping-apartments. — They should never be connected. — Seal up the doors between them if any exist. — Dangers in sewer gas. — Some of the diseases induced by it. — A common cause of chronic catarrh. — A sad case illustrating its insidious effects. — Deafness the frequent result of bad drainage and sewer gas.	
CHAPTER XIII. . . . .	60
Water-closets. — Common faults in the construction of houses. — An important duty which householders owe to themselves and families. — Determine if the drainage is defective. — How the peppermint test may be applied. — Ventilating water-closets. — Routine duties to insure perfect cleanliness. — Disinfection. — Preventive measure which all should employ. — Constant vigilance the price of safety.	
CHAPTER XIV. . . . .	67
Basement kitchens and dining-rooms. — Why they are often unhealthy. — Made ground for building purposes. — A “death-trap.” — Damp walls and damp cellars may be prevented. — Damp cellars always dangerous. — Other serious objections to basement kitchens. — Excessive stair-climbing and its evil effects upon women. — A consideration deserving much weight.	
CHAPTER XV. . . . .	73
Basement kitchens continued. — Dangers from damp cellars and sewer gas. — Imperfectly filled cesspools and vaults. — An interesting case. — Dangers which few realize. — Perfect drainage, and yet sewer gas finds entrance. — Old drain-pipes. — Valuable lessons taught. — Privileges which should never be granted. — Quite natural mistakes. — Important facts concerning the deadly miasm.	

## CHAPTER XVI. . . . . 79

Around the house.—The importance of neatness there.—The ground air and its movements.—A danger of which people know but little.—Sink-spouts.—Banking up for cold weather.—How death is invited in many homes.—Diffusion of gases underground.—An interesting case.—Drains as ordinarily constructed.—How they should be made.

## CHAPTER XVII. . . . . 83

Cesspools and privy vaults.—Why they are condemned.—Wherein lies the danger from them.—Ventilating privy vaults.—A disgraceful scene.—Dangers which cannot be exaggerated.—Duty of every man.—Disinfection of vaults.—Means to be used.—Sulphate of iron.—Its cost.—Quantity to be employed.—Comparative safety secured by proper precautions.

## CHAPTER XVIII. . . . . 89

Drinking-water.—Ease with which it is contaminated.—Relative situation of privy vaults.—Wells in cities.—Typhoid fever.—An instructive case.—Serious consequences of carelessness.—Poisoned wells.—Infection possible for a long distance through the ground.—Duties which all must recognize.—Natural instincts of man too often unheeded.—Premature mortality among animals.—“Hygiene is manly.”

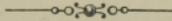
## CHAPTER XIX. . . . . 93

Tenement houses.—Dangers of living in crowded houses.—The homes of the poor.—A problem difficult of solution.—Habits of workingmen.—The noon hour.—After dinner rest awhile.—Location of homes.—The great advantage of living in the country.—Overcrowding of large cities.—Measures of relief.—Displacement of population.—Excessive mortality.—Work for the philanthropist.

	PAGE
CHAPTER XX. . . . .	98
Life in the city and country contrasted. — Why the air of cities is impure. — What it is loaded with. — Habits which are invited by breathing foul air. — Inestimable benefits of country life. — Degeneration of the American nation. — Moral obligations of the thoughtful and intelligent. — The homes of the poor. — Wide field for missionary work.	
CHAPTER XXI. . . . .	103
Country life. — Pre-eminently the place to bring up children. — Educational advantages. — Faults of the times. — The responsibilities of parents. — The policy of many questioned. — Social life in the country and city contrasted. — The situation of a site for a country residence. — Locations to be avoided. — Effects of vegetation. — Influence of trees and shrubbery on health.	
CHAPTER XXII. . . . .	108
Our homes. — Importance of sanitary inspection. — Common sense and hygiene. — Not an isolated case. — Choice of residence. — Soils. — Streets. — Tenement house act. — Builders' restrictions. — A Massachusetts law. — What constitutes a tenement house. — The conduct of landlords. — A salutary city ordinance. — Filthiness a punishable offence. — The responsibilities of owners and householders. — Physical and moral laws are alike divine.	



## HEALTH IN OUR HOMES.



### CHAPTER I.

Population-density and mortality. — The nearer people live to each other, the shorter their lives. — Cleanliness and disinfection. — Ignorance and neglect characterize many people. — Diphtheria due to foul surroundings. — Its liability to reappear where it has once existed. — Responsibility of landlords. — Evil effects of bad drainage. — Safety from infectious diseases largely secured by reasonable precaution. — Thorough cleanliness an imperative necessity.

PEOPLE who reside in large towns and cities fail to realize that the farther they are removed from nature, or, in other words, from the country, as a rule, the shorter will be their lives. The eminent statistician, Dr. Farr, according to Hartshorn, gave the following interesting facts regarding the proportion between the population-density and mortality in 619 districts of England and Wales, from 1861 to 1870. In seven groups in these districts (excluding London), the number of persons to the square mile was respectively 166, 186, 379, 1178, 4499, 12,351, 63,823. The annual mortality for each

1000 inhabitants in these same districts was 17, 19, 22, 25, 28, 32, 39. It will be seen by these figures that the denser the population, or the nearer people lived to each other, the shorter were their lives. In 53 districts, the average proximity of residents was 147 yards, and the mean duration of life was 51 years; in 345 districts, the proximity was 139 yards, and the mean length of life 45 years; in 137 districts, the proximity was 97 yards, and the mean length of life 40 years; in 47 districts, the proximity was 46 yards, and the life duration 35 years; in 9 districts, with an average proximity of 28 yards, the mean duration of life was only 32 years. In Manchester, the average distance which separated the residents was 17 yards, and the mean length of life was 29 years. In Liverpool, the proximity reached the maximum of 7 yards, and the average duration of life was 26 years.

Thus it will be seen that, as civilization advances and the population becomes denser, subtle influences which tend to shorten the duration of life are encountered. This fact deserves especial emphasis, and yet large cities, which have been termed "the graves of the human race," need not necessarily be so unfavorable to human life. There are adventitious, but yet more powerful, causes operative which might be prevented. To obviate them, continued

watchfulness and untiring efforts will be imperative, and each individual must recognize and religiously perform the duty which devolves upon him. The people must be made familiar with sanitary laws and encouraged to obey them. The work of prevention is with them, among themselves, and every man can and should aid in effecting such reforms as are needed in his community.

“Cleanliness is next to godliness.” If all could feel the importance of thorough cleanliness, and each and every one would do his duty to maintain it, there would be but little need of disinfection. That infectious diseases depend largely upon bad sanitary conditions is now believed, and testimony is accumulating to sustain this assumption. That one malady, which has been so prevalent at times during the past year, diphtheria, is clearly due to foul surroundings. Those who have had the most experience in this disease will testify that in the majority of their cases they have been able to trace infection to untrapped sinks, defective drainage, or the vile influences of decomposing filth. In apartment houses in which this and other infectious diseases have occurred, remedying the mechanical defects is by no means all that is required to be done. The board of health, in large cities, has made it a practice of forwarding to every householder in whose family

any of this class of diseases has occurred circulars advising thorough disinfection; they also give instructions how to secure it. Among other valuable hints conveyed, it is advised that all the wood-work be washed with a disinfectant solution, the ceiling be thoroughly whitened, and the wall paper removed. Few, indeed, have ever profited by these suggestions. It is safe to say that not one in a hundred has done so. Defective traps, drains, etc., they have had repaired and the general surroundings improved, but precautions of infinite importance they neglect. The consequence has been that in very many tenement houses, year after year, have occurred new cases of diphtheria; and when one estimates the amount of the physicians', and, possibly, the undertakers', bills, they must appreciate from a pecuniary point of view, if from no other, the truth of the saying "an ounce of prevention is worth a pound of cure."

Unless extraordinary precautions are taken to disinfect a house where diphtheria has occurred, it is almost certain, sooner or later, to reappear there again. There is one house in Boston with a sad history. Within a period of ten years it has been occupied by no less than six families, one after the other, and in every one of them there has occurred a death from diphtheria. This house, which cost some \$5000, stands in a very good locality, and

has always been kept, as far as could be seen, in good repair. After each death the drains were opened and every effort made to discover and remove the cause of infection, but all to no purpose. In an instance like this probably no amount of disinfection would prove effectual, and such a house should never be tenanted until stripped to its very walls and entirely rebuilt inside. Why is not a landlord who rents a house so thoroughly impregnated with infection liable for heavy damages, even under the existing laws? If his tenant slips on a defective stair and injures himself, then the landlord is liable. If life is sacrificed through defective drainage, why should he not also be held responsible? If he is not under the present laws, a most needed reform is to enact a new one, making it a high crime for a landlord to let a house which has been infected, before he has thoroughly disinfected it.

It is to be understood that the mere burning of sulphur or the free use of other chemicals, does not signify disinfection. To secure it, every waste-pipe in the house should be exposed and tested, all the paper should be removed from the walls, the ceiling whitewashed, and the wood-work cleaned and repainted, and, in fact, the entire inside of the house should be renovated. Until such security is afforded them, people who contemplate hiring a house should

first familiarize themselves with its history. If it is learned that it has ever contained a case of infectious disease of the nature of diphtheria, they should not think of occupying it, at least not until the careful and thorough changes advised have been made. Once a man assumes the care of a house in good sanitary condition, let him guard well his threshold, for safety from infectious diseases will depend in a very great degree upon his own thoughtful efforts. The first law is absolute cleanliness from the floor of his cellar to the roof; no less important is perfect ventilation. If a house is in the slightest degree damp, it is absolutely unsafe while it remains so; and as all are more or less liable to become damp in the seasons of heavy storms, not a moment should be lost in obviating this trouble, if it once exists.



## CHAPTER II.

The care of the cellar. — The walls should be impervious to water. — Dryness and cleanliness of the utmost importance. — Thoroughly ventilate on every pleasant day. — How to dry the air without heat. — Burn sulphur in it once a week. — A musty smell within a house unmistakable evidence of danger. — Disinfection alone promises safety.

THE cellar is a portion of the house to which the least attention is given, and yet no part of the entire building demands greater care. A cellar wall should, of course, be perfectly impervious to water, and the floor concreted. Defective walls are, however, the rule, and therefore the storm water which dashes against the house, and the water from freshets in its vicinity, in the majority of cases, to a greater or less degree, find entrance into the cellar. It would not be too much to insist upon that surety, that the walls be absolutely impervious to water, and that the site of a house be thoroughly drained. It is more than can be reasonably expected, however, in this money-grabbing age, when the builder's first thought is economy. No other class of people can more often be justly accused of

being "a penny-wise and a pound-foolish." Since they are rarely obliged to pay the penalty of their short-sighted practices, it is all the easier for them to indulge in them; the unfortunate tenant is the one who suffers. Every cellar which does not contain a furnace should have a stove in it. Here trouble is met; for in many houses the chimneys are so constructed they cannot be entered from the cellar. If a stove can be used, then a fire should be built in it, every day or two, to insure perfect dryness. In every instance the walls should be whitewashed several times a year.

The cellar is often made a "catch-all," and many contain more or less old rubbish. All that should be removed, and only those things in actual use be allowed there. Twice a year at least, oftener if possible, the entire contents of the cellar should be taken out and exposed for several days to the pure outside air and strong sunlight. Then every inch of the space should be thoroughly cleaned. The average householder in the fall nails in the windows of his cellar, and then stores in it his winter's vegetables. This has always been the custom, and, doubtless, no amount of argument will ever eradicate it. Considering the proverbial carelessness of people, it certainly ought to be abolished, for, more often, in the vegetables there soon commences the

decomposing changes which are attended with such exceeding danger to those brought within their influence. If people must keep vegetables in their cellars, then let them "sort" them over every week, and at once remove all which show a sign of decay. Instead of fastening in the windows so as to exclude not only cold, but the outside pure air, they should be adjusted with hinges that they may be opened easily. There is scarcely a week in winter when the cellar cannot be ventilated without danger of freezing its contents, water-pipes, etc., and on all such days a window on each side should be opened to secure a free circulation of air.

Supposing, as not unlikely will be the case, that the air in a cellar is damp, and a stove cannot be set up in it, neither can it be dried by ventilation during the winter, what then should be done? The most sensible course, and one which a tenant ought to pursue, is to move out of such a house. Very rarely indeed will he follow this advice, and the exigency must be provided for. Let him take advantage of every warm, pleasant day, and secure perfect ventilation by opening his windows. For about \$3 he can buy a barrel of the chloride of lime. Let him put this in his cellar and remove the head, or, what is better, divide it up in two or three quantities, and expose it in open boxes. This lime will absorb the

moisture in the air and keep it dry. In ordinary cellars one or two barrels of lime a year will be sufficient ; if not, all that is needed should be used.

There is yet another practice to which the householder should be habituated. It is that of burning sulphur in the cellar at least every week, and oftener, if possible. This can easily be done at night before retiring. If all the doors leading to the sleeping apartments are closed, and the upper part of the house is well ventilated, then the fumes of the burning sulphur cannot reach them. It will seem to many almost absurd to describe so simple a process, and yet there is one danger from the burning of sulphur, unless people are careful, which must not be overlooked. Slight though it may be, there is a danger of fire, if the floor is boarded over, as many are. This can be easily obviated. Take an old pan of large size and fill with sand ; then, in the centre of this, place a small shovelful of live coals ; have your powdered sulphur at hand, and as soon as a pound or more of this is thrown on to the coals, leave the cellar on the instant, as no one can breathe the fumes of sulphur with safety. Instead of using the "live coals," the sulphur may be saturated with alcohol and then burned. This method advised is one of the most effectual disinfectant processes. It not only purifies the air, but if sufficient sulphur is

burned, the fumes will destroy all disease germs within its influence.

There is one fact which should be remembered: because the air of a closed space like a cellar contains no offensive odor, it must not be assumed that it is free from harmful properties. A musty smell within a house is always unmistakable evidence of danger; and yet the absence of such an odor is by no means conclusive evidence of its purity, nor does it obviate the need of occasional disinfection.



### CHAPTER III.

The infinite importance of pure air. — The most potent causes of physical evils. — Foul air and typhus fever. — The value of pure air as a protection against infection. — A terrible experience with yellow fever. — Sunshine indispensable to perfect health. — “Black hole of Calcutta.” — Poisonous effects of impure air. — Consumption and its potent curative agent.

FRESH air has been termed the one mighty disinfectant. It is certainly its own best purifier, and no method of disinfection can be substituted for thorough ventilation. As all palpable poisons may be rendered harmless by dilution, so, too, may those unseen products of disease and harmful gases and miasms be so weakened by diffusion they are no longer capable of infecting man. It is a well-known fact that infectious diseases attack more often people of the poorer classes, and poverty has been in times past assigned as a potent cause. It is now believed that its influence has been overestimated. One intelligent observer even maintains that poverty in itself has nothing to do with the occurrence of infectious diseases; that luxury and density of population are the two bad spirits which conjure up the great

physical evils of humanity. He finds that the vagrant class, who have no homes, but sleep anywhere and get food anyhow, rarely contract contagious diseases, and more rarely convey them, and that, too, notwithstanding they wear cast-off and often infected clothing, and occupy the worst of lodging-houses. When epidemics occur, their full force is felt in the densely packed tenement houses, where the occupants are so shut up by walls that the pure air cannot freely circulate and dilute those poisonous gases which surround them.

Want of air is one of the principal factors of those cruel epidemics of typhus fever which occasionally occur. Rightly has it been called "a disease of the poor"; for, forced to live in confined lodgings, too rarely cleaned, disinfected, or whitewashed, it is there that the germs of disease find the conditions most favorable for their growth and development. While poverty of itself is not an exciting cause of infectious diseases, its influence as a predisposing condition cannot be denied, for poor food or an insufficiency of food so lowers the vitality of the system it is no longer able to resist disease: it invites, as it were, infection. While foul air is an important factor in the production of typhus fever, pure air is no less essential to the cure of that disease. In its treatment the rule is, even in midwinter, to open wide all

the windows, and in desperate cases even to remove the sashes. When pure air in sufficient quantity is administered to a patient, the effect upon him is quickly apparent; often his fever will decline rapidly, and the other symptoms present share in the improvement.

The value of pure air as a protection against infection is well illustrated by the following case, personally known to the writer: In the early part of the war of the rebellion, a United States gunboat entered New York harbor, with yellow fever on board. A large part of her crew and the majority of her officers lay between decks, sick and dying from that terrible disease. All the sufferers were at once removed to the hospital ship, and then, as soon as possible, followed the transfer of those who had escaped the scourge. To prevent transmitting the germs of the disease to their new quarters, the following cautious method was employed: All belonging to the ship were mustered on the fore-castle; then men from the quarantine station deposited bales of clothing on the quarter-deck. This clothing was heavily loaded with disinfectants. Those belonging to the ill-fated steamer, one after another, removed the clothes which they were wearing, and, leaving them at their feet, they walked aft in the garb of Adam; there they dressed in the clothes provided for them, and

then passed over the side into boats which were waiting to convey them to another steamer which lay at anchor several hundred yards distant. In this way every man left the ship. The means employed proved effectual; none of the germs of the disease were transmitted. Some four or five poor fellows showed symptoms of the disease within three or four days, and they were at once removed to the hospital ship. After that no new cases occurred, and some two weeks later the survivors were released from quarantine and allowed to enter New York. All this is somewhat foreign, as the instance sought as an illustration occurred after they had left what was afterward called the "death ship." It was necessary for several men to remain on board of her as guards, also to hail and warn off passing vessels which might run in too near her. Good wages were offered those who cared to assume the responsibility. Several men volunteered, and, if memory is not at fault, six returned to her. These men slung their hammocks in the rigging, and all intended to remain constantly on deck, in the open air, both night and day. All did so but one. He went below for something that was needed, but remained only a short time, however. Out of the number of guards, this man alone contracted the disease, and he died of the terrible black vomit. The others, although for days on the

deck of this ill-fated steamer filled with the germs of yellow fever, escaped infection, protected only by the pure air in which they lived.

In sunshine, nature has provided another powerful disinfectant, the inestimable value of which many fail to appreciate. Almost the first procedure on the part of some in cases of sickness is to darken the room; whereas, only in exceptional cases, such as inflammation of the brain or eye, is it necessary to do this. In all other diseases, light and sunshine should freely enter. The former is a healthy stimulus, and the latter is not only cheering in its influence, but is powerfully destructive to the germs of disease. "Where the sun does not enter, the doctor does," is an Italian proverb, and its truth is well established. Not only should sunshine enter every room, but all therein should frequently be brought within the influence of its strong rays. Especially is it important that all the clothes about beds be not only well aired, but, when possible, spread and exposed to strong sunlight, to combat the offensive emanations which they absorb from the body during sleep.

Not only are pure air and sunshine the surest protection against infectious diseases; they are also indispensable to the health and well-being. The story has often been told of the "black hole of

Calcutta." It was a room 18 feet square, and in it were confined 146 men. It had in it two small windows, and yet all but 23 of the occupants died. This case illustrates the immediate danger from the want of ventilation. If continually exposed to air even but slightly impure, its poisonous effects are soon evident, the general health is impaired, the body languishes, and all the vital powers share in the decay. Contrast the general appearance of the drivers and conductors of street cars and those men confined to counting-rooms. The former are not only employed 12 or 13 hours, at least, daily, but are exposed to the vicissitudes and inclemencies of the weather, while the latter, protected from all these hardships, rarely labor over eight or nine hours. Yet, in ill-ventilated enclosures, shut in from the sun and often from the light, these men grow old long before their time. They are more often the victims to acute diseases, such as pneumonia, bronchitis, etc., while the average out-of-door laborer rarely suffers from them. When prostrated with disease, the effect of the poisonous influences to which they have been subjected then becomes pronounced. Not only are they unable to resist disease, but also are they unable to rally from it as they ought; they lack, as it is termed, reparative force. Consumption is far less common among those inured

to exposure; pure air, to a very great extent, affords protection from that grave disease, and certainly when its symptoms once appear in a patient, pure air is the most potent curative agent, and without its influence the disease can never be arrested.



## CHAPTER IV.

Ventilation. — Purity of air must be maintained even at the expense of heat. — The baneful practice of many mothers. — How soon the air of an average-sized room may be made unhealthy by one occupant. — Death rate among the poorer classes. — Simple means of securing ventilation without draughts. — Catarrhal affections and their causes. — Consequences of neglect. — That feather-bed.

**I**N properly constructed houses, ventilation is, of course, easily secured during warm weather; but in winter, heat, to a certain extent, must be sacrificed for pure air. But comparatively few people are ready, however, to make this sacrifice, and, as a consequence, by far the larger number of houses are but indifferently ventilated. To the women, more often than to the men, this fault can be attributed. Too little in the open air, their blood becomes impoverished, and in a room comfortably warm for them the heat is absolutely insupportable for a healthy person. It is not at all uncommon to find persons who insist upon keeping their rooms at, or above, the temperature of 80° Fahr. As a natural consequence, these people are always ailing; colds

with them are constantly suffered from. The average mother, in her anxiety to protect her young children from the cold, will, nevertheless, slowly poison them with impure air. They can never understand, it would seem, that the "surest way to take cold is to keep too warm."

Without entering into an exhaustive discussion of the subject of ventilation, in a general way it may be said, that if a room ten by twelve feet, and with a ceiling eight feet high, is occupied by one person only, to keep the air in that room healthy, it must be all changed about four times every hour. It might also be said that every sleeping-apartment should be of the size stated, and, even then, but one person should occupy it. It must be remembered that the amount of fresh air which should be supplied a child in health is only one-third less than that demanded by the mother. In the former, the tissue change is greater, and hence more pure air in proportion is needed. When it is considered that families of four or five, or even more, are often lodged in two or three rooms, and sometimes in one room, there is no reason to marvel at the high death rate among the poorer classes.

The public generally can have but a vague idea how a certain class of people live. Within a few months the writer attended two children ill with

diphtheria, under conditions which were no worse than many others in this city. The family consisted of the father, mother, and the two children in question. Their living quarters consisted of one room eight by ten feet square. In this they ate and slept, the one bed serving for all. In a basement kitchen, three flights below, the mother said that she did her cooking, but her statement was not believed because of the too evident contradictory signs apparent in the room first mentioned. Diphtheria attacked the oldest child first, and there, night after night, these people breathed over and over again the poisoned air in that little space. Not only that, but the room was constantly overheated by a large cylinder stove, and a kerosene lamp, turned low, burned all night. The mother said she was afraid to open the windows for fear the baby would take cold. No amount of urging would persuade her to properly ventilate her quarters, and finally, when told that she must seek another physician if she disobeyed again, she promised faithfully to correct the fault. She had proved herself so unreliable her word could not be believed, and, therefore, a visit was made one morning shortly after daylight. Entrance into the house was easily effected, and then noiselessly the stairs were climbed and the door of her apartment opened. The stench that issued was a terrible one, and as the writer

encountered it there came to his mind an expression he once heard in his boyhood. An old lady attempting to describe a certain odor, said, "It was strong enough to knock you down." It must have been very much like that which filled the room in question. Not a window was open; the curtains were drawn; there was a brisk fire burning in the stove, the door of which was opened, and the lamp still flickered. The smell was indescribable — it partook of fetid breath, coal gas, kerosene oil, and other odors which emanate from unclean bodies. All were asleep; the father, mother and baby lay side by side at the head of the bed, while at the foot, with her feet pointing toward the faces of the others, there slept the little girl ill with diphtheria. The reader may be assured that the parents were awakened suddenly and completely also; that interview they are not likely to soon forget. The older child recovered, but the younger, which, as might naturally be supposed, was attacked with the malady, died after a few days' illness.

Very likely this will draw out the comment so often heard, "Such people should not have children"; unfortunately, they are of the class that have by far the largest number. Why they were living as they did no earthly reason can be given. The father earned \$14 a week, and was temperate, and

had steady employment. The only solution is—they were ignorant, and one might as well talk to the winds as to attempt to teach them anything; the result would be equally as unsatisfactory. Not only is the case described not an unusual one, but it is even, indeed, mild compared to many which physicians encounter.

Returning to the subject of heat and ventilation, on the wall of every room in which there is a fire continuously there should hang a thermometer. By this the temperature should be regulated, and  $68^{\circ}$  and  $70^{\circ}$  are the limits. Never have a room heated above  $70^{\circ}$ . If that is not warm enough for the occupant, he or she, as the case may be, should put on wraps and take a brisk walk in the open air; when they return the room will be even too warm for comfort. In ventilating a room, draughts should be avoided. When the windows are opened, direct the cold air to the ceiling. To do so, have a wide board screwed to the face of the casing at the bottom. By this means the air as it enters is deflected upward. If the adjustment is too unsightly, take a strip of wood two or three inches wide and as long as the sash. Tack a strip of felt or one or two thicknesses of flannel on the edge of the narrow piece of board, which is to come uppermost; then raise the window, put in the board, and shut the sash on to it.

By this means no air can enter at the bottom of the window, but it can pass in freely between the sashes at the middle, and the top of the lower one will deflect it toward the ceiling. In inclement or intensely cold weather it may not be advisable to open the windows; then ventilation can be secured through the aid of an adjoining room. Open the windows of that room, close all the doors, and leave it until the air within is entirely changed; then return and close the windows. From this room the pure air can be admitted gradually.

Into every sleeping-room pure air should enter from out of doors during the night. If this rule were observed, colds, coughs, and catarrhal affections would be far less common. When there is but one window in the apartment, it should be opened slightly, at least, at the top and bottom, to allow the air to circulate, the pure expelling, as it were, that which has become foul. When windows can be opened on opposite sides of the room, good ventilation can be secured. If people suffer from the cold with the windows opened, they should add more blankets to the bed-clothing.

How few there are who observe these simple rules of health! No small number of people call into service, winter after winter, that same old feather-bed, which, very likely, supported their grandparents.

It is generally loaded with the emanations which generations have exhaled in sickness and in health ; it matters little, however, for the older it is, the more hallowed its memories, and the greater its value in the eyes of its possessor. Stowed away in a musty garret all summer, in early fall it is put into use, and only discarded late in the spring. The people who are wedded to this most abominable and health-destroying article of bedding are those who can never be persuaded to sleep with their windows open. The consequence is, and no wonder, they tell of having horrid dreams, and of waking in the morning tired rather than refreshed. They are never well ; in fact, are always complaining, and always will have reason to complain until a little sterling sense can be incorporated into them.



## CHAPTER V.

Heating. — Open grates inadequate. — Serious defects in the usual heating-appliances. — Cast-iron furnaces unfit for use. — A large furnace and moderate fire. — Fresh and pure air only for the air-chamber. — Dry air unhealthy. — Cold-air box. — Its situation and construction. — The management of stoves and furnaces. — Dangers from cracks and imperfect joints.

CONSIDERING the manner in which the average modern house is constructed, how to heat it properly, and yet secure needed ventilation, is a problem by no means easily solved. The primitive blazing wood fire, with logs heaped in the chimney-places, is a thing of the past, displaced for convenience and economy by man's ingenuity. Small open grates for the burning of coal are now in use, principally, however, among the rich; but they are the least economical of all methods of heating, and rarely prove adequate, owing to the fact that they affect but little more than those parts of the room which are in front of them, or nearly so. Heat from grates diminishes in proportion to the square of the distance; hence, at the distance of ten feet from the fire it is one hundred times less than at a distance of one foot.

It has also been proven that from an open-grate fire, as grates are usually constructed, seven-eighths of its heat is lost in the chimney. Therefore, when fire-places are in use, other means of heating must necessarily, as a rule, be combined.

The most healthy methods of heating a house are those in which the fresh air is passed over moderately heated surfaces and conducted into the different apartments. On this principle, furnaces are constructed; but, unfortunately, many are exceedingly faulty. For reasons which will be given anon those made of cast iron are unfit for use. Again, very frequently, too small, rather than too large, furnaces, in proportion to the house, are in use, and it is necessary to push the fire to supply sufficient heat to the rooms depending upon them. It is generally accepted that furnaces should not be heated above  $150^{\circ}$ ; whereas, in nearly all, in very cold weather at least, they are pushed to a much higher degree. The consequence is, the hot air from them is baked or burned, and has an unpleasant odor: it also causes an uncomfortable feeling in the inmates. To obviate this, the furnace should be so large a moderate fire will warm sufficient air to supply the need and keep the house heated to a comfortable degree.

The air which supplies the air-chamber of a furnace should be fresh and pure, and come directly from out

of doors. There are still in use many old-fashioned furnaces which are supplied with air from the cellar. They cannot be too strongly condemned; for, even under the best of conditions, the air from that source must be more or less impure, and in very many cellars the atmosphere is very bad indeed. Again, the air warmed by these furnaces is very dry, and therefore unhealthy. A certain amount of moisture in the air is an absolute essential, and water should always be kept in the air-chamber of a furnace so as to evaporate constantly. It is generally accepted that if the air with which a furnace is supplied comes from out of doors, that is all sufficient, and the cold-air box is, therefore, rarely extended beyond the cellar wall. The air from so near the surface of the ground, in certain kinds of weather, at least, may be unhealthy; the supply-box should, therefore, extend upward, on the outside of the house, five or six feet at least, and the top should be provided with a cowl which can be moved at will. This should be changed as the direction of the wind changes, to assist in creating a strong current down the flue.

It has already been said that furnaces constructed of cast iron are more or less dangerous. It has been proved that carbonic oxide gas readily passes through cast iron when it is heated to redness; as a result, the air in close rooms at once becomes more or less

poisonous if the stoves or furnaces which warm them are made red hot. A crack in the top of a stove is rarely considered by many of very much consequence; few, indeed, can be persuaded that it is unfit for use, which is actually the case. Regarding the management of stoves and furnaces, says one writer, in order that we may avoid the evil results of this poisonous gas, we should see that the castings are perfect, with as few joints as possible, and these perfectly cemented, and should not allow the iron to be heated to redness. The heat is retained and given off slowly by having the firepot laid with fire-bricks, thus avoiding any necessity for allowing the iron to become red hot. If we close the smoke-pipe with a damper, in order to economize fuel, we prevent the escape by the chimney of whatever carbonic oxide may have accumulated over the fuel, and favor its escaping through the heated iron, through imperfectly fitting joints, a possible crack or flaw in the iron, or a loosely fitting door; and if we shut off the supply of air, we deprive the fuel of the necessary amount of oxygen to insure complete combustion, and favor the accumulation of carbonic oxide gas, thus laying the foundation for future ill health, the inevitable consequence of breathing an atmosphere contaminated with the treacherous poison.



## CHAPTER VI.

Heating continued. — System of steam. — By hot-water pipes. — The most perfect method of heating. — How a pure and even temperature may be obtained. — The plan advised by an American architect. — Every part of a house should be equally warmed. — Cold currents along the floors. — Faults which are not uncommon. — Double windows. — Movable panes in storm windows necessary.

AS a general rule, air heated by steam or hot-water pipes is healthier than that which is supplied by furnaces. A more uniform warmth is also diffused throughout the building. The system of steam heating has serious disadvantages, however; leakings are quite frequent, and the expense of maintaining it is measurably greater than the hot-water-pipe system. People whose rooms are heated with either of these methods are even more inclined to neglect ventilation than those who use furnaces. Again, the air of a room heated by a steam register is not, as many imply, necessarily sufficiently moist. By reason of its dryness, unless perfect ventilation is insured, it is oppressive, and not infrequently headaches and other uncomfortable symptoms are caused by it.

It is generally accepted that the most perfect method of heating a house is to heat the floors and walls. Several years ago the *Boston Medical and Surgical Journal* told of an attempt to solve the difficult problem of house heating, as described in the *Lancet*. It said: "The house in question is the property of Dr. Hogg, of Bedford Park, Chiswick. In it no window can open, and there is no fireplace, except in the kitchen. Underneath the hall a large passage is used as a receiver of fresh air, where it can be cooled in summer by ice, while in winter it is warmed by hot steam pipes, heated by a small coke stove. The air then passes up into the hall through an iron trellis-work, and travels into every room by apertures made in the skirtings and cornices. In the ceiling of each room there are openings into exhaust-shafts which lead to the foul-air chamber in the roof of the house. A large shaft runs from the foul-air chamber down to the back of the kitchen fire, where the heat of the boiler and the fire suffices to attract the air, and a square brick shaft or chimney conveys it through the roof into the open air. In the centre of this shaft is a circular metallic flue, which carries away the smoke of the kitchen fire, and this flue, always more or less heated, stimulates the current. A comparison of the minimum velocity of the air in the extracting flues with the cubic contents of the

house shows that the atmosphere is entirely changed throughout the dwelling once in every twenty minutes. This result is obtained without the slightest draught, yet ten persons smoking in one room felt no inconvenience, and next morning there was not the slightest trace or taint of tobacco odor remaining—a test which will endear the system to every house-keeper. Every part of the house being equally warm, all danger of catching cold from draughty corridors, chilly bed or bath rooms is obviated. A nurse and three children sleep in one room measuring fourteen feet square by ten feet high. The system works so well during the night that in the morning the room is not at all “stuffy,” but is quite sweet and clean. Dust and dirt are reduced to a minimum, and two domestics do the work for which three were formerly required. In coal, the cost has been reduced to one-third, though the whole house is warmed, instead of a few rooms. The temperature is easily modified, and remains the same throughout the whole house—an exceedingly important result for invalids and people of delicate constitutions.”

One of America's best known architects has advised that the cellar of a house be used for no other purpose than as an air-chamber. This he would heat with a portable furnace or large stove, and by openings in the floors of the rooms above,

conduct the warm air into them. He would have the walls hollow, that the warm air might find its way into the upper stories between the ceilings and floors. By keeping the air of the cellar fresh and pure, he considers that this system of heating would be far preferable to those ordinarily in use.

When a house is supplied with furnace heat, it is especially necessary that the hall or entry also be well warmed; otherwise the cold air from it finds an entrance under the doors to the occupied apartments. This cold current along the floor is not alone a source of considerable discomfort, but it is also prejudicial to health. If only the living-rooms are heated, owing to the entrance of air as described, there will be from ten to twenty degrees difference between the temperature just above the floor and the height of a person's head when standing, and the occupants are likely to have cold feet and lower limbs, while the upper part of the body and head are overheated—a condition which is certainly the reverse of what ought to exist; that is, if there must be a difference. In a room, when properly warmed, the thermometer should exhibit near the same degree of temperature in all parts of it.

Unless carefully sealed up, more or less air will enter through the crevices of the windows, in the front of which will be felt a cold current of air.

This same current, or draught, will appear to exist even if no cold air enters from the outside ; it is a downward current of air within, cooled by contact with the glass. This often causes no little discomfort in much occupied sitting-rooms ; it can be obviated by using double windows. If the outer or "storm windows" are constructed with a movable pane to assist in ventilation, they cannot only do no harm, but will add much to the comfort of the inmates.



## CHAPTER VII.

Grave dangers from escaping coal gas. — An agent ever to be dreaded. — The immediate effects of the poison. — Slow poisoning often attributed to other causes. — Sad cases to illustrate the deadly nature of coal gas. — Economizing fuel at the expense of health. — Look well to back dampers. — Safety demands constant watchfulness.

VERY few persons appreciate the danger of coal gas. Among the symptoms which it produces are severe headache, giddiness, and unconsciousness. Not unfrequently death has been caused by it. One writer tells of an instance which happened in a public school. A lady teacher, sitting at her desk on a raised platform, observed that some of her youngest pupils were nodding, and shortly after several of them fell over on to the floor. On bench after bench they were overcome, when her presence of mind sufficed to get the windows open, and to have the children carried to another room, where they revived. The cause of the trouble was an obstructed and leaky stovepipe, through which gas had been slowly escaping into the room and stealing their lives away, first acting upon the smaller scholars, breathing the air

nearest the floor. Many a time, says this observer, without any such alarming immediate effects, gas from imperfect furnace flues in our city houses produces headache, general discomfort and debility, often ascribed to some other imaginary cause. It is quite necessary that the box or tube which admits air into the air-chamber shall be so tight that gas cannot be drawn into it when the upper door of the furnace is open. If the draught be imperfect, there may be, especially when fresh coal is put on, an escape of gas into the cellar. This possibility adds emphasis to the reasons for having, not the cellar, but the open air, to give the supply to the air-chamber for the house.

Some years ago, in the Highland District of Boston, three men were quartered in a small room which was warmed by a cylinder stove of the most primitive construction. One bitter cold night they filled this with coal, and, after it had begun to burn freely, partially removed the single cover from the top, that the fire might "keep" all night. Soon afterward they fell asleep, and not arising as early as was their wont, one of the other tenants in the house entered their room to awaken them. This he found impossible to do, and, becoming alarmed, a physician was summoned. They were at once removed to the hospital; there one died, a victim to coal gas, but the other two recovered after a long illness.

The daily press have recently told of another unfortunate, who, it is supposed, after shutting up his place of business late at night, had put on fresh coal and neglected to replace the cover. "While counting over some bills he must have dozed, when the effects of the gas told upon him. He was discovered near a window in the rear of the shop in a standing posture, where he had dragged himself, and where it is thought that he died." Only those who have narrowly escaped death from this terrible agent can realize how this unfortunate victim must have suffered before he became unconscious.

It is now many years since the writer met with an experience which taught him to be ever on his guard against coal gas. His quarters were then a small cabin, heated by a cylinder stove of an antique pattern. While soundly asleep in his berth, the night being very cold, his associate then on watch came below, chilled and shivering. Thoughtlessly he closed the "ports," which had been left open for ventilation, and then filled up the stove with coal. Shortly afterward he was called on deck, but before leaving the cabin he partly removed the single cover on the top of the stove, the usual means employed to control the draught. Part of the coal only had been lighted, and soon the gas from it filled the little space. The sleeper, sometime after, awoke or partly

recovered consciousness, sufficiently to realize that he was suffocating. What influence aroused him he never knew; certainly it was to him Heaven-sent. It seemed as though a heavy weight was crushing in his chest; his brain whirled, and sight had nearly left him. For a moment he lay powerless, his sufferings rapidly growing less; seeming to fully realize his danger he put forth what little strength was left him and rolled himself from his berth. The shock of the fall upon the hard floor tended to arouse him still further, and he managed to crawl to the cabin door leading between decks, dash it open, and the little strength then remaining left him, and he fell unconscious, but in pure air.

Good ventilation necessarily demands increased consumption of fuel, but it will save doctors' bills and also insure a longer, healthier, and happier life. Of the utmost importance is it, that those who have the management of stoves and furnaces be ever on their guard against the deadly agent, the effects of which have just been described.

No one should ever remain in a closed room where there is a smell of coal gas. At once the draught should be regulated, and the doors and windows opened, and not again closed until the air within has been entirely renewed.



## CHAPTER VIII.

Overheated apartments. — Poor ventilation commonly an associate evil. — Tenement houses. — How many people live. — Keep children out of the kitchen. — The baneful effects upon them of excessive heat. — The grievous faults of some mothers. — The health of their little ones ruined by wanton neglect. — The nursery. — Its temperature. — Ventilation. — Necessary precautions.

WHILE not necessarily so, yet, as a rule, overheated rooms are poorly ventilated, and thus two pernicious influences are combined. Almost without exception, tenement houses in large cities are of faulty construction, and the occupants are crowded into much too small spaces, which it is next to impossible to properly ventilate. Even people in moderate circumstances, if there are no more than three or four persons in the family, are usually quite content with four or five rooms; and, among the poor, a smaller number of rooms often suffices for much larger families. When the mother “does her own work,” the kitchen is the living-room during the day, if not in all waking hours. Here her children are quartered, as it is much less trouble for

her to care for them than it would be were they in adjoining rooms. Again, very often, she feels that she cannot afford more than one fire. At all seasons of the year these children are more or less exposed to the excessive heat of the cooking-stove. During the warm months its effects are less sorely felt, for the doors and windows may be kept opened, and those who are old enough to be out of doors usually pass much of their time in the open air. The smallest children must, however, remain constantly under the watchful eye of the mother; and, as a consequence, attacks of the so-called "summer complaint" are frequent among them. The first "cold spell" of winter generally finds the children of families situated as described huddled around the kitchen stove. Their blood, naturally poor, soon becomes more impoverished, and they only feel comfortably warm when the temperature of the room is between 80° and 90°. If they have occasion to answer the door bell, or enter an adjoining cold room, they return chilled and shivering. The mother will occasionally have a spasm of good judgment and insist that her children go out of doors and play with their more hardy mates. The healthy winter-sports they do not enjoy, however; they suffer from the cold, and have too little energy to exercise and keep warm. Their absence from the house is, therefore, usually a brief

one ; and as the mother is generally "as sensitive to the cold" as are her little ones, she has not the heart to force them to remain out when she feels that they suffer by so doing. Soon she has reason to complain that "they are sick all the time, and she cannot, for the life of her, see what makes them so." Colds, coughs, and catarrhal affections are common, and yet how they take cold she cannot understand, "because they are never out," as she says.

Outwardly, children such as those described are pale, thin, and poor in blood. It is interesting to consider some of the ill effects of the excessive heat to which they are subjected. The appetite is lessened, and digestion is impaired. The skin is more active than under the usual conditions of health, and hence eruptive disorders are not uncommon. The kidneys are less active, and the waste materials which they are intended to expel from the body are, to a greater or less extent, retained in the system. The effects of the heat on the nervous system are depressing and exhausting, both mentally and physically ; the children are disinclined to make much effort, and instead of being light, cheerful, and happy, they are inclined to be dull, fretful, and constantly complaining of trifling annoyances. It is almost needless to say that children should not be allowed to make the kitchen their play-room. Espe-

cially should they be excluded from it while the meals are being prepared, or other work is being done by the mother which requires her to keep a "hot fire."

Of all the rooms in the house, the one allotted to the children should be the brightest and sunniest, and the temperature should never be allowed to go above 70°, and if kept at 68°, it will be still better for them. Free ventilation is, of course, to be insisted upon, and in stormy weather fresh air should enter from an adjoining room. The main hall or entry, with which the living-rooms are connected, should be kept warm, so that the doors of the latter may be opened without admitting currents of cold air.



## CHAPTER IX.

The kitchen and dining-room. — Why they should be uncarpeted. — Wall-papers generally inimical to health. — The development of germs. — A thorough spring cleaning. — Repairing. — Never put new paper over old. — A common fault to be avoided. — Why some houses are unhealthy. — Neglect invites disease. — To make home healthy have due regard for seeming trifles.

**O**CCASIONALLY one notes a carpeted kitchen floor, — an evidence that sanitary laws are made subordinate to convenience. The carpeting is commonly the oil-cloth, and between it and the floor germs of disease are allowed to accumulate. When housekeepers who insist upon using these carpetings are remonstrated with, their excuse is that it is easier to keep an oil-cloth clean than it is the bare floor. In other words, they are reconciled to dirt as long as it does not show. When their carpets are washed, as they usually are, too much water being used, the floor beneath becomes more or less damp, and dries somewhat slowly. This dampness favors the development of the germs harbored there.

People will insist upon carpeting their dining-rooms, especially in winter, as they are undoubt-

edly made warmer by doing so. It would be far healthier if they would discard all floor coverings excepting mats or rugs. Dining-room carpets receive many particles of food from the table. These are ground up by the feet, and then, carried about in the air, attach themselves to woollen and cotton textures of every kind. The steam which rises from the food also is absorbed by everything in the room capable of taking up moisture. Here are conditions exceedingly favorable for the growth and development of germs. Therefore it is advised that dining-room floors be uncarpeted, and mats, so small that they can be easily removed and shaken and aired every day, be substituted.

It should not be forgotten that wall-paper absorbs the moisture from steaming foods and other vapors, and becomes the lodging place for germs. Wall-papers are inimical to health, in all but the largest and best aired rooms. If in use, they ought, therefore, to be occasionally replaced. If it is done every spring, it will be none too often, and under no conditions should the new paper be put on over the old. The latter should be entirely removed, and the walls washed; for old paste, it is believed, undergoes decomposing changes, and promotes the growth of germs. Not only should the rooms of a house be frequently repapered; the ceilings should also be

whitewashed and the wood-work repainted. Unless it is done from time to time, even this neglect alone will be sufficient to render the house unhealthy.

Recently the writer visited a boy of six years, living with his grandparents on one of Boston's eminently respectable streets, the residents of which felt no little pride in the fact that business had not as yet invaded their sacred presence. The child in question proved to be suffering from a chronic catarrhal trouble. His tonsils were enormously enlarged; there was some cough; he was thin and pale, and listless in his manner. He had but little appetite, complained of being tired, and was also nervous and peevish. This boy had never been well since he had lived in that house. At different times, for several months, he was quartered elsewhere, and the change had always proved salutary; recovery took place rapidly, and he continued well until he returned to the home of his grandparents; then the old troubles were renewed. There was every reason to believe that the fault existed in the house, for the child's general management was good. The plumbing had been carefully inspected, and no trouble appeared there. By a careful observer, the reason why this house was unhealthy could not be overlooked. As one entered the main hall, a peculiar odor was at once detected. It could not be called musty, yet it

was of that character. Everything in sight bore an air of antiquity. The paper on the walls had seen some ten or fifteen, and possibly twenty, years' service. The ceilings had a yellowish tint, and here and there were streaked by time. The paint was well worn, and must have been about the same age as the paper. Inquiry elicited the fact that all the other members of this family were more or less ailing; none enjoyed good health. The house was infected with germs; doubtless every nook and crevice swarmed with them. They were nourished by the inmates, who seemed utterly unconscious of their unhealthy surroundings. The house was so constructed it was difficult to ventilate it properly; and pure air being denied, there was no reason to marvel at the ailing condition of the occupants.

The advice given those people was, to either vacate their house, or to paint, paper, and whitewash every room between the cellar and the roof; to remove every carpet, tapestry hanging, etc., and have them thoroughly cleaned and aired. In fact, to renovate not only the inside of the house, but its entire furniture and belongings. This matter of papering, painting, and whitewashing may seem very trifling as methods of treatment in such cases, yet it is by no means unimportant. It is for these seeming trifles that all must have due regard, if they expect to keep their homes healthy.



## CHAPTER X.

Sleeping-rooms. — The temperature to depend upon the health of the occupant. — The indispensable sponge-bath. — Ventilation. — Deadly coal gas in the sleeping-apartment. — Kerosene oil and illuminating gas. — Pernicious effects of a lamp burned low. — Cleanliness here as everywhere imperative. — Gas fixtures. — Purity of air. — Carpets. — Substitutes by far healthier.

**A**DULTS in remarkably good health should in winter always sleep in cold rooms; that is, made cold by opening the windows sufficiently to insure needed ventilation. As a general rule, however, a fire should be kept burning in the sleeping-apartment, or the heating-arrangements should be such that it can be warmed before retiring, and in the morning while dressing. Young people of rich, pure blood and strong reactive powers might dress and undress in a cold room; but for others, and older people, it is a hardship which should, if possible, be escaped. Again, every night or morning all persons who can do so safely should take a cold sponge-bath, and, unless the room at the time is comfortably heated, the temptation to omit this very important duty is generally too strong to be resisted.

In constructing a house, it is not too much to say that fireplaces should be provided in all sleeping-rooms, as, beside a means of heating, they are the most efficient ventilators. They afford sufficient heat in cold weather, and during the summer months can be converted into ventilating shafts by the simple means described by Carl Pfeiffer. A gas-burner may be put in the smoke-flue to induce a current of heat. The gas-burner may be made accessible by cutting an opening in the chimney-breast above the mantel, and the opening may be covered by a hinged picture, answering as a door to the opening. Instead of an ordinary painted picture, it may be stained glass, or a glass or porcelain transparent picture.

Unfortunately, fireplaces are now but rarely provided in modern houses, and in those in which they once existed they are now but little used, being in many instances "bricked up" for the substitution of stoves. Here, again, is encountered that inevitable plea — economy — which for many is all-powerful, and those who advance it, no amount of argument can ever convince that a policy of living established on such a basis is not only insecure, but extremely unwise and often fatal.

While coal gas is ever to be dreaded, it is yet the most dangerous in a sleeping-apartment; therefore every precaution should be taken to prevent its

escape, and the damper in the stovepipe, which is so often closed to economize fuel, should be sufficiently open to afford it a free passage into the chimneys.

Very many houses are lighted by gas, but, in as many more, kerosene oil is used for the same purpose. Excepting in cases of sickness, a lamp should never be allowed to burn all night in the sleeping-apartment. Those who have small children, and who feel obliged to have a lamp burning, should keep it in an unoccupied room, and well ventilated as well. The habit which many have of allowing the lamp to burn low in their sleeping-rooms is a most atrocious and pernicious one, and should never be indulged in.

Diphtheria recently prevailed quite extensively in some places in the State of Connecticut, and it appears that some physicians suspected that the disease was caused by the burning of kerosene oil. This is a new theory of causation, and can hardly be sustained. It is a fact, however, that when the oil is burned in a close room insufficiently ventilated, it is productive of catarrhal disorders of the nasal and other air-passages, and sore throat may not infrequently be attributed to it. Kerosene oil may, therefore, be a predisposing cause; that is, it may create a condition favorable for the reception of the disease germ, the active cause, but there is no reason to believe that in itself it is capable of producing diphtheria.

Many among the poor think it is economy to buy the cheaper grades of the oil in question, as thereby they are able to save a few pennies a gallon. They had much better practise the policy in some of their other expenditures, in which the question of health does not enter. Kerosene oil may not improperly be considered a noxious agent when at its best, and the poorer grades are by far the most harmful. Kerosene lamps, if slovenly kept and allowed to become foul, are a perfect abomination. The oil should be frequently poured from them, and a thorough cleaning in strong soapsuds follow. The wick should be accurately trimmed every day, and a new one will be needed often. The custom so common in Europe of retiring by the light of candles is one which recommends itself, especially to those who now use kerosene lamps, as the strong odor of the oil, even when the lamps are out, certainly cannot contribute to health.

Those who use gas ought to look well to their fixtures, that no leakage exists. When there is much escape of gas, the fact is, of course, at once apparent ; but trifling leaks often remain undiscovered, and are, therefore, of more importance. In fact, the sleeping-room should be free from all odors, and the air kept absolutely fresh and pure. No utensil should be allowed in it which in the slightest degree affects the purity of the air.

Properly, the floor of the sleeping-room should be uncarpeted. Here, again, is encountered a prejudice too strong, it is feared, to be overcome. Carpets harbor a vast amount of dust and organic matter which is inimical to health, and which no amount of sweeping can overcome or remove. Hard wood, polished floors, which can be frequently and easily cleaned, are, of course, to be preferred, and they can be covered with small mats or rugs, which can be shaken every morning, and exposed to the air and sunlight. The ordinary pine floor, if stained or painted, need not be unsightly, and if people cannot afford costly rugs, they can at least make mats out of carpet remnants which will answer every purpose. Those who insist upon using carpets should be content with the straw matting.



## CHAPTER XI.

Sleeping-rooms continued. — Grievous faults in modern houses. — The furnishings of sleeping-apartments. — Rigid simplicity advised. — Bedsteads. — Mattresses. — Feather-beds absolutely forbidden. — Springs. — Bed-clothing. — Offensive coverings in use. — Pillows. — Night-dresses. — Underclothing for night wear. — Ventilation. — Plants render the air impure at night. — Not to be permitted in sleeping-rooms.

**I**T is a fault plainly apparent in modern architecture, that the importance of sleeping-rooms is not properly estimated in nearly all houses; they are small and have very low ceilings. The hand of fashion and the promptings of vanity are painfully evident; a room merely large enough to admit a bed is too often thought quite sufficient as a sleeping-apartment, in use so many hours daily, while the more desirable rooms, rarely entered, are set apart solely for display.

The bedrooms should be large and airy, pleasantly situated, and accessible to the sunlight. They should be furnished with those articles only which are indispensable. Pictures and other ornaments permit the accumulation of dust, and therefore may properly be dispensed with. In none of the domes-

tic arrangements is good taste so easily recognized as in the sleeping-apartments. Gaudy furnishings may well be displaced by rigid simplicity. A bedstead movable and easily disjointed is most suitable. If made of brass or iron, rather than wood, it is to be preferred. Those large, lumbering affairs in common use are poor substitutes for the simpler and more convenient, but possibly less stylish, bedsteads found serviceable generations ago. The gaudy ornamentations of the present day invite the lodgment of dust, and, if the housekeeper is neat, they add not a little to her domestic burdens. Fortunately bed curtains are now rarely in use; they are objectionable, as by them a free circulation of air in the room is interfered with.

An elastic hair mattress is, of course, to be chosen if one can afford it. In selecting the cheaper varieties of mattresses, the firm and somewhat compact are the most suitable, as they offer a more even support for the body. Bed springs are now deservedly popular; they are a source of comfort, and if properly constructed, may wisely be employed. The weight of the body should be evenly distributed, without undue strain upon any one part or spring; those made of woven wire are said to excel in utility and durability.

For bed-clothing in the winter time knitted cover-

let and blankets are much to be preferred. The so-called "comfortable" of quilted cotton is altogether too heavy, and often causes excessive perspiration; and in consequence of it not infrequently headache is induced. A blanket under the lower sheet, between it and the mattress, contributes greatly to comfort.

Pillows filled with hair are preferable to others. Feather pillows, like feather beds, too readily absorb impurities, are not easily cleaned, and are, therefore, highly objectionable. In size, the pillows should be large enough to sustain the head slightly above the level of the body; when raised too high, circulation through the neck is interfered with, and unpleasant dreams are some of the consequences.

Those in good health should wear night-dresses made of cotton; for winter use the so-called "cotton flannel" is the most comfortable. The night-dress should be long, loosely fitting, and button easily about the neck. It is important to remember that for those who sleep in a cold room, the undervest for night wear should be as heavy and as warm as that employed during the day. It is an absurd custom for one who wears woollen underclothes during the day to remove them on retiring and sleep in their night dresses of linen or cotton. They may have done this for a time with impunity, but there is always more or less danger in it.

As one writer has aptly said : We live on air as much as, if not more than, upon food, and stale or contaminated air is capable of poisoning us as readily as deadly drinks or unwholesome viands. But it must be remembered that air is rendered unfit for breathing, not only by the action of human and animal respiration, but by that also of plants, at night, and especially, by the burning of lights, whether candles, gas, or lamps. Flowers breathe like animals ; they abstract oxygen from the atmosphere and give out carbonic acid gas, differing in this respect from foliaceous trees and shrubs, the green leaves of which, under the action of daylight, act inversely, withdrawing carbonic acid gas, and returning oxygen in its stead. For this reason, among others, forests are very invigorating and refreshing retreats during the daytime ; the trees not only afford a pleasant shade, but actually purify the atmosphere and exhilarate the nervous system of the wayfarer. At night, however, the proximity of green plants is not so beneficial, and it is therefore inadvisable to keep them in the bedrooms.



## CHAPTER XII.

Bathrooms and sleeping-apartments. — They should never be connected. — Seal up the doors between them if any exist. — Dangers in sewer gas. — Some of the diseases induced by it. — A common cause of chronic catarrh. — A sad case illustrating its insidious effects. — Deafness the frequent result of bad drainage and sewer gas.

**I**N many houses one or more sleeping-rooms adjoin and are connected with bathrooms. Even if every sanitary precaution is taken and the most approved system of drainage is introduced, there is still danger from sewer gas. It is scarcely too much to say that the partitions between the sleeping-apartments and bathrooms should be thick and impenetrable. The baneful influence of this noxious agent cannot be overestimated. It is the most potent factor in the production of infectious disease, and there is no constitution so strong that it will not eventually yield to its destructive power. In all old city houses the only safe method to employ where the sleeping-apartments connect with the bathrooms, is to seal up the doors between them ; for, considering how easily the plumbing becomes defective, danger is always in lurk.

Among the many diseases induced by sewer gas, chronic catarrh of the throat and nasal passages is one of the most common, and that affection may not improperly be considered one of the penalties of city life. Very rarely indeed is it complained of by people of the country, and, when once acquired by residence in the city, a removal to the country is the most certain means of effecting a cure. In fact, no treatment which can be employed is likely to prove successful unless change of air is sought.

From chronic nasal catarrh and catarrhal deafness there is no wide division — every case of the former is liable to develop into one of the latter. When catarrh is developed by sewer gas, it is even more liable to eventuate in deafness than it is when favored by occupations such as wood-turning, milling, cigar-making, etc., in which the atmosphere is dry and dusty, or is the result of continued exposure.

One case is recalled which illustrates the dangers and the course of this affection. Some ten years ago a gentleman well known to the writer lived in a fashionable quarter of the city, in a house built some fifteen years previous. Before moving into it, the sanitary condition was carefully considered; in fact, the most ample repairs had been made, and especially had the plumbing been closely inspected. His sleeping-apartment adjoined the bathroom, which seemed

singularly free from all offensive odors. Not long after entering his new quarters, his health, which had been previously exceedingly good, began to suffer impairment, and catarrhal symptoms commenced. These were at first barely more than a slight "stiffness," respiration through the nose being at times somewhat difficult. Soon, thick, tenacious mucus collected in the nostrils, and severe fits of coughing were induced every morning by the accumulations in the upper part of the throat. The uvula, popularly termed the "palate," became lengthened, and soon excited a constant "hawking," which intensified the inflammation in the throat. A specialist was consulted, and he removed a portion of the offending part, but only temporary relief was afforded. Another advised inhalations of tannin and similar agents, together with the use of the nasal douche, but all to no purpose. No permanent benefit resulted. After a time his hearing power became impaired. The deafness stole on insidiously, and progressed relentlessly. The most eminent aurists in the city were sought, and the treatment of one after another faithfully tried, with the same result, however, in all instances. The terrible loss of hearing power was not even retarded. At last his suspicions were excited, and he changed his sleeping-apartment for one in the attic, and then for the first time he noted that the progress of his

affection was arrested. As no improvement took place, he wisely removed to the suburbs of the city, and, discontinuing all treatment, trusted solely to pure air to effect relief. After leaving the house in the city, thorough repairs were made, and on inspecting the plumbing there was found an imperfect joint in the waste-pipe which permitted the easy access of sewer gas into the house, and especially into the bathroom.

This is no isolated case; in fact, similar cases which have been, with reasonable certainty, traced to the same cause, are not uncommon. It is interesting to note that in the instance used as an illustration, the unfortunate, under his changed and favorable conditions, recovered entirely from catarrh, and regained his general health; but his deafness, while somewhat improved, still exists, and there is no reason to hope that the infirmity can ever be overcome.



## CHAPTER XIII.

Water-closets. — Common faults in the construction of houses. — An important duty which householders owe to themselves and families. — Determine if the drainage is defective. — How the peppermint test may be applied. — Ventilating water-closets. — Routine duties to insure perfect cleanliness. — Disinfection. — Preventive measure which all should employ. — Constant vigilance the price of safety.

THE internal arrangement of some of the houses in large cities would indicate that those who constructed, or rather designed, them, were entirely ignorant of the laws of sanitation. Every bathroom containing a water-closet should be so arranged that it can be constantly ventilated by air from out of doors. While it is possible to ventilate many in that way, there are as many, if not a far greater number, which pure air can only reach through the other and living-rooms. It is not at all uncommon to find, even in houses built within ten years, the ventilating windows in water-closets opening into the halls; into them the impure air passes to make its way under the doors and into the occupied rooms, whenever a current is created by heating the air within, or by opening the outside doors. No wonder that

diphtheria the more often attacks children living in tenements so arranged ; certainly the conditions are favorable for that disease. Even the means of ventilation provided in this class of houses is infinitely better than that which exists in some and far more costly buildings. In not a few of the latter, the ventilating windows even open into the living-rooms, or those constantly occupied, and the only method by which pure air can be introduced into the rooms containing the water-closets, during cold weather at least, is by vacating one of the adjoining rooms, closing all doors connecting with it, and then opening an outside window. With all the trouble which this entails, it is scarcely reasonable to expect perfect ventilation in such quarters : and here, again, diphtheria finds the conditions which it needs for its development.

In a suite in Boston in which the bathroom is situated as described, the "peppermint test" showed plainly that there was an escape of sewer gas into the living-rooms ; for a visitor entered the parlor shortly after the drug had been introduced into the water-closet, and, not knowing what had been done, voluntarily commented on the strong odor of peppermint. The history of this suite of rooms, the annual rental of which is not less than \$600, even though on the third floor, tells of two deaths by diphtheria

within a few years, one an adult, the other a child. Will people ever awaken to the dangers which surround them, and learn that absolute safety from this and many other similar diseases depends upon their own vigilance and the timely preventive measures which they can apply?

That sewer gas is dangerous to health, and even to life, is a fact beyond dispute. No householder should trust to the assurances of his landlord or plumber that the waste-pipes are in perfect repair; neither should he depend upon the board of health for information which he can as easily acquire as they, and not infrequently with just as positive certainty. The peppermint test is the one applied by the health authorities; it is perfectly simple and equally inexpensive. Every householder is advised to use it, and satisfy himself whether or not sewer gas finds its way into his apartments. When this test is applied, it will be well to first send some one member of the family into the open air to remain for a short time, that under the influence of fresh air they may be made more acutely sensitive to odors. At about the time they return let another person pour a small quantity of peppermint down the water-closet. The party who has been outside should go first to the cellar, and then pass from room to room, to see if the odor of the drug can be detected. It

may be noticeable in one or more rooms ; sometimes the characteristic smell is quite strong in the halls and yet does not appear in the apartments. If the odor of peppermint is detected in any part of the house, there the leak should be at once sought for and stopped, no matter what the cost or inconvenience.

“Tenants at will” too often find landlords not only slow, but exceedingly reluctant to make repairs. Even if the health officers are appealed to, more or less delay, possibly of some weeks, will follow before the necessary relief comes. In all such cases, where it is likely to occur, the most sensible course would be for the tenants to remove to other and more healthy quarters. The reader will say that this entails an expense which very many can ill afford. That is all very true ; but consider it a question of expediency, if you will. If the drainage of a house is defective, the tenant is in danger every moment he remains therein. With reasonable certainty, sooner or later, some member of his family will be taken ill, and the chances are that the attack will be a serious one. Let the tenant, therefore, weigh the expense of moving with possible physician’s fees for attendance, the cost of medicines, the loss of wages, if the patient should be an adult, and, too, the undertaker’s bill, which may also be contracted. Let him weigh

these chances carefully, and even if he excludes that item, duty, he will find it expedient to move from unhealthy quarters.

If a householder, after the application of the test advised, has reason to believe that the drainage of his house is faultless, he must not rest in fancied security, for there are certain preventive measures for him to apply. As already stated, the room containing the water-closet should always be well ventilated, and with equal truth, it may be said that it should be so situated that light and sunshine can freely enter. The first important thing, then, is to insure perfect cleanliness, and that is too often neglected by people who are in other duties the personification of neatness. All the apparatus connected with the water-closet should be frequently scrubbed with boiling hot soapsuds, and the layer of sheet lead which usually covers the edge of the bowl should also be scoured and kept bright. Every day the valve should be raised, and a stream of water allowed to run with full force for several minutes, to completely clear out the waste-pipe. As much of the time as possible the cover should be down.

It will be well to occasionally disinfect the waste-pipe, and for the purpose a solution of copperas or green vitriol is not only effective, but inexpensive; it may be made by dissolving two or three pounds in a

gallon of water. This quantity it will be well to use every week or oftener. The face-board of the closet is easily removed by loosening the screws which hold it in place. In the space beneath, small dishes full of chloride of lime can be placed, and thus contribute to thorough disinfection.

Many, very likely, will say that it is too much trouble to take the preventive measures advised; neither will they recognize the need, having always enjoyed good health. In the lives of all who study convenience so closely, there may come a time when, had these simple hints been observed, serious illnesses would have been averted, and possibly lives been spared.

As one writer in a popular monthly has recently said of disinfection: "Ordinarily this has been done spasmodically, irregularly. Some one dies, perhaps, as happened so lamentably a few years ago in the family of the distinguished chemist, Dr. Doremus of New York, from sewer air poisoning; and then for awhile after this the drainage is looked to, and a few pounds or quarts of some disinfectants are used. But this is not the right or rational way. It ought to be done all the time—to be continuous. The difference is much like that between the two ways of dealing with Anarchists or mobs. One plan is to leave them alone until they come with their

rifles, revolvers, and bombs, ready to sack a town, and then bring a regiment of soldiers or a gatling gun or more, to mow them down. The other and more reasonable way is to have a good police watch kept on them all the time, and shut up and disarm every Most, and Spies, and Parsons as soon as they begin to show themselves. Thus, prevention with clubs and handcuffs will be shown to be the better than attempted cure with bayonets and cannon-balls. The only proper aim, then, concerning disease is non-infection, by the continuous preventive use of disinfectant materials in house drains."



## CHAPTER XIV.

Basement kitchens and dining-rooms. — Why they are often unhealthy. — Made ground for building purposes. — A “death-trap.” — Damp walls and damp cellars may be prevented. — Damp cellars always dangerous. — Other serious objections to basement kitchens. — Excessive stair-climbing and its evil effects upon women. — A consideration deserving much weight.

EXCEPTING in family hotels, conveniently constructed in suites, very many kitchens are located in the basements, and in not a few the dining-rooms are also situated in the same part of the house. In this arrangement of the rooms there again appears that inevitable disposition of man to subordinate every other consideration to mere convenience. The end is, however, by no means always attained, and, in this especial instance, he often defeats his purpose; that is, if he studies the convenience of other members of his family as well as his own. Even if the site of a house is dry, and the walls are so constructed that it is impossible for dampness to penetrate them, there are other considerations of importance which cannot be overlooked. But the sites of many houses, in large

towns and cities at least, are anything but dry, and builders in Boston have been heard to jocosely remark, when driving piles, that they let the weight of the driver fall but once on them, and then drive them the rest of the way with a hammer, not daring to risk the weight again, for fear of burying it too deeply and losing it at the next blow, so soft and boggy is the soil.

Very many of the houses of Boston are built on "made ground," of which one writer says it is the worst soil of all for building, composed as it is of the refuse from various places, filth of houses, decaying vegetables, etc., carried and deposited to fill up low spots in the suburbs of towns. Observation shows that at least three years will be required for such earth to undergo the changes necessary to make it innocent of unwholesome emanations; and even after a longer period it is impossible to be sure of its healthfulness. Within the old city limits there are very few cellars, indeed, which are secure from dampness, and the basement apartments located over them, with simply a board floor between, cannot be made healthy under such existing conditions. There is one block of houses on Tremont Street, each renting for about \$1000 a year, which long had the reputation of being unhealthy, and no wonder, for the cellars were so deep the "tide water" penetrated

them. The writer examined one, and was forced to throw down sticks and bits of board to walk on, so deep was the mud on the bottom. There had been a furnace put in a few years previous, and that was nearly eaten up with rust. The brick-work, even, had fallen in ruins, dragging down the furnace and its attachments, leaving the register pipes open, and by them this foul cellar air was being conducted through the house. On the second floor the registers were located under the mantel, where fireplaces were previously situated. One of the inmates complained that when he placed any article of jewelry on the mantel at night it was blackened the next morning, much the same as when carried in the pocket with matches, and he was forced to use a polish to remove the discoloration. Here, certainly, was a house which might not improperly be termed a "death trap." For years it had been rented, and the owner was fully aware of its unhealthy condition, but cared little as long as he received the usual income from it. It is understood that the cellars of these houses have since been filled with sand.

It is interesting to note what one of the best known sanitary engineers says regarding the construction of cellar walls. Damp walls and damp cellars may be prevented by having an area or air space all around the walls below the surface

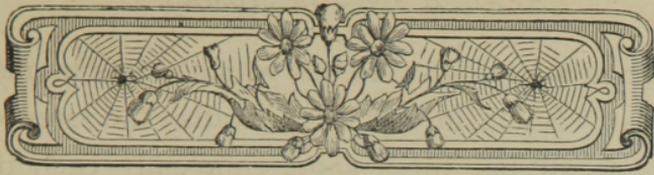
of the ground; where desirable, the area may be covered with flagstone slabs. The same purpose may also be accomplished by an outside lining, or an independent wall, on the outside of the cellar wall, leaving an air space of four inches between it and the cellar wall proper, the air space and the independent wall to be covered with stone slabs. The thickness of the independent wall need not exceed the width of a brick, if well bonded to the main wall, taking the precaution to have the bonding brick and the outside of the stone slabs well covered with asphalt, to prevent the communication of dampness. The outside of the independent wall, or any wall in contact with the ground, should have a thick coat of cement, and a thick layer of cement should be put upon the wall horizontally, immediately above the level of the ground. The entire surface of the cellar floor should have a layer of concrete not less than six inches thick, the top of the concrete to be finished with Portland cement, hand-floated to a smooth, even, and perfectly hard surface. Where the substratum of the cellar floor is of rock or clay, it is best to put down first a layer of concrete four inches thick. The inside of the cellar wall, from the foundation to one foot above the level of the cellar floor, should be lined with asphalted brick. Even on a rock bed, the foundation

should rest upon concrete, the latter preventing the rise of dampness within the walls. The most important precaution, however, is to lay a drain all around the outside of the cellar wall, at the bottom of the foundation, and extend the same to a natural outlet. For the largest private house the smallest-sized agricultural drain-pipes will be quite sufficient.

Now, all these, or equally as efficient means, if there are others, should be taken in constructing a house, to render its cellar secure against dampness; for, if it is damp in the slightest degree, the house is untenable, and every householder should recognize this fact of infinite importance. Some may say that they have lived over damp cellars and yet enjoyed good health. Possibly they may have done so, if the living-rooms of the house have always been well ventilated. It is said that a man fell from the old "echo chimney" in Boston, and yet lived for years afterward; but it by no means follows that another man could make the same journey and escape death. Damp cellars are dangerous, and those who live over them risk not only health, but life; and this fact there is no disputing.

If basement kitchens are located over perfectly dry and well-ventilated cellars, as there is reason to believe but few in cities are, then there are serious objections to them. Not the least important is

the absence of sunlight, a fault which exists in many instances. Shut in by high walls, the sun can enter, if at all, but for a short time only each day, and sunlight is one of the essentials to all living things. Again, there are stairs to climb, an exercise which, if prolonged, and persisted in day after day by women, becomes a potent source of evil. On those women who "do their own work" this influence in time tells sorely, and is productive of infirmities which are peculiar to their sex. Even if there is one domestic employed, the wife finds it necessary to assist her much in her kitchen work, cooking, etc. It will, therefore, be impossible for her to entirely escape the pernicious results of excessive stair-climbing. It may seem severe to say that husbands too seldom consider these things, which to them, possibly, appear trifling. Men are not, as a rule, overburdened with thoughtfulness for their wives. They say that "woman's work is never done." There is no little truth in the statement, for the average woman and mother rarely "finds time hanging heavily," nor does she want for employment. She must necessarily pass much of her time in the kitchen; therefore simple humanity, if no deeper feeling, should prompt the husband to see to it that that room is not only healthy, but that it is also convenient for her.



## CHAPTER XV.

Basement kitchens continued. — Dangers from damp cellars and sewer gas. — Imperfectly filled cesspools and vaults. — An interesting case. — Dangers which few realize. — Perfect drainage, and yet sewer gas finds entrance. — Old drain-pipes. — Valuable lessons taught. — Privileges which should never be granted. — Quite natural mistakes. — Important facts concerning the deadly miasm.

**T**HERE is danger in basement kitchens, which, while it may exist only in a few instances, yet certainly does exist in some, and especially in the older buildings most centrally situated in large cities. It is that danger which has been previously dwelt upon,— sewer gas. If there is a leak in the drains, of course the gas usually penetrates the whole building, but is felt with greater force in the lower rooms. Sewers are of modern construction, and originally cesspools received the waste from the houses. As fast as sewers have been introduced, these cesspools and vaults have been filled in, but in many cases the work has been imperfectly done. The following case illustrates the meaning of the writer: Within a quarter of a mile from City Hall of Boston there stands a house which is not rented for less than

\$1500 a year, and, if memory is not at fault, the sum paid is \$1800. The present occupants had scarcely moved into it before they noticed in certain rooms an almost intolerable odor of sewer gas. It was much stronger in the basement kitchen, and the domestic, previously in good health, was the first to suffer and become ill; soon the other members of the family were more or less ailing. A plumber was called in, and, after a thorough examination, he reported that there was no fault in the plumbing, and failed to discover the source of the sewer gas. The board of health were then notified, and under their directions certain improvements were made, and all precautions which seemed to them necessary were taken, and still sewer gas poured into the house. Quite naturally enough, the landlord, who had been put to considerable expense, became discouraged, and told the householder that he could do no more; but if he could discover and correct the fault, the amount of expense incurred would be cheerfully deducted from the sum paid for rent. A builder of much experience was then consulted. He made a careful search, in the course of which he found a ventilating shaft from an old, dry privy vault, which had evidently been closed up many years before. One end of this shaft opened into the sewer, or to waste-pipes connecting with it; the other end opened under the

kitchen floor. The remedy was easily applied, and the trouble obviated, but not before the health of the inmates of the house had been seriously impaired.

The "Annals of Hygiene" tells of an instance somewhat similar. A corner property had been purchased for the purpose of erecting a modern dwelling. On the lot stood a small two-story brick tenement, an old-time landmark, occupying about one-half of the ground, and which was to be removed to give place to the new structure. A previous sad experience, incident to defective drainage, had so impressed the owner with the importance of a perfect sanitary system of plumbing, that he secured the services of a skilful and experienced engineer, the adoption of whose suggestions it was thought would secure all that might be expected from the most advanced methods of modern plumbing. In the specifications furnished by the architect and sanitary engineer, the plumber was directed to remove "all old drain-pipes," and as it was known that the owner of the adjoining property had years before been accorded the privilege of laying a soil-pipe through the yard of the corner property, for the purpose of making connection with the sewer in the street running north and south, he was duly notified that the excavation for the foundation of the new structure would necessitate the removal of said pipe. With this notice he promptly

complied by having the drainage of his house conveyed into a sewer of later construction in the street running east and west, and upon which his dwelling fronted.

At completion, the house passed into other hands, and the new owner had not occupied it long before he noticed in certain rooms an almost overpowering odor of sewer gas. Being familiar with the admirable system of drainage of the house, and the thorough manner in which the plan had been executed, and, indeed, seeing no way for the effluvium to get from the sewer through the numerous traps and ventilators arranged for its interception, the plumber who had superintended the work during the erection of the house was requested to make a thorough examination, and he reported everything in good order, and assured the occupant that it was simply impossible for sewer gas to pass in beyond the trap at the curb line, which was supplied with a ventilator.

With this assurance, the matter was temporarily forgotten, but it was soon discovered that sewer gas issued from a register in a third-story room in which two children slept, and a servant reported "a smell of gas" in a dining-room closet, which also proved to be sewer gas. Every effort was then made to discover the cause of the presence of the gas. Essence of peppermint was poured down the sinks, that being

the usual way of discovering the existence of open joints or other defects in the drainage system of a dwelling, and on the plumber suggesting, as a remote possibility, that connection might exist with a neighboring defective drain, through the agency of a rat, mint was again employed in an adjoining house, but without effect. Almost the entire yard was dug up in a vague search for the source of the trouble, and at last the plumber frankly owned that he could not account for it.

Another plumber of much experience was then consulted, and in the course of his investigation he removed some of the brick of the pavement near the curb line, and there found a ventilator proceeding from the trap of what proved to be the old drain-pipe already referred to. It had been cut off within the foundation wall nearest the adjoining property which it drained, and continued thence unbroken, passing under the foundation nearest the street to the sewer. From this point where the pipe was cut, an uninterrupted flow of sewer gas found its way into the air space formed by the "stripping" of the wall, and thence into the upper rooms from every open space along the washboarding, and into the warm air conductors through their slip-joints, and thus the entire atmosphere of the house was contaminated. The remedy was simple enough; the old pipe was removed, and the opening into the sewer closed.

There are valuable lessons, says the journal quoted, to be learned from this incident. The privilege of laying soil-pipes across a neighbor's property is fraught with danger, and should never be granted. Alterations in dwellings often make it necessary to change the course of the drainage, and the use of the privilege may be discontinued and the existence of the old pipe forgotten, or the properties may fall into the hands of other owners, entirely ignorant of the existence of such a source of contamination, while all the time it may be stealthily pouring its deadly miasma into the sleeping-rooms of a dwelling, though every precaution has been taken there to secure perfect sanitary conditions.

An offensive odor in any part of a dwelling should be traced to its source at any cost. Sewer gas in large cities is always mixed with a large percentage of illuminating gas, which finds its way into the sewer from leaking mains; hence it is often mistaken for "a slight leak in the gas-pipes." The odor of sewer gas may first be detected in a room, or closet, of a part of the house remote from its point of entrance; this may be explained by its buoyant nature, which enables it to circulate up between partitions and along walls which are "stripped," making its escape through every crevice and open place.



## CHAPTER XVI.

Around the house.—The importance of neatness there.—The ground air and its movements.—A danger of which people know but little.—Sink-spouts.—Banking up for cold weather.—How death is invited in many homes.—Diffusion of gases underground.—An interesting case.—Drains as ordinarily constructed.—How they should be made.

**I**T is of the utmost importance that the soil in the vicinity of houses be kept entirely free from refuse matter. Under no condition should waste material of any sort, "dish water," or other slops, be thrown on to the ground; for where it is saturated with such filth it becomes a hotbed for the growth and development of poisonous germs. The so-called ground air which fills the spaces between the particles of earth, is subject to the same laws, so far as its motion is concerned, as is the air above ground. There is, says one writer, a tendency on the part of the air to move toward and into a house on account of the heat which causes an upward current through the chimneys and roof, and more or less of this ground air is drawn into the cellar and passes upward into the apartments above. Ground air, when un-

contaminated, is not to be recommended for breathing purposes, as it contains a large amount of carbonic acid; but when it passes through filth-sodden soil and becomes loaded with an additional weight of poison, it works dire mischief to those who are obliged to breathe it. It is in this way that those mysterious "visitations" of fever have their origin, which in time past have been so unaccountable.

In nearly every section of our country, there is the utmost carelessness about the disposition of refuse matter. The cesspool or privy is near the house and well, and the slops are frequently removed no farther from the house than the length of a "sink-spout." Of course the ground in the vicinity, and the very foundation of the house in time, becomes saturated with filth. In addition to this, in the northern States at least, as winter approaches the house is "banked up," as it is called (a practice which cuts off all ventilation from the cellar); the cellar is made the storehouse for vegetables and fruit, which decay more or less during the season; the fires are kindled, and a current of poisoned air commences to ascend from the cellar, which does not cease until spring puts out the fires and takes down the "banking." No wonder that their homes are visited by the spectres of disease; that consumption and fever and diphtheria, attended by a cohort of minor ills, startle so many families with their dreaded presence.

A case illustrating the diffusion of gases underground is mentioned in the report of Mr. Child, officer of health for certain districts in Oxfordshire, Eng. : "In consequence of the escape of the contents of a barrel of petroleum, or benzoline, which had been buried in an orchard, a circuit of wells, 60 feet below and 250 or 300 yards distant, became so affected that the occupants of 15 houses, containing 82 inhabitants, were for 10 days unable to use the water for drinking or cooking. The cattle of one of the proprietors, moreover, refused to drink at the spring where they were accustomed to drink." Had this soakage been sewage, instead of petroleum, who can doubt that the result might have been wholesale water-poisoning and an outbreak of typhoid fever ?

In the country, especially, drains from the houses are often made of plank, and not infrequently these extend no more than 30 or 40 feet, and then discharge its contents on the surface. In the sun this filth acquires greater virulence, and gives off its noxious exhalations almost under the very nostrils of the occupants of the house from which it comes ; out of wooden materials it is absolutely impossible to construct a drain which will long remain safe. It may not leak at first, but eventually it must, and decay is then rapid ; soon the waste matters saturate the soil along its course. If a well is in the vicinity of the

drain, this filthy liquid ere long reaches it, and deposits therein its disease-producing germs.

The distance which sewage matters will pass through the earth, and still retain their virulent properties, is something to marvel at ; many hundred feet in certain kinds of soil it often penetrates. All drains should therefore be made of glazed earthenware, the joints being thoroughly secured with cement. No matter how great a distance they are conveyed underground, they should never open on to the surface and discharge their contents, but should empty into a cesspool made absolutely water-tight.



## CHAPTER XVII.

Cesspools and privy vaults. — Why they are condemned. — Wherein lies the danger from them. — Ventilating privy vaults. — A disgraceful scene. — Dangers which cannot be exaggerated. — Duty of every man. — Disinfection of vaults. — Means to be used. — Sulphate of iron. — Its cost. — Quantity to be employed. — Comparative safety secured by proper precautions.

**I**T is certainly to be deplored that in many large cities the systems of drainage are yet so incomplete, privy vaults are still needed; and the assertion is made without hesitation, that were they abolished, the death rate would be greatly decreased. Forty-two deaths from infantile diarrhoea in June, 1886, in New Haven. These deaths, says a popular journal, occurred in forty houses. Dr. Lindsley, the secretary of the Connecticut state board of health, tells us that the sanitary inspection reports of thirty of these houses are now on record in his office, and by reference to them it appears that all have privy vaults save two. Of these two, one had thirty-four persons resident in the house, and probably overcrowding had much to do with the fatal result; and the other had twelve persons, and the

plumbing was reported to be "bad," and the kitchen "insanitary." In these thirty houses there were thirty-six untrapped sinks. About these thirty houses were fifteen cesspools. The other houses were either connected, as regards their kitchens, with the sewers, or threw their slops on the ground. Many of the houses were supplied with water from wells in their yards, in close proximity to the cesspools and privy vaults. Most of these places, which have not as yet been inspected, are in localities where exactly the same conditions are known to exist.

While privy vaults cannot be too strongly condemned, the fact that as yet, for a time at least, they must continue to exist, renders it important that all should understand wherein lie their dangers. No more favorable condition than these vaults afford, for the growth and development of disease germs, can be found; and yet they can be rendered comparatively harmless to man, if proper precautions are observed.

In constructing a privy vault, it should be made absolutely water-tight, and the cement used should be of asphalt and sand; the ordinary cement is worthless for the purpose. It is necessary that into the vault there should be a sufficient flow of water to cover the solid matter, for, according to Trouessart, if disease germs are present, they only become dangerous when dry enough to float in the air. He says

that the gases which are discharged from privies are deleterious to germs as well as to man, and they cannot coexist with them, which is perhaps the reason why men employed to empty the vaults enjoy the immunity from most contagious diseases.

If a privy vault is within a hundred feet of the house, it should have a ventilator from twenty to thirty feet high. If located much nearer than that, the ventilator should extend above the roof of the house. Few vaults, indeed, within the limits of towns and cities are properly ventilated, and in the latter an infinitely greater number will be found pouring their vile gases into the sleeping-apartments, in many instances separated from them but by a few feet. Not only does this condition exist, but the assertion is ventured, without fear of contradiction, that but a small percentage of the landlords have their vaults emptied sufficiently often, and properly so; more often, indeed, are they forced by the health officials to do what they never would do, unless threatened by that authority.

“Man’s inhumanity to man makes countless thousands mourn.” These lines recur to the writer as he recalls an instance which occurred under his eye some years ago. During one of the hottest days in summer, he was called to attend a child ill with cholera infantum, in a family living within two miles

of the City Hall of Boston. The house occupied by this family was small, and stood unconnected with any other. It was one of a row of fifteen, all fronting on the same street. In the rear, there was another row of five houses, also unconnected; these faced in an opposite direction. The distance between this double row of houses was less than twenty feet, and the space was equally divided into inclosures, one for every family, and in each inclosure there was a privy vault. On the day in question, these vaults were being emptied. The contents were disposed of by burying them in shallow holes, dug in a corner of each of these small yards. The vaults were emptied with ladles, and the work progressed very leisurely. Often for several hours this vile mass lay festering in the burning sun, and in midsummer, throwing off its pestilential odors. In all of these houses the kitchen served as a dining-room as well. Quite naturally, the table was set as far from the cooking-stove as was possible. This brought it up to the rear windows, which must necessarily be opened, owing to the intense heat of the day, notwithstanding it was even less than ten feet from where that loathsome process was going on. The writer made his visit while the family were at the table. The picture, with its striking background, he is not likely to forget.

While privy vaults, in the present condition of things, are evils which must exist, it is the earnest prayer of every man, interested in the public health, that the day come quickly when these relics of the dark ages can be forever abolished. In the meantime, their deadly nature should be appreciated, and householders should feel that "eternal vigilance is the price of safety." It is not to be assumed that their greatest danger is from contagious diseases, for such is not the case. Within the baneful influences of privy vaults, their poisonous exhalations slowly but surely undermine the general health, all the vital powers are lowered, and the system becomes impoverished. It is no longer able to resist disease, and life is generally cut short by some affection which would not have proved fatal, but for the influence which had destroyed the constitution of the unfortunate.

If necessary, let each man constitute himself the guardian of his neighbor, and see to it that he does his duty, whole and entire. If one becomes neglectful, and allows his privy vault to become offensive or overflow, those living in his vicinity should at once make it their personal duty to see that the nuisance is abated, and the danger removed. To do this, there need be no collision between the parties most interested. By postal card the health officials can be

notified, and the person at fault need not know who the complainant is. Most assuredly the inspector would not mention from whom the notification had been received. Were he to do so, he would defeat the end which he subserves, for it would deter many from entering complaints through fear of incurring the enmity of the neglectful parties; and thus sources of great danger might be allowed to remain concealed from the authorities.

All householders should disinfect their privy vaults every week or two at least. The sulphate of iron, known also as copperas and green vitriol, is one of the best disinfecting agents, and it is also one of the cheapest. For a trifling sum fifty pounds of this can be bought at any wholesale dealer's, and that quantity will last for a long time. If the vault is in a very bad condition, ten pounds of material, at least, should be dissolved in a bucketful of water, and then poured into it. In some cases more than that quantity is needed, but it will generally suffice. Three or four pounds of the iron used in the same way each week thereafter ought to keep the vault in a safe condition, unless several families have access to it. The larger quantity advised might wisely be used for the first disinfection in all cases. Let the means herein advised be employed, and the danger from that potent source of disease will be infinitely lessened.



## CHAPTER XVIII.

Drinking-water. — Ease with which it is contaminated. — Relative situation of privy vaults. — Wells in cities. — Typhoid fever. — An instructive case. — Serious consequences of carelessness. — Poisoned wells. — Infection possible for a long distance through the ground. — Duties which all must recognize. — Natural instincts of man too often unheeded. — Premature mortality among animals. — “Hygiene is manly.”

THE ease with which wells become polluted must seem incredible to those unfamiliar with the subject, and the drinking-water is one of the most common vehicles by which the germs of disease are conveyed into the system. In thickly settled districts the safety of wells may properly be distrusted, and in large cities the water from them should never be used. The late chief engineer of the Philadelphia water department said that there was not a well in that city the water of which was fit to drink. The “Annals of Hygiene,” discussing the subject, says: Let us remember that a well will drain an area with a diameter equal to twice its depth. Therefore a well twelve feet deep will drain an area the diameter of which is twenty-four feet; that is to say, that it will drain the surrounding soil for twelve

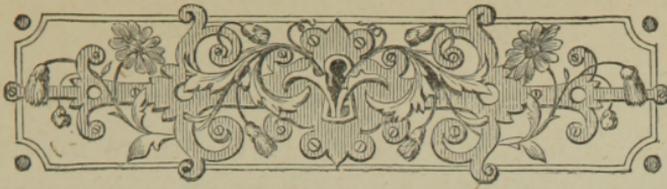
feet in every direction. Obviously, then, the privy should be more than the depth of the well away from it, and more than this again, if it is proposed to place it on a higher level, which, however, should never be done. The well should be lined inside thoroughly with mortar, so that percolation cannot occur between the crevices of the bricks; and it should be so well covered that surface drainage cannot get into it, for you want to drink water that has come from the bottom, after it has been purified by filtration through the earth. These, then, are the precautions to be observed in locating and building your well in the country. How about the city? Well-water in the city should never be used; the sources of contamination are too numerous and too hidden to be avoided.

The writer recalls an instructive case which occurred in the early years of his practice. The family which he attended consisted of four persons, three of whom, the mother and two children, were all taken with typhoid fever at about the same time. They lived in an outlying district of the city of Boston, the sole occupants of a small house. Some thirty feet distant was a well from which they drew their drinking-water. Naturally, this was first suspected as the source of the infection. Considering the location of the privy vault, it did not seem possi-

ble for pollution to have been derived from that source; it was at some distance from the well, and situated on much lower land. Rising abruptly back of the house was a hill, and on the top there stood a very handsome residence, the back of which was toward the patients' home. From the rear door and window of the kitchen the servant was in the habit of throwing her "slop-water," and this ran readily over the face of the hill. The water which had been used in washing clothes was emptied from the tubs in much the same way.

Some weeks previous to the attack of the family living under the hill, one of the occupants of the house above them had been ill with what was termed "slow fever," presumably typhoid. Here was a ready solution of the problem of infection; the germs of typhoid had found entrance into the well below from the house above, although the distance was at least one hundred feet. From this well another family obtained their drinking-water, and shortly after the first was attacked, two from the second family were taken ill with the same disease. The water was at once pronounced unsafe, and no other cases of typhoid occurred in the neighborhood. Fortunately, all of the patients recovered. A great amount of suffering was caused by the almost criminal carelessness of this neighbor, and the poor people were put to a heavy expense, which they could ill afford.

Not only must every man guard his threshold for his own safety, but the safety of others in a great degree depends upon a conscientious performance of those duties which all right-minded persons must recognize. A rather unique argument has recently appeared in a popular monthly. It says: Hygiene is manly, and it is also womanly. Worcester defines manly to be "becoming a man," and womanly to be "becoming a woman." Bacon says that "man is an animal as well as a brute, but he is something more." We say that a man is he who has always the conscientious knowledge that he does right to the best of his ability; and the same definition applies to the woman. "To do right to the best of his ability," a man must live a sanitary life; let him but follow his natural instincts (we say natural, and when we say natural, we do not mean perverted), and he is all right. Premature mortality among the lower animals is comparatively rare, because instinct guides them, while it is fatally frequent among mankind, because the dictates of instinct are unheeded. To be manly, a man must live as a man, and to live as a man, he must observe the teachings of hygiene; therefore do we come back to the proposition with which we started, that "hygiene is manly."



## CHAPTER XIX.

Tenement houses.—Dangers of living in crowded houses.—The homes of the poor.—A problem difficult of solution.—Habits of workingmen.—The noon hour.—After dinner rest awhile.—Location of homes.—The great advantage of living in the country.—Overcrowding of large cities.—Measures of relief.—Displacement of population.—Excessive mortality.—Work for the philanthropist.

THE "Big Flat" is an enormous tenement house in Mott Street, New York, containing a population of 478 persons, most of whom are Roumanians and Poles. "The Society for Improving the Condition of the Poor" finds that the mortality rate for 3¼ years was 42.40 per 1000, while that of the whole city was 25.72. Of these, 62 per cent were among children under five years of age. No better illustration than this can be given of the baneful results of density of population, and yet this problem, how to improve the sanitary condition of the poorer laboring classes (upon which the health of the whole community in a great measure depends), is one exceedingly difficult to solve. In certain sections of all cities these people are found huddled together in old tenement houses, reached only by narrow dingy alleys,

and into the windows of which sunlight and even pure air can scarcely enter. Many of these houses are ram-shackled affairs, so dilapidated that repair is out of the question, and before any sensible landlord would undertake it, he would entirely demolish them. Many of the dwellers in these houses are so poor they are forced to occupy such quarters ; and if their present homes were torn down, a large proportion of these people would be without shelter, and where could they find it? So valuable is the land for business purposes where the houses in question now stand, were new buildings to be erected, in order to obtain a fair interest on the property, the rents would necessarily be placed so high they would be beyond the means of poor tenants, unless, indeed, a great many of them were permitted to live in one building.

The destructive tendency of many of the poorer people is too well known to landlords, and they are naturally averse to admitting them as tenants, excepting to buildings no longer habitable to the better classes. Therefore, of necessity, the poor of all cities are found in worn-out, tumble-down buildings, the sanitary defects of which are beyond remedy. Their very surroundings encourage personal neglect, unclean habits, and the accumulation of filth, the hot-bed for the germs of infectious diseases. Many among them could not obey the simplest of sanitary

laws if they would, and many more would not if they could; in their present conditions they can never be taught how to live. That these people measurably increase the annual rate of mortality is a fact beyond dispute, and yet how to counteract the evils which surround them is a problem by no means easy of solution.

Naturally most workmen prefer to locate their homes as near their places of business as is possible. Some are content to live at a distance and "carry their dinners," but a far greater number object to doing so, and not a few are believers in that quite popular theory that a hot dinner is an essential to health. Many of the latter class feel that they cannot afford to patronize boarding-houses or restaurants, and as a consequence, if residing within from fifteen to twenty minutes' brisk walk from their work, they prefer to make the journey and eat with their families. As the usual interval allowed them at noon is only one hour, these men undergo no little hardship, and one which should not be encountered. If too great effort is not required, and a man has ample time in which to eat his midday meal and return leisurely to his duties, he, of course, does well in seeking it at home; otherwise he is not justified in so doing, and it would be far better for him to take his dinner at his work.

Those whose occupations are sedentary, involving but little bodily effort, ought to live two or three miles from their places of business, as at least that distance should be walked each day, morning and evening, in order to promote good health. But for those employed at hard, muscular labor, or forced to be many hours upon their feet, experiencing great bodily fatigue, it is desirable that their homes should be near the place of work, or that they can reach them by some cheap and rapid conveyance.

On many of the steam railroads from large towns and cities accommodation trains are run, and the fares to the suburban stations have been so reduced that many workingmen can, if they desire to do so, live in the country on even a smaller sum than is required to maintain them within the city limits. These corporations have taken a step in the right direction to relieve the density of population, and improve the condition of the laboring classes, as well as contribute to the welfare of the entire communities. In small cities, horse-cars serve the same purpose; but in large cities this means of conveyance is too slow and tedious, and no man who has worked hard all day, and is worn and hungry, will care to pass half or three-quarters of an hour in a car to cover a distance which he might have walked in nearly the same length of time.

While the steam railroads are doing much in the right direction, they can never meet the difficulty so apparent at this time, and larger measures are undoubtedly required to relieve the overcrowding of many large cities and displace the population, which must be done before the annual death-rate can be measurably decreased.



## CHAPTER XX.

Life in the city and country contrasted. — Why the air of cities is impure. — What it is loaded with. — Habits which are invited by breathing foul air. — Inestimable benefits of country life. — Degeneration of the American nation. — Moral obligations of the thoughtful and intelligent. — The homes of the poor. — Wide field for missionary work.

**S**TATISTICS have already been given showing that the nearer people live to each other, the shorter their lives. This fact should certainly be considered and have due weight. A large proportion of the people, now residents in large cities, could as conveniently live in the suburbs, or in the country adjoining, and it is clearly the duty of those who have families, and especially growing children, to do so. It is too much to say that children may not, in large cities, by proper management, be reared to maturity and reach the perfection of health, but there are adventitious as well as powerful causes operative, which tend to obstruct the highest development of the growing youth; and unless they are literally raised in the streets, they cannot escape the influences pernicious to health which almost invariably surround them.

Many people reside in the country during the hottest months, but return to the city when colder weather approaches. They may know that the air of the latter is warmer and drier, but it is also less pure than that of the country. This great difference in the purity of the atmosphere is not difficult to understand. The air of cities is heavily freighted with organic and mineral particles. It bears the exhalations from living bodies, dust, smoke, and the sources of its varied impurities are almost countless.

Professor Tyndall has developed the fact in his microscopic studies, that air of large towns and cities is filled with infinitesimal fragments of every imaginable kind of material. The horse-cars and heavier teams grind the dust in the streets so fine that it is easily suspended in the air; there is also found floating with it dust and gases contributed by every industry, atoms of food, fine particles of refuse, manure, etc., together with the germs which abound wherever there is decomposing animal and vegetable matter. From the clothing of the inhabitants there is thrown off dust of cotton, linen, velvet, fur, wool, etc. All these, and countless other products, float in the atmosphere of all large cities. Surely it is not difficult to understand why a residence in the country promises better health and a longer lease of life.

Ozone is oxygen gas in a peculiar state of concentration ; the air of towns and cities contains but little of this vitalizing agent, which is more stimulating than oxygen. On the other hand, there is present in the atmosphere of densely inhabited places far more carbonic acid gas than is contained in country air. As one writer has aptly said : "One of the most mischievous social tendencies of the present time is that which leads the inhabitants of civilized countries to mass themselves together in crowded areas, forsaking the villages and hamlets in which our ancestors spent such long and healthy lives. The continued inhalation of vitiated air, loaded with the products of decomposition and depleted of vitalizing elements, occasions much of the lassitude, nervous irritability, craving for alcohol and stimulants of all kinds, sleeplessness, pallor, anæmia, and other complaints common to residents in great towns. The atmosphere of such places is burnt atmosphere, deprived of all invigorating and naturally stimulating qualities, and hence the need so often felt by those who constantly breathe it for artificial stimulants and hot drinks after meals. Smoky air, moreover, irritates mechanically the mucous membranes of the mouth and throat, setting up dryness, tickling, hoarseness, and congestion ; and all these symptoms contribute also to create thirst

and feverishness, thus inducing improper habits of diet and abnormal desire for strong beverages. Drunkenness is a commoner vice among the poor of cities than it is with the country peasants."

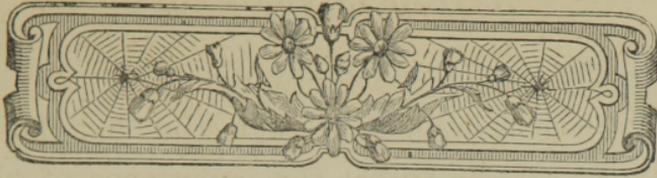
The statement has been made without hesitation, that those who reside in crowded districts should, if possible, find homes in the adjoining country or towns, or at least in the outlying districts, and for those who have families, duty imperatively demands this change. That city life is not favorable to the health of individuals in any period of existence is undeniable. That it is most unfavorable to the health and development of youth is equally true.

It has been said that "we find in each generation that the leading business and professional minds in our great cities are importations from the rural districts." This fact is self-evident, and cities have been rightly termed the "centres of decay." Can these powerful causes which are producing this degeneration be combated, and can city life be rendered less unfavorable to health and longevity? None can deny that there are remedies, and it is also evident that only the people themselves can apply them. A diffusion of knowledge on sanitary laws is an important step in the interests of reform; when individuals can appreciate the dangers which surround them, they will naturally seek relief. The intelligent and

thoughtful should constitute themselves the guardians of the ignorant and neglectful, and the latter must not only be taught the importance of cleanliness, but they must be forced to maintain the same.

To teach the lower classes personal hygiene is a work which should interest societies, and there is no better field for missionary labors in the wide world than in the tenement houses among the poor of large cities. It is not so much that they lack the means of living; they do not know how to live. Ignorance in matters of dress, of diet, and especially of infant feeding, can and should be dispelled. Correct the physical habits of these poor people, and they will improve morally; neglect and filth propagate wickedness and vice.

No further proof is needed that many lives are sacrificed by reason of faults in the construction of buildings, in plumbing, and in the disposition of the refuse in large cities. There is no reason why these defects cannot be obviated, at least in a very great degree. Secure to every person pure air and sunlight, and in tenements where these essentials cannot enter, people should not be allowed to live.



## CHAPTER XXI.

Country life. — Pre-eminently the place to bring up children. — Educational advantages. — Faults of the times. — The responsibilities of parents. — The policy of many questioned. — Social life in the country and city contrasted. — The situation of a site for a country residence. — Locations to be avoided. — Effects of vegetation. — Influence of trees and shrubbery on health.

OF nineteen of the largest cities in Massachusetts, statistics have shown Newton to be the healthiest among the number. In 1886 the death-rate was only 13.72 per 1000. It is observed that one authority states that the lowest mortality anywhere is 15 in 1000, and the lowest annual mortality to be expected in a healthy locality is 17 in 1000. No argument is needed to support the assertion that all who now live in the city should, if they possibly can do so, seek a residence in the country. Many will consider that the change necessitates some sacrifice of personal liberty or pleasure. This is very true; there will be fewer opportunities for certain selfish indulgences; lounging-places are not so numerous; theatres, pool and billiard rooms will very likely be less convenient; and a man must

necessarily pass more of his leisure time with his family, which certainly ought not to be a great hardship, although for some it would doubtless prove so.

It may be said that the educational advantages are fewer in the country than in the city; but it remains to be proved that the products of city schools attain greater eminence, notwithstanding the endless cramming processes to which they are subjected, than the country lads and lassies taught in the little old-fashioned schoolhouses, lacking the modern improvements, as well as imperfect ventilation, sewer gas, and other sanitary defects, but yet accessible to pure air, sunlight, and other healthful influences. Possibly, too, the habits of the country may be less pleasing to the growing youth who permit their parents to reside with them. The average city lad who feels that maturity has been reached at the age of fifteen, would doubtless find greater freedom of movement necessary to "split the kindlings" than the latest cut of costume affords. Such menial duties would no doubt be beneath him; to nurse the end of a cane and keep a cigarette lighted are the greatest muscular efforts many can make without exhaustion.

There are fewer temptations in the country than in the city for boys to indulge in numberless habits

which impoverish their blood, deaden their intellect, arrest their growth, and render perfect manly development impossible. Young girls, too, accustomed to city life, might find the quiet of the country monotonous; and to relieve it they might be tempted to share with their overworked mothers a few of her domestic cares, with which many are now so strangely unfamiliar. The time was when mothers were ambitious to educate their daughters in all those duties which they themselves had been taught, and a knowledge of which is indispensable in every true woman, whatever her station in life. Have not the customs changed with the times? Certainly they have in many homes, and especially those of the city. The study of music, painting, polite letter-writing, and of tongues, whether quick or dead, is now encouraged, while a knowledge of much that is infinitely more serviceable is neglected. The average young lady of the period can faultlessly perform the most difficult selections on the piano, but of the simplest domestic duties she is wofully ignorant. No attempt is made to lessen the value of these interesting and beautiful accomplishments; far from it: their attainment, if possible, is urged upon all. But why should young people remain wholly ignorant of the humble duties of life; and ought they not to be permitted and encouraged

to share the cares with which the parents of many are weighted?

This brief reference to the education of children, while seemingly foreign to the subject under discussion, yet has a bearing, as it assists somewhat to contrast social life in the country with that of the city. It is true that the contrast is less marked than it was a score of years ago, and there is a tendency in the former to conform more and more to the latter. Still, socially, morally, and above all physically, the country is pre-eminently the place to bring up children. It is there they are least likely to encounter those influences which tend to make them frail in body, as well as frivolous and artificial.

Those who seek homes in the country should be careful to avoid low grounds, where dampness of the soil is possible; for where that exists, a habitation is exceedingly unhealthy, and rheumatism, "colds," consumption of the lungs, and many other serious ailments are invited. Dryness of site is, therefore, of paramount importance, and sandy or other soil which is naturally porous is, of course, to be preferred. In building, the sites of old dwellings are to be avoided, as they are deemed especially unhealthy. It is, therefore, wise to secure ground which has never been much disturbed. Carl Pfeiffer says on the subject of habitations: Among hills, the unhealthy

spots are enclosed valleys where the air must stagnate; such selections are ravines, or places at the head or entrance of ravines. In valleys where the prevailing winds sweep across the top of the rising ground on either side, buildings below are often subject to excessive heat and moisture. The neighborhood of marshes and of manufactories discharging deleterious gases and vapors should be avoided. The effect of vegetation on ground is very important. In cold climates the sun's rays are obstructed and evaporation from the ground is slow; the ground is therefore cold and moist, and the removal of wood renders the climate dryer and milder. In hot countries vegetation shades the ground and makes it cooler. The evaporation from the surface is lessened, but evaporation from the vegetation is so great as to produce a lowering effect upon the temperature of a place. Dense vegetation, thick clusters of trees in the immediate vicinity of a house, should be avoided, as the movement of the air is impeded and sunlight obstructed; the air becomes stagnant and favors the spread of diseases, though a belt of trees at some distance from a house may afford a protective influence against malaria. While the presence of trees and bushes in a neighborhood may not sometimes be desirable, herbage is always healthy. It cools the ground, both by obstructing the sun's rays and by aiding evaporation.



## CHAPTER XXII.

Our homes. — Importance of sanitary inspection. — Common sense and hygiene. — Not an isolated case. — Choice of residence. — Soils. — Streets. — Tenement house act. — Builders' restrictions. — A Massachusetts law. — What constitutes a tenement house. — The conduct of landlords. — A salutary city ordinance. — Filthiness a punishable offence. — The responsibilities of owners and householders. — Physical and moral laws are alike divine.

A RESIDENCE favorably situated being selected, the sanitary condition of the house within and without should be inspected with exceeding care, and made perfect, if faulty in the slightest degree. All who can afford to employ a sanitary inspector ought to do so, lest some grievous fault be overlooked. The importance of this course the following will illustrate: A few years ago a resident of the city removed to the country, on account of his own and the health of his family, which had been threatened. He was a college graduate and a man of more than ordinary good sense, yet one who was quite content to act upon his own judgment in many matters concerning which he knew but little. He desired to make his house healthy; therefore all cess-

pools and vaults were at once filled up. The stable for his horses was connected with his dwelling by a short passage, covered on every side. Into the cellar of this stable he conducted the waste-pipe from his sinks and water-closets, and there all the filth from them was disposed with the manure. To conduct off the fluid contents of the cellar, he had what is called a "blind drain" put in. None more useless could be thought of, and naturally, of course, it soon became choked as no strainer had been provided. The consequence was, the cellar became filled three feet deep with the vilest of fluids, and in this condition was found by the writer. As might be supposed, considering his lack of sanitary knowledge, the owner of the premises was quite reluctant to make the radical changes demanded, and no little urging was necessary before he remedied the dangerous condition. Here was a man of far more than ordinary intelligence on many subjects, and yet his common sense did not teach him the gravity of his own fault.

For those who, for the want of means, are forced to live in cities, there is much room for selection. They should seek residences on the highest elevations, and, above all, avoid houses built on soils recently made. The rule of health condemns all streets which are of less width than twice the height

of the houses upon them. As a sanitary writer says : The least width at all tolerable, in the poorest part of a town, should be fixed at the height of the highest dwelling upon the street. In high model houses the upper suites are generally the most healthy. A large space in the rear of a house is necessary to permit a free circulation of air ; houses erected back to back are deemed unhealthy.

The tenement house act, passed in New York in 1879, insists that the rear of every house has a clear, open space of not less than ten feet, and that no one continuous building shall occupy more than sixty-five per cent of the lot. Were builders subject to like restrictions in all cities the effect would be salutary. The law in many, however, forbids persons to erect, or convert to the purposes of a tenement or lodging house, a building on the front of any lot where there is another building on the rear of the same lot, unless there is a clear, open space, exclusively belonging to the front building, and extending upward from the ground, of at least ten feet between said buildings, if they are one story high above the level of the ground. If they are two stories high, the distance between them must be not less than fifteen feet. If they are three stories high, the distance must be twenty feet, and twenty-five feet if they are more than three stories high.

The law of Massachusetts says that at the rear of every building erected for or converted to the purposes of a tenement or lodging house, on the back part of every lot there should be a clear, open space of ten feet between it and any other building. But, when thorough ventilation of such open spaces can be otherwise secured, said distances may be lessened or modified in special cases by a permit from the inspector of buildings.

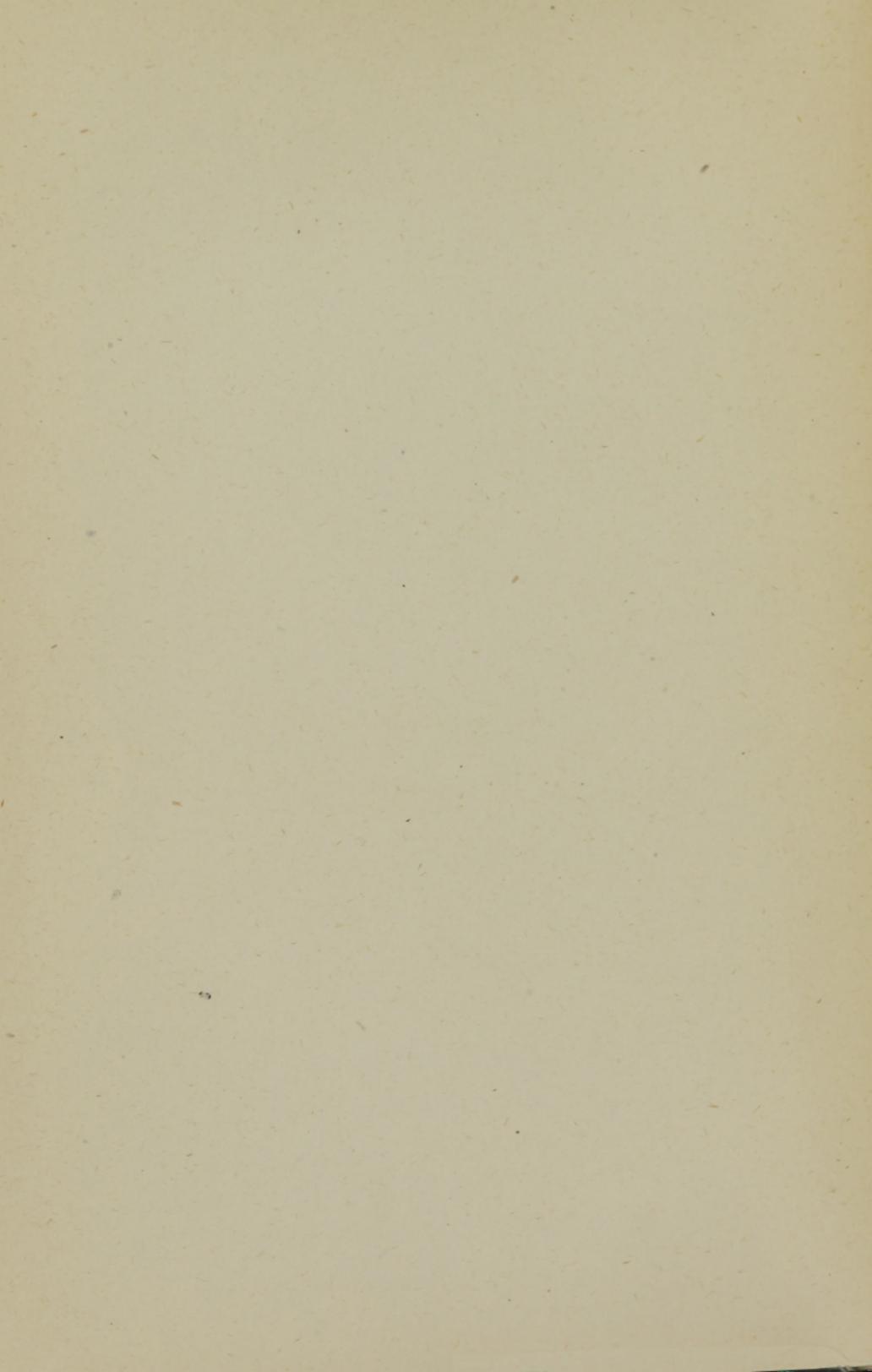
The so-called tenement houses have of necessity been frequently referred to. Probably there are many who are unaware of the exact meaning of the term within the law. "A tenement house shall be taken to mean and include every house, building or portion thereof, which is rented, leased, let or hired out to be occupied, or is occupied as the house or residence of more than three families living independently of one another, and doing their cooking upon the premises, or by more than two families upon a floor, so living and cooking, but having a common right in the halls, stairways, yards, water-closets or privies, or some of them."

Here is a city ordinance with which all landlords should be familiar: "Every tenement or lodging house, and every part thereof, shall be kept clean and free from any accumulation of dirt, filth, garbage or other matter in or on the same, or in the yard,

court, passage, area or alley connected with or belonging to the same. The owner or keeper of any lodging-house, and the owner or lessee of any tenement house or part thereof, shall thoroughly cleanse all the rooms, passages, stairs, floors, windows, doors, walls, ceilings, privies, cesspools and drains thereof of the house, or part of the house, of which he is the owner or lessee, to the satisfaction of the board of health, so often as shall be required by or in accordance with any regulation or ordinance of said city; and shall well and sufficiently, to the satisfaction of said board, whitewash the walls and ceilings thereof twice at least every year, in the months of April and October, unless the said board shall otherwise direct."

Too many seem to think that better health in communities can only be secured through the enactment of rigid sanitary laws. They should know that personal and absolute cleanliness can never be secured by legislation. People who are vile in their habits must be taught that "cleanliness is next to godliness," and be encouraged to feel that it is not only essential to comfort and happiness, but that upon it health and long life measurably depend. In other words, it is the work for the philanthropist rather than for the officer of the law; the latter may assist, and even do much, but alone he can never succeed in effecting the needed reform in certain classes.











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