

The preservation of health : as it is affected by personal habits such as cleanliness, temperance, &c.; / by Clement Dukes.

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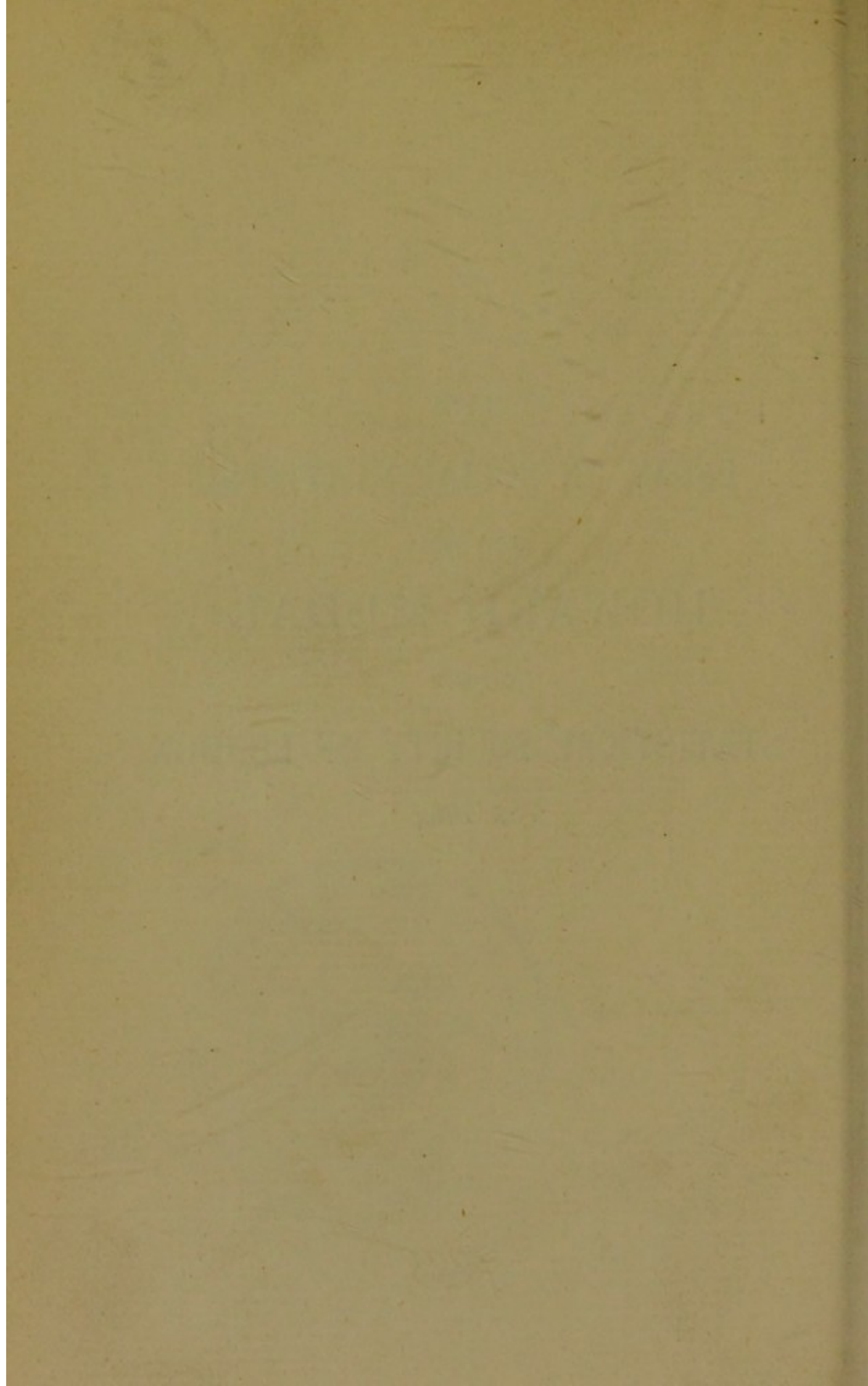


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THE
ESSAY ON SOCIAL STATISTICS
FOR THE
HOWARD MEDAL
OF THE
STATISTICAL SOCIETY OF LONDON
FOR 1884





3

THE PRESERVATION OF HEALTH

AS IT IS AFFECTED BY
PERSONAL HABITS

SUCH AS
CLEANLINESS, TEMPERANCE

BY
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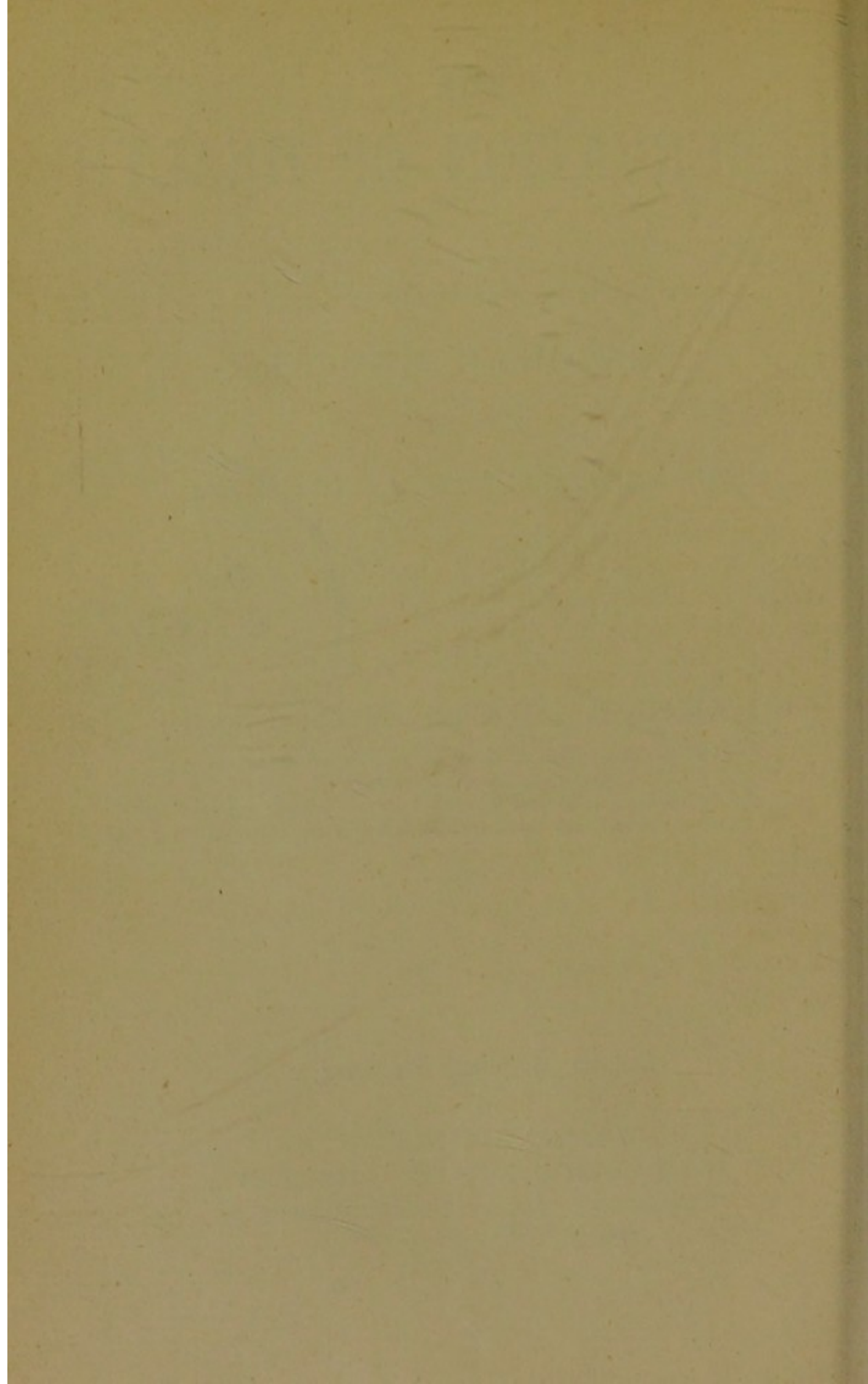
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1885



“HOWARD MEDAL.”

STATISTICAL SOCIETY,

LONDON,

July, 1883.

The usual Annual Competition for the “Howard Medal” (1884) will take place subject to the Rules and Conditions which will be found on the other side. The Essays to be sent in on or before the 30th June, 1884.

The Council have again decided to grant the sum of £20 to the writer who may gain the “Howard Medal” in 1884.

The Subject is—

“The Preservation of Health, as it is affected by personal habits, such as Cleanliness, Temperance, etc.”

(The candidates to be referred to Howard's account of his own habits, as well as to his opinions, as set forth in the text and foot notes of his two works on “Prisons” and “Lazarettos.”)

STATISTICAL SOCIETY.

(FOUNDED 1834.)

"THE HOWARD MEDAL."

In the year 1873, the centenary of the appointment of John Howard as High Sheriff of the County of Bedford, the Council of the Statistical Society gave effect to the suggestions of the President, Dr. Guy, F.R.S., by founding a Medal under the above title, and adopting the following rules and conditions :—

1. That a Medal, to be called "THE HOWARD MEDAL," shall be presented in the name of the President, Council, and Fellows of the Statistical Society, to the author of the best Essay on some subject in "SOCIAL STATISTICS," a preference being given to those topics which Howard himself investigated, and illustrated by his labours and writings.

2. That the Medal be a Bronze Medal, contained in a case, having on one side a Portrait of John Howard, on the other a Wheatsheaf, with suitable inscription. The Executive Committee to arrange the details.

3. That the subject of the Essay shall be selected by the Council at their ordinary Meeting, next preceding the Anniversary Meeting of the Society, at which anniversary meeting the title of the said Essay shall be announced.

4. That the Essays be sent to the Council of the Statistical Society, 9 Adelphi Terrace, Strand, W.C., London, on or before June 30th of the year following the announcement of the subject of the Essay. Each Essay to bear a motto, and to be accompanied by a sealed letter, marked with the like motto, and containing the name and address of the Author; such letter not to be opened, except in the case of the successful Essay.

5. That no Essay exceed in length 150 pages of the *Journal of the Statistical Society*.

6. That the Council shall, if they see fit, cause the successful Essay, or an abridgment thereof, to be read at a Meeting of the Statistical Society; and shall have the right of publishing the Essay in their *Journal* one month before its appearance in any separate independent form; this right of publication to continue till three months after the award of the Prize.

7. That the Executive Committee for the time being, or any other Committee the Council may appoint, shall examine the Essays, and report their decision to the Council at their Meeting next preceding the ordinary Meeting held in November of each year.

8. That the President shall place the Medal in the hands of the successful Candidate, at the conclusion of his Annual Address, at the ordinary Meeting in November, when he shall also re-announce the subject of the Prize Essay for the following year.

9. Competition for this Medal shall not be limited to the Fellows of the Statistical Society, but shall be open to any competitor, providing the Essay be written in the English language.

10. That the Council shall not award the Prize, except to the author of an Essay, in their opinion of a sufficient Standard of Merit; and that no Essay shall be deemed to be of sufficient merit that does not set forth the facts with which it deals,—in part, at least, in the language of figures and Tables, and that distinct references be made to such authorities as may be quoted or referred to.

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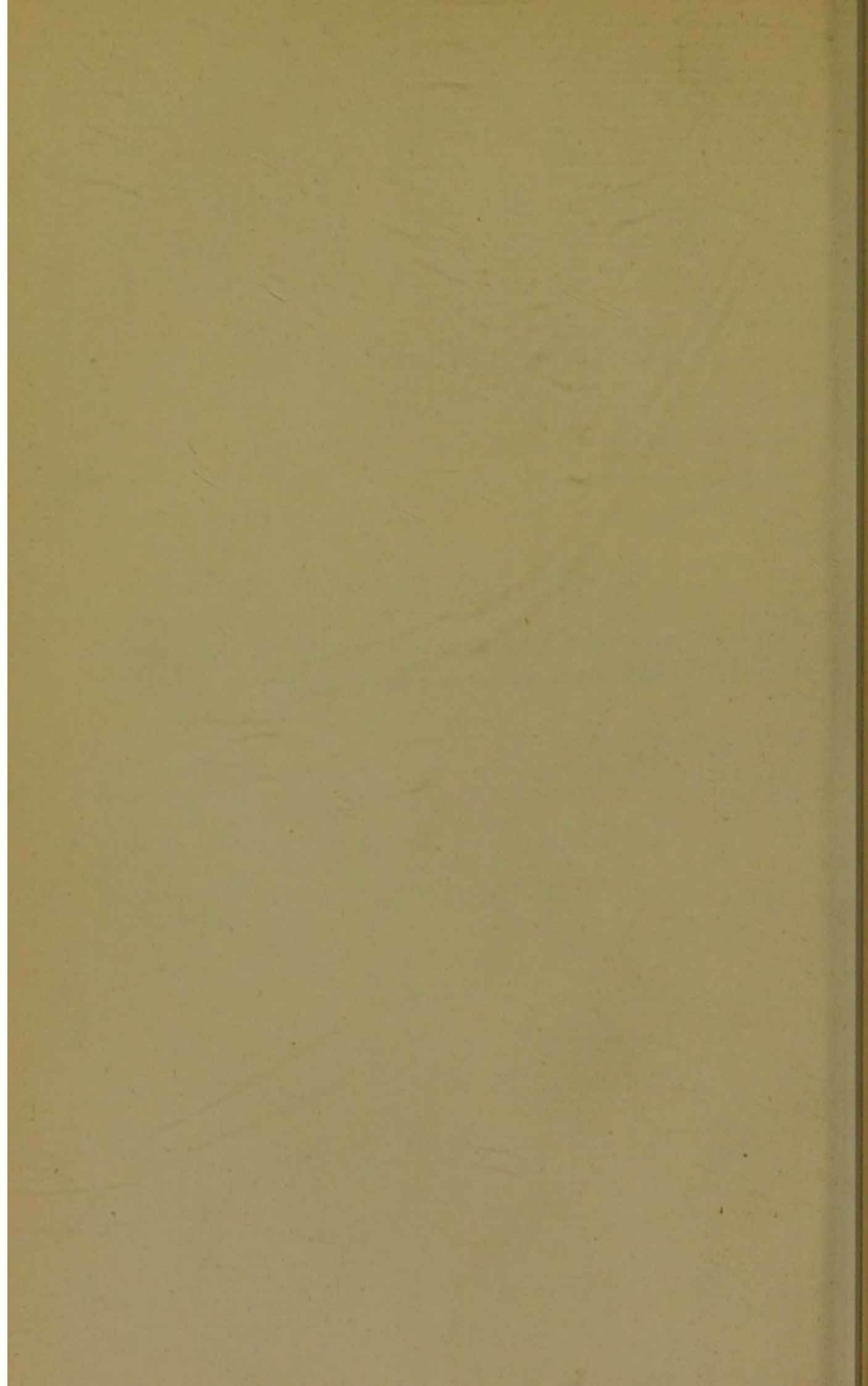
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AUTHORS REFERRED TO.

Title of Work.	Author.	Date.
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An Account of Lazarettos	"	1789
Practical Hygiene	{ Parkes and De Chaumont }	1883
Diet in Health and Disease	Chambers	1876
The Book of Health	Morris	1883
The Seven Sources of Health	Strange	1883
The Length of Life of Total Ab- stainers and Moderate Drinkers compared	Drysdale	1884
Habitual Drunkenness	Bucknill	1878
School-boy Morality		1883
Immorality in Schools		1883
The Reproductive Organs	Acton	1875
Numerous papers of various Societies. Numerous papers in several weekly Journals.		

MOTTO FOR ESSAY.

“Never act otherwise than so that you can will that your maxims should become a universal law.”—KANT.



I.

INTRODUCTORY.

THE "Preservation of Health" is a subject which concerns all classes and ages, and both sexes. It is *the* question which is nearest and dearest to every man, woman, and child. From the Queen in her palace and the nobleman in his mansion, to the pauper in the workhouse or the prisoner in the gaol, all desire it; all, more or less, in their own way seek after it; and yet often by their own imprudence at other times, try to discover how *not* to preserve it. The trite saying, "How are you?" said thousands of times every day, testifies to the common interest we all share in this health question.

And in order to enjoy preservation of health, each member of society must, more or less, seek to carry out certain rules of life for his own sake; of which we shall speak hereafter.

And not only this, but every occupier of this earth is also concerned in his neighbour's health; and no one, however rich he may consider himself, and however much he may strive to preserve his own health, by every sanitary improvement that may be devised, can

afford to neglect the condition of his fellow-creatures, however much beneath him.

So that, it will be seen, this wide question of the preservation of health is not only, or even chiefly, a personal one, but a question that is common to us all.

The *mother* is concerned in the proper feeding, suitable clothing, and the cleanliness of her offspring, if she wish to rear a healthy child.

The *child* has to be taught, and also learns by its own experience, certain laws which tend to insure health and comfort; and gradually recognizes that the neglect of these rules entails discomfort and ill-health. Thus, by degrees, he knows what to avoid—what to seek after; often, perhaps, only after many serious falls, which may, and unfortunately frequently do, bring about suffering and ill-health which last a lifetime.

The *adult* learns, in one way or another, what is necessary and will tend to the highest state of health; and also the reverse, what causes temporary illness, or, when frequently repeated, permanent ill-health and its consequent misery.

Yet, alas! how few have courage enough to abstain from the offending habit whatever it may be. What gives momentary pleasure is only too often partaken of, and the effects—though known to be ill—are absolutely ignored, or forgotten at the time: so strong are human appetites and passions.

Amongst adults, it is the first law of nature, that

every one should take care of himself. This is a most salutary—nay, a necessary—law, so far as it goes ; but, it goes such a very little way. No civilized society could exist, with any comfort or health, were the rule of that society simply, “Every man for himself.” Hence every civilized State, some in a greater, some in a less degree, recognizes and provides for the rights of others. For instance, is it not the duty and the privilege of the rich, to help the poor—hence our workhouses, and our charities without number ; the strong, to help the weak ; the healthy, to help the sick and injured—hence our hospitals for curables and incurables ; the sane, to aid the insane—hence our asylums ; the strong in mind, to assist the weak-minded—hence our idiot asylums ; the educated, to train the uneducated—hence our board-schools ; the free, to help the prisoners—and yet how terribly did we neglect them, until the great and the good John Howard rose to plead their cause amongst his countrymen, and to breathe forth that prayer, how earnestly and at what cost is scarcely known to his countrymen in this century, “Oh, let the sorrowful sighing of the *prisoners* come before Thee !” ?

What havoc is caused by the neglect of this wholesome law of being concerned in the health of our neighbours as well as our own, is only too well known in history ; and we see it more or less every day still. What terrible mourning in the land was occasioned by the utter neglect of all sanitary laws in times gone by, is only too well

exemplified in the ravages made by the plague, and in those caused by gaol fever.

Howard says,¹ "In 'Baker's Chronicle,' p. 353, that historian, mentioning the assize held in Oxford Castle in 1577 (called from its fatal consequence the Black Assize), informs us that 'All who were present died within forty hours: the Lord Chief Baron, the Sheriff, and about three hundred more.' Lord Chancellor Bacon ascribes this to a disease brought into court by the prisoners; and Dr. Mead is of the same opinion." Also, in days gone by, so foul was the air in the dormitories of the students of some of our universities, that they became centres for the origin of typhus fever, from which centres it often spread far and wide. Although, thanks to Howard, our prisons are now sanitarily excellent; and although our cities are so much improved in cleanliness, above and below the surface, that the plague would have a difficulty in thriving; yet, even now in this nineteenth century (Nov., 1883) a piteous cry is going up before God from a small section of the poor of London, and other large towns, which we, as Englishmen, have not yet heard; or, if heard, not yet heeded; and if not regarded, must wreak its vengeance, as of old, in some way, that will visit all—rich and poor, young and old, innocent and guilty—because of the ghastly infringement of all sanitary laws: laws well known, but not carried out.

¹ "Prisons," p. 17.

The chief cause of this shocking state of large areas in London seems to be that the improvements, which have been carried out during the last quarter of a century, have caused the residences of the poor to be demolished, though not before it was requisite, and the houses provided in their place, known as Peabody's and Waterlow's Buildings, etc., have not been supplied to an adequate and appropriate extent. The consequence is that some of the lowest of the poor are being driven into a closer and closer circle, and whole families are being compelled to occupy single rooms, for which, in many cases, they pay half their wages for a bare shelter. Here they live in a semi-nude and semi-starved state, and, to a great extent (but unfortunately not entirely) owing to their misery, they indulge in drink, which gives temporary comfort, rather than food. In these dwellings (!), where there is an absence of ventilation and cleanliness, "the air" (as Howard said) "which has performed its office in the lungs, is feculent and noxious;" also, still only too true, "air which has been breathed is made poisonous to a more intense degree by the effluvia from the sick; and what else in prisons (or lodgings) is offensive." Many of the *rooms*, too, are in as bad a plight as the *prisons* in Howard's day, where bedsteads, and even straw to lie on, do not exist; water is a luxury only, and that not clean; and "conveniences" are in a deplorable state. The *lodgers* in these tenements are in almost as bad a state as the *prisoners* were a century

ago ; and this often from no fault of their own ; though doubtless many have brought it on themselves by their own vice. Yet, if a sufferer needs pity, how much more does a sinner.

But Mr. Robert Giffen, President of the Statistical Society, in his famous paper on "The Progress of the Working-classes in the last half century," has shown, beyond all question, that the poor as a class are richer and better off in every way than they were fifty years ago.

And that they are more healthy, too, is proved by the death-rate, thus—

DEATH-RATE.		
	Urban.	Rural.
1873	23	18'4
1883	20'8	17'7
		} per 1000.

By this it will be seen that the death-rate of towns has improved at a greater rate than in country districts.

It is, therefore, only a comparatively small section of the poor who are in such abject misery ; how to get hold of them, and improve them, in spite of themselves, is a labour fit for, and worthy of, a philanthropist.

Since the above was written a Royal Commission has been appointed, with the Prince of Wales as a member ; so, doubtless, help will be afforded to those who have yet to learn the delights of "personal habits of cleanliness and temperance."

Captain Galton, in April, 1883, showed, before the Society of Arts, that improvements in sanitary administration, and in the personal habits of the people, have reduced the mortality 2 per 1000. Also, that in thirty years the mean age at death has been raised from 28·4 to 29·6.

Further, Mr. Humphreys, in his paper on "The Recent Decline in the English Death-rate," showed, that for the five years, 1876-80, the mean duration of life is raised from 39·9 to 41·9 years, a gain of two years; and in females from 41·9 to 45·3 years, a gain of three and a half years, in the average duration of life. He also showed that this increase is effected at the useful ages, and not in infancy and old age. Mr. Giffen points out how much this means; that such a change could not take place without a great increase in the vitality of the people; and that the significance of this is, not only that fewer have died, but the masses who have lived have been healthier, and have suffered less from sickness.

But what sanitary science can effect, as recommended by Parkes, Simon, Guy, Buchanan, and others, is exemplified in no better instance than in our prisons, where the mortality in Howard's day was appalling; whereas the mortality in prisons in this country for 1883 was only 7·8 per 1000, *i.e.* about one-third that of all large towns. How this would have rejoiced the heart of John Howard!

That it is owing to the efficient carrying out of the

sanitary laws advocated by Howard, there can be no doubt; for the mortality in Russian prisons—which are in as bad, or worse, a state as our own were in Howard's day—is still terrible: thus, in 1882, 1268 cases of typhus fever occurred, and a still larger number suffered from dysentery, and recurrent fever, while 1311 fell from diphtheria, small-pox, and measles.

In this paper, I shall strive to show that the good John Howard, the plain-speaking, courageous philanthropist, was a man who lived a century before his time: that what he saw should be carried out in prisons, hospitals, poor-houses, and in man's daily life, is what has been the aim of sanitary science for many years, and the daily work of all sanitarians in the present day; what he advised for the personal preservation of health is what we now find to be the aim of each individual who desires to live in the enjoyment of health: that it is the influence of light and air, of a supply of pure water, and of good drainage, ventilation, and cleanliness, which is the means of prolonging life. Howard says of himself, "I have been frequently asked what precautions I use to preserve myself from infection in the prisons and hospitals which I visit. I here answer, next to the *free goodness and mercy* of the *Author of my being*, temperance and cleanliness are my preservatives. Trusting in *Divine Providence*, and believing myself in the way of duty, I visit the most noxious cells; and while thus employed, 'I fear no evil.' I never enter a hospital, or prison,

before breakfast, and in an offensive room I seldom draw my breath deeply."

For this "Preservation of Health," Howard drew up a series of regulations: these rules we shall follow, and bring them down to the altered circumstances of to-day, and point out their further applications in accordance with the still better known laws of sanitary science and personal hygiene.

II.

HEALTH.

WHAT is this *Health* we are all so anxious to obtain, and, having obtained, to keep? It is simply a proper and perfect working of all the organs of the body, which, in their working, produce certain definite and necessary functions, which mean *Life*. But it will be evident that life itself may be carried on, without perfect health, by organs capable of some amount of work, though not in such a state as to perform their functions perfectly.

The healthy man knows, from personal experience, nothing about any of these organs—what they are, where they are, or that there is any working at all going on in his body. As soon as he is conscious, from his personal sensations, of having a head, heart, lungs, stomach, liver, or muscles, from that moment he cannot be said to be in a healthy condition. Where there is a harmonious action of all the organs of the body, there is a happy ignorance of all this intricate internal machinery, and we are not cognizant of the fact that we are “fearfully and wonderfully made.” *This is Health!*

An aching head, a palpitating heart, breathless lungs, and painful limbs, are finger-posts which warn the individual that perfect health does not exist. It may be owing to temporary functional disturbance, or to permanent organic derangement, which leads to that opposite condition to health, *Disease* and *Death*.

“Where all life dies, death lives.”

Some individuals are never allowed to experience the joy of health ; for, having been cast in a mould that is itself imperfect, they are stamped with a die for life, and inherit, unfortunately, some defect in their organs, whereby they are never able to work perfectly ; and the individual is conscious of some defect or discomfort, which renders him more or less incapable of living the life he would wish : though by extra care many of these unfortunates may so regulate their living as to pass as healthy amongst their neighbours, while the contrary is known alone to themselves.

But we may have healthy organs, and yet not possess health itself, for we are all greatly dependent on our external circumstances. How few, in this world, are able to choose what air they will breathe, what food they will eat, what water they will drink, or what exercise they will take ! How many are obliged to work hard, on scanty food, in impure air, and without exercise !

Again, there are *others*, who, though having healthy organs naturally, yet by their own imprudence, want

of thought, or vice, never know what health really means.

We now come to the question,—How is this health to be preserved by personal habits? Very much by the mode of life we lead: bearing in mind the peculiar characteristics of each individual.

But chiefly by *Cleanliness* in our persons, clothing, and houses. It can avail little for individuals to be clean in their persons, while they never pay any attention to the frequent changing of their under-clothing; or while their houses are never cleansed, and they live where there is an absence of fresh air and ventilation, and of the proper and rapid removal of all effete products.

Moreover, there must be *temperance* in eating, drinking, sexual affairs, sleep, work and rest: intemperance in any of these causes deterioration in health and character, and prevents that good temper and cheerfulness which are essential to a healthy well-being. We shall now proceed to discuss these points in detail.

III.

CLEANLINESS.

SANITARY science and sanitary laws can effect little for a community without individual help and sympathy with the movement. People must be made to feel the pleasure and wholesomeness of cleanliness before they will understand its desirability and necessity ; individuals cannot be made clean by Act of Parliament.

There are many who, if they once experienced the joy of a clean body, clean clothes, a clean house, and a clean neighbourhood, would revel in it as a luxury never to be parted with ; while there are others only too like an acquaintance of mine, who when reminded by his servant one morning, when he got up and went on the deck of his yacht, that he had not washed himself, said, " Oh ! never mind, nobody will see."

Dirt is divided by some into clean dirt, and unclean dirt. Another has called it " matter in the wrong place." But all who are interested in the preservation of health, and the prolongation of life, must look upon all dirt, as *filth*. This filth may exist on the skin, in the clothes, or in the house. I myself have seen the skin of a rich lady

in such a state, that the dirt might have been scraped off; yet she would have felt insulted had she been told of her dirt. The plea of many who do not believe in washing their skin, is that nature is always shedding the epidermis, and so washing is not required; the odour from such persons testifies to the contrary, and is evident to all, except the owner.

The fundamental law of cleanliness is—no cleanliness without fresh air. It is necessary inside the body, and outside it; inside and outside the clothes; and in every nook of the house. Moreover, to get *fresh* air, it is as important for it to be in motion as it is for the blood to circulate. There is no such thing as fresh air when it is stagnant where human beings are; no such thing as good blood when it is not circulating, and so oxygenating. This fresh air is requisite, too, night as well as day.

(i.) **Cleanliness of Person.** 1. **EXTERNAL CLEANLINESS.** (a) *Skin.* It is within the power of every human being to keep the body clean. It may not always be easy to keep clothes, house, and surroundings clean, for these latter require leisure, strength, and opportunity; but for a dirty skin there is no excuse whatever.

It acquires dirt from without and from within. The former is occasioned by dust, smoke, etc.; the latter, from the secretions of the skin itself, which are exuded on its surface.

Did we, human beings, go about without clothes, so that the skin was always in the fullest amount of fresh

air, we should not have so much to say on the importance of a clean skin, for the fresh air would at all events keep it free from smell ; besides which, the dirt would then be visible, and would, in consequence, be removed by most people for appearance' sake alone. It is astonishing what an amount of dirt many people do not object to carry about with them, when it is not visible to their neighbours. But living, as we do, in clothes day and night, it is of the first importance that the secretions exuded on the surface of the skin should be daily washed off ; otherwise—owing to a deficiency of fresh air being applied to it, *because* of our wearing clothes—they remain on the surface, and, like all organic matter, decompose and become foetid.

This *secretion*—or rather I should say, excretion—of the skin consists of sensible and insensible perspiration ; and this perspiration is formed of water, carbonic acid, fat, salts, and animal matter from within ; worn-out scales of epidermis from its surface ; and adherent dirt from without. All these ingredients, when not removed from the skin, form an extra coating to it, which nature never intended ; and which becomes decidedly odoriferous. This is not only unhealthy in itself, consisting of over two thousand superficial square inches of decomposing refuse, but this unnatural skin-coat blocks up the natural sweat and oil ducts, and causes ill-health ; while, if complete—as by an artificial covering—it causes death.

But why is so much said about this cleanliness of the

body? First, because the skin is the most important gland in the body, and needs cleanliness to enable it to act to the greatest advantage; and it is covered with clothing, to allow it to perform its functions the more easily, and to prevent sudden changes of temperature affecting its continuous action: next, so as not to be a nuisance to one's neighbours: also, in order that it may not afford a suitable soil for parasites—animal and vegetable,—and, we might add, zymotic diseases too.

Moreover, Howard observed that “the most cleanly men are always the most decent and honest; and the most slovenly and dirty are the most vicious and irregular.” Also, “Sir John Bingle, in his last anniversary discourse at the Royal Society, on the subject of Captain Cook's successful care of the ship's crew in his voyage round the world, and the medal deservedly adjudged to him on that account, has the following at page 26 :—‘It is well known how much *cleanliness* conduces to health; but it is not so obvious how much it also tends to good order and other virtues. That diligent officer was persuaded . . . that such men as he could induce to be more cleanly than they were disposed to be of themselves, became at the same time more sober, more orderly, and more attentive to their duty.’ This remark is confirmed by an observation in the *Spectator*, No. 631, ‘Several vices destructive both to mind and body are inconsistent with the habit of cleanliness.’ ”¹ Further,² “Dr. Blane,

¹ “Prisons,” p. 59.

² “Lazarettos,” p. 98.

Physician to St. Thomas's Hospital, in his 'Observations on the Diseases incident to Seamen' (printed in 1785), says, 'If men are not constrained to keep their persons sweet, their clothing and bedding clean, and their berths airy and dry, the *most* efficacious remedies, and the most skilful physicians and surgeons will be to *little* purpose.' He relates in the account of the sick sent from the fleet that arrived at New York in 1782, that each man on the sick list was supplied every week, at the public expense, with four pounds of apples and *half a pound of soap*. That the supply of *soap* was a thing entirely *new* in the service; but the good effects of all the other articles would most probably have been *defeated*, unless men had been furnished with the *means* of cleanliness, which is the most essential requisite of health."

Howard again, speaking of schools, says,¹ "I have in these remarks seldom omitted to mention the allowance for soap, that *necessary* article of cleanliness, because it is too small in these schools; and this is an inducement to preserve the urine for washing the children's linen, which is one cause of cutaneous disorders."

Again,² he says, "The great attention in this hospital to *cleanliness* and *air*, makes the proportion of sick in it very small."

If there be one thing more than another adverse to cleanliness of person, it is as Howard, the acute observer, said: "The use of perfume I always reckon a proof of

¹ "Lazarettos," p. 108.

² *Ibid.*, p. 70.

inattention to cleanliness and airiness." It disguises dirt, but does not remove it.

This cleanliness of body is only properly effected by daily ablutions.

(*b*) *Baths*.—Howard thought so well of cold water that he said, "The custom of washing the feet and hands of patients before they are put to bed, which I have observed in some hospitals, is not known here. I am persuaded, however, that such a custom, with air and cleanliness, and an abstemious diet, is of more importance in hospitals than any administration of physick."

Baths are of various kinds, and are used for various purposes. We shall speak only of those used by the healthy for the preservation of health, and not of those employed in the treatment of disease.

(*a*) The great purpose of all baths is that of *cleansing*; and the most efficacious for this object is a "warm bath," about 98° , with the plentiful use of soap, and good friction of the skin with a rough towel afterwards. By this means all extraneous dirt is removed; effete epidermis is rubbed off, and the sebaceous and sudoriferous gland-ducts are left freely open, and the secretion of the skin promoted. But such baths should be taken with care, so as to avoid an after chill; the use of soap also should not be too frequent, otherwise the natural oil of the skin is too freely removed, and the skin is consequently left dry and cracked, less able to perform its appropriate functions, and liable to show cutaneous

diseases; moreover, a skin in this condition is unnaturally sensitive to changes of temperature.

The warm bath is not only a great cleanser, but may be used also for its soothing influence: to bring blood back to the skin after a chill, and as a promoter of perspiration. It may be resorted to for ten or twenty minutes with safety.

(β) But the best bath of all for daily use is the "morning cold bath," which, used with discretion, nearly every individual is able to enjoy. The strong may take it cold all the year round; but the weak, and those with a feeble circulation and no after re-action, should in winter take it at the temperature of summer cold water, about 65° Fahr., and even, if necessary, take it with the feet in hot water.

The reason why the poor never use a morning bath is because they have never learnt its value; or, because they are too poor to have a bath of any kind.

But why so few well-to-do people employ it—especially girls and women—is because they have never been taught its use in early life.

Howard states,¹ "Dr. Lind, in his ninth section on the preservation of health on board ship, says, 'That by cold bathing in warm weather, the body is cooled and refreshed, the fibres braced and invigorated, so that the men become afterwards better enabled to undergo the fatigues and heat of the day. This would prove not

¹ "Lazarettos," p. 104.

only an excellent means of health, but of cleanliness ; by cleansing the skin, and invigorating the whole habit, it is so far from stopping the perspiration in hot weather, that it promotes it.' I can affirm from my own experience in hot climates, that *fluxes*, and many other complaints, have 'not only been cured by cold bathing, but the return, and even the attack, of such diseases, effectually prevented by it." He adds, "I am persuaded that the remarkable healthfulness of the *Tyger* ship of war *was* more owing to the *use* of the *cold bath*, than to any other circumstance."

Howard further continues,¹ "Cold bathing, especially in salt-water, prevents many cutaneous and other diseases, promotes perspiration, and strengthens and invigorates the whole habit."

I can scarcely speak too strongly of the beneficial effects of the daily cold bath in the morning. I am inclined to think that the reason why it is not more used as a daily luxury on rising from bed, is owing to the very common practice of bathing infants and young children in the nursery in the evening instead of in the morning. By this means the delight of the morning bath is not experienced from the commencement of life, but is a "new thing" which has to be started after the children leave the nursery ; and thus it is neglected, and the start rarely made. I believe if mothers would only see that their infants and young children were bathed in the

¹ "Lazarettos," p. 155.

morning, which is far more healthy than at night, with warm water at first, and gradually using cold as they become older, and would provide a bath in their room when they leave the nursery, the practice would become continuous as a matter of routine. It is a habit which is not only cleanly, but invigorating, and when started early in life, and practised in a proper manner, incapable of doing harm to boy or girl.

The *proper way* to take it is to have the bath ready overnight; and while the body is warm, to get straight into it out of bed, without a moment's delay; to sponge the body all over rapidly twice or thrice, and then get out and vigorously rub dry.

In the case of nearly every person, where the practice has been commenced early in life, and been continued, it produces a most *agreeable shock* to the system. This contracts the superficial blood-vessels, and drives the blood back on the heart and internal organs. The heart then redoubles its action to overcome the resistance, and refills the vessels of the skin with increased vigour. And thus the tone of the heart and blood-vessels is invigorated and made strong to accommodate itself to the ordinary changes of temperature.

But if the bather remain too long in his bath, or, by standing about insufficiently clothed, gets chilled beforehand; or if he be, unfortunately, one of those individuals who has so feeble a circulation, or nervous power so deficient, that he is unable to take a cold bath in

the morning, then a *disagreeable shock* is experienced which amounts to a nervous depression, and is accompanied by blueness or whiteness of the extremities, a sensation of cold, and the absence of a "*glow*." Such a bath has no salutary influence, and should be avoided altogether, or used in such a way that these evil effects may be avoided.

The cold bath in the morning is especially valuable to females, for it renders tone to their nervous system—so often in a state of uncertain equilibrium—and makes it more stable.

For infants and young children the warm bath in the morning is the most appropriate, since they are unable to bear a severe shock to the system, and are always extremely sensitive to marked heat or cold. Where this warm bath is suitably given, the delight of the child is so great that it cries when it is taken out of the water. If this delight be maintained, by care to avoid fright, the water may be gradually made cooler, and at length cold, and it will still be real enjoyment to the child. But if the child be suddenly plunged into cold water in its bath—in the cruel manner in which some parents hand their children over to the bathing-woman to be bathed in the sea—nothing but terror will be occasioned, and the child will be terrified by cold water for the rest of its days.

We have spoken very freely concerning cleanliness of the skin, and about the virtues of the cold shock to the skin every morning, as given by the morning bath. But

why is so much stress laid upon this, apart from cleanliness, as a means for the preservation of health? Because the skin is the great regulator of the temperature of the body, and on this equability of temperature much of our health depends. For it is essential, whether we live at the equator or the poles, whether we are in a hot room, or suddenly go out into the cold night with a temperature below freezing, and with a keen east wind blowing, that the temperature of the body should be always equal— 98.4° Fahr.—if health is to exist and be preserved. But how can this be effected when the thermometer is sometimes 50° Fahr. below freezing, and at others 120° Fahr. in the shade in various parts of the world? Nature effects this marvellous achievement chiefly by means of the skin.

The skin is not only a covering for the body, and the chief element of human beauty, but it is the great protector of the person owing to its wonderful supply of nerves, which inform the brain of all dangers in their neighbourhood by means of the exquisite sensation of touch; it also regulates the amount of heat in the body. This latter function it performs through the vaso-motor nerves, which control the size of the cutaneous blood-vessels. In *cold* weather the superficial blood-vessels are so contracted, that they circulate very little blood in the skin, which is, therefore, nearly all retained within the body itself, so as to keep up the heat of the blood, and not allow it to be cooled by exposure to the air, through

radiation and evaporation: thus, the heat of the body is not unnecessarily lost. In *hot* weather the cutaneous blood-vessels are relaxed and enlarged, so that much blood circulates in them and is exposed to the air, which, being usually cooler than the blood itself, cools it; and thus a safety-valve is provided for the heat generated. Added to this is the enormous cooling power of a sweating skin, which, in its evaporation (which always takes place according to the amount of the external heat), lowers the temperature of its surface, and consequently that of the superficial blood-vessels within it. This specific action of the skin, it will thus be seen, is the most important regulator of heat in the body, the blood-vessels opening and shutting according to the amount of heat generated within, and according to the external temperature in which the body is placed.

In order that this adjustment may take place in a perfect manner, it is essential that it should be as prompt in its action as an electric shock, which the cold bath, by giving tone to the cutaneous nerves and blood-vessels, helps to induce. Those in whom it takes place most quickly are in the most vigorous state of health. To all it is most important: to the young especially so, for in them all changes are more rapid than in adults. Those who are sensitive to colds—"catching cold" I mean—usually make themselves more so by taking warm, instead of cold, baths, a course which only adds fuel to fire. Would they only resolve to take the cold bath—gradually

accustoming themselves to it—they would find that their predisposition to “cold-catching” would leave them; for their superficial vessels and nerves, becoming more vigorous, would open and shut the heat doors more promptly, and thus save them from the chill that is dreaded.

Moreover, not only is the skin a great regulator of the heat of the body, but it is also so important an *excreting gland*, as I have said before, that when its action is impeded, ill-health results; when stopped completely—even in the dog, who never sweats perceptibly—death ensues. A clean skin, therefore, is an imperative condition of this excreting action properly taking place.

By some—especially by athletes—the bath in any form is deprecated, in the belief that it makes them languid and disinclined for exertion: but it is only the improper use of the bath which occasions this.

(γ) It is when the cold bath is taken in the form of the “swimming bath” in summer, that this prolonged immersion—from fifteen to sixty minutes—occurs. This happens chiefly amongst boys and young men, and the beneficial effect of the bath is thereby converted into a harmful one. For the blood is driven from the skin, which contains about two thousand five hundred superficial square inches, and being kept from it for so long a time, its blood vessels become contracted, owing to the paralysis of their nerves from the cold, and they refuse to recover themselves with a rebound when the cold is removed. The blood, which should have occupied this large surface,

being driven into the vessels of the internal organs and retained there, over-dilates them, producing congestion of those organs, and the various harmful conditions of congestion of the brain ensue with persistent headache; congestion of liver and jaundice; and congested kidneys with albuminuria. Besides these, we get the marked nervous depression, which may remain for days, not only expressed by inertness, but by a torpor of the whole system, mental and physical.

Those who remain too long in the water are undoubtedly liable to experience these sensations; but those who remain only a short time in it, are always invigorated—the bath being really a most important aid to the athlete, engendering muscular vigour, increased nervous power, and preserving health.

In connection with the swimming bath, it is very important to remember that the hot water should enter at the bottom of the bath, so that in rising to the surface, as it does on account of being specifically lighter, it may warm the whole bulk of the water. It should on no account enter the bath at the surface of the water, else it floats on the cold water like oil, and warms the building, instead of the water. It is most injurious to any one to bathe in water which is hot round the neck and cold to the feet; to those getting on in years, it is dangerous.

For those leading sedentary occupations in cities, and who, taking little exercise, rarely perspire, the Turkish bath is sometimes a valuable aid to health.

There are some who stoutly maintain that they are unable to take any form of bath at all. Even here, however, there is no excuse for having a dirty skin; they can at least wash each part of the body separately, a piece at a time and then dry it, and this every day; but better once a week, both for themselves and their neighbours, than not at all. As age advances, the plan just mentioned should be resorted to, so as to avoid all shock to the system, and even momentary internal congestion of vital organs, which is so ill borne in the aged; though even in the aged, the bath may be taken according to the habits, taste, and vigour of the individual.

For those in complete health, the range of bath temperature may extend from 33° to 110° Fahr. Water feels cold to the skin at 65° Fahr.; at 70° Fahr. neither warm nor cold.

(8) "Sea-bathing" which is resorted to—as fashionable—by so many people once a year, is in the highest degree deleterious for all, except the young and robust and those who, by frequent swimming at home, are accustomed to such a bath. For those in a condition to indulge in it with enjoyment, it is a luxury and of the greatest benefit to the whole body. But, be it still remembered, that prolonged immersion counteracts the stimulating effect of the sea-water, and causes languor and sleepiness. For the most vigorous, the best time to take a sea-bath is before breakfast; for those less strong, in the middle of the morning after a light breakfast;—never when the body

is weary ; nor soon after a meal ; nor when the body, having perspired, is cooling. Always bathe while hot ; never wait to cool first.

(c) *Nails*.—We have spoken much about the importance of cleanliness of the skin ; but there is an appendage to the skin, forming part of it, but so far distinct as to require separate mention, which it is even more important in many ways to keep clean—I refer to the finger-nails. Yet, amongst high and low, one sees the finger-nails very much resembling mourning note-paper, having a deep black edge—of dirt.

Well-cut and well-cleaned nails are good for all, and do not occasion much trouble. It would be deemed loathsome were I to recount in this paper the known filth that adults and children get into their nails and pass on to their mouths !

Besides this, medical men, nurses, and those who attend on the sick, convey virulent poisons, neatly packed in this small compass of nail-dirt, which have occasioned, in surgery and obstetrics, deaths without number, unintentionally, but no less negligently.

“ Evil is wrought by want of thought,
As well as want of heart.”

(d) *Hair*.—The importance of cleanliness of another appendage of the skin—the *hair*—is too well known to require much remark. Neglect in this respect entails well-marked discomfort and disgrace, for the hair is apt

to become the hunting-ground for vegetable and animal parasites.

2. INTERNAL CLEANLINESS.—We have now freely discussed the question of the *external* cleanliness of the person, showing how important it is not to have many hundred square inches of surface covered with decomposing excrementitious matter, together with dirt from without, but by daily ablutions and friction to remove the whole of the *débris* as soon as it is deposited.

It is no less important that similar cleanliness should be observed within. Nature provides for this herself in most cases. Thus, the excretion from the lungs is removed in the form of carbonic acid, whether we will or not, though aided by copious fresh air and exercise; similarly with the excretion from the kidneys. But the chief effete material, resulting from the continual wear and tear of the body, is cast out, together with the secretion from innumerable glands, into the intestines, which form the great Cloaca, twenty-five feet long, of the human body. From here, as in a common sewer, it requires daily removal, so that stagnation may not occur. For if stagnation does take place, then, in spite of the marvellous antiseptic power of the bile, the animal matter decomposes, gases are generated, and the system is more or less poisoned and in danger; for not only is there risk of mechanical obstruction from bulk of matter, but also from the various efforts to effect relief. Besides this, the venous portal system stagnates, and varicose veins (piles)

are the result. Moreover, the system is so poisoned by the products of decomposition that there ensue headache, mental and bodily depression and hypochondriasis; sallow pasty complexion, and skin frequently covered with spots of acne; offensive breath; and evacuations, when they do occur, foetid in the highest degree. Not only therefore for health's sake, but also for cleanliness, a daily relief of the bowels should take place.

With some, this is already carried out successfully; but a large proportion of people do not obtain this regular relief, and state, moreover, that they cannot obtain it. From a very large experience I am sure this assertion is not accurate. I am certain that nearly every one can get this daily *natural relief*, in health, if they will; its absence is from bad habit, and that alone. I have cured the most inveterate cases by making the individual understand this. Sometimes it requires many months, but a month is, as a rule, sufficient. The secret of success is this. We are such creatures of habit, that if any habit be once established, every one knows how difficult it is to break it. This rule holds good in the case before us; and if any human being (possibly with rare exceptions, which I have not yet met with) will only take the trouble to get this natural relief every day at the same time for twenty-eight *consecutive* days—if necessary, by means of aperient medicine or enema—he will not only find it an easy matter to effect it afterwards without any external aid, but the interruption of the

practice will produce a most uncomfortable sensation. But I mean *consecutive* mornings, and not missing a day here and another there, for by the latter course the charm or habit is broken, and the learner must commence again.

This is true for adults ; but it is easier and even more true in the case of the young. Infants can and should be taught it, and parents should exercise endless pains to establish the rule in all their children and impress upon them its importance.

Yet, in the schools for boys and girls throughout Great Britain, I do not think five per cent. of the pupils have ever been taught at home this wholesome lesson. It has never been thought of ; or, if it has, has been allowed to pass by as of no moment at all, or as one which an aperient would soon overcome. I have never seen a child in health who really required the constant aperients which are so often given. Over and over again I have cured children by rewards or punishments ; many times by promising sixpence every time of success, and taking away a shilling after failure. Once a good whipping—rewards having failed—perfectly cured, and no aperients were ever required after, although up to this time they had been frequently requisite.

So certain am I that it is only a question of habit with most adults who fail, that I am sure I should soon be ruined were I to offer to the most obstinate case in existence a five-pound note every successful morning, on

the understanding that I should be given a ten-pound note after every failure—of course allowing twenty-eight days in which to form the habit, with help during that time if need be. I do not believe I should receive a single ten-pound note.

I have spoken freely on this matter, for I am persuaded there is no personal habit more neglected, and allowed to take its course, with a complete absence of regularity; and yet there is none more healthy and cleanly. Moreover, a large share of the suffering of daily life is simply owing to the neglect of the effective establishment of this most wholesome rule in childhood.

(ii.) **Cleanliness of Clothes.**—There are many people who would feel hurt if we were even to suggest that they were dirty. They would tell us that they were continually changing their linen, etc.

It must be understood that no frequency of change of linen can compensate for the neglect of frequent and regular washing of the body. Clean linen is a necessity—for the decomposing secretion of the skin saturates not only the under-clothing, but even the outer as well—though it will not take away the necessity for cleanliness of the person. There are other persons again who, while very particular about washing the skin, care little about clean under-clothing, whereas, next to a clean skin itself, this is of the first importance.

In clothing the body, two principles are carried out.

First, that of adornment and decency. Nearly every

tribe under the sun has some form of covering. Some races clothe the whole of the body, including the hands and feet. Others cover only a part, or parts, of the body, for decency's sake. Whereas, all people adorn the body in some form—either by ornaments, paint, feathers, or skins, etc.

Second, for protection; and to guard the person against heat and cold. In this country, its chief use is to keep the temperature of the body equable, when the temperature of the body is always higher than that of the air. Its use, therefore, is to keep out the cold, and retain the heat of the body, and so prevent its waste. In winter, and in colder countries, there would be a greater loss of heat, and therefore the greater need of clothes. In summer, and in hot countries, the skin is always acting more freely, and is naturally more sensitive to changes of temperature: under such circumstances the value of an artificial covering is to keep it acting night and day, whether the temperature be high or low.

We have seen above, what a very important gland is our skin. In order to insure its efficient action under all conditions, it is essential that it should be protected from all sudden changes: hence the necessity of having a non-conductor of heat next to it, summer and winter, to retain the heat and keep out the cold.

We divide our clothing into two kinds, according to its position on the person—under-clothing and outer-clothing. The great object of proper clothing is, that

while it affords protection to the body, it should also keep the temperature of a uniform heat; and in doing this, it should neither interfere with any function nor any movement of the body.

1. *Under-clothing* is used for various purposes, thus—

(1) To keep the skin always, as nearly as possible, at the same temperature.

(2) To absorb the natural secretions of the skin, which occur chiefly in the form of insensible perspiration.

(3) To secure cleanliness, by means of the removal of the secretions from the skin immediately they are formed through their absorption and retention by the clothing. Under-clothing for this reason should be composed of a washing material, which should be changed once or twice a week.

For all these purposes, *woollen material* is the most efficient; and white flannel is the best form of all. It is the worst conductor of heat, and so allows the skin to act most perfectly under all conditions; and however sudden the changes of temperature to which the skin is exposed, this kind of material prevents a check to its action. It is the best absorber of moisture, and the best retainer of it and of the other elements of perspiration. It is, therefore, the most cleanly, when changed as frequently as it should be, that is to say, once a week at least; this is too often neglected, because it does not *look* dirty.

All will admit that flannel is the best for winter wear;

but it is not so generally allowed that it is even more necessary for the summer. No one, however strong, whether living in a hot or in a cold country, should be without a good non-conductor next to the skin—summer and winter.

Next to flannel, in its efficiency as a skin covering, comes merino, then silk, calico, and linen, in the order named.

This under-clothing of flannel should be always worn by day, though the consistency of it may be varied in winter and summer according to the temperature of the seasons. But in this country the summer season should be well established before a change is made in the thickness of the flannel; much illness being caused by a too early change, owing to a few warm days in April or May.

Those undergoing active exertion, as in labouring work; or engaging in the various sports, as hunting and shooting; or the numerous games in vogue for taking exercise, such as rowing, cricket, football, and tennis, where the skin acts very freely, should always wear special flannel garments, which should be changed immediately after the exercise, so as to get rid of the moisture they contain. A neglect of this precaution has cost many a life. A feeling of chilliness after exertion means that the body is cooling too rapidly, and an extra coat is necessary, or the person should move about, so as to check its rapidity.

Parkes says, "Wool is a bad conductor of heat and

a great absorber of water, which penetrates its fibres and distends them. During perspiration, the evaporation from the surface of the body is necessary to reduce the heat which is generated by exercise. When the exercise is finished, the evaporation still goes on to such an extent as to chill the frame. When dry woollen clothing is put on after exertion, the vapour from the surface of the body is condensed in the wool, and gives out again the large amount of heat which had become latent when the water was vaporized. Therefore a woollen covering, from this cause alone, at once feels warm when used during sweating."

The under-clothing for night should be different from that worn in the day, whereas a large number of persons retain some of their day garments, and on going to bed put the night-dress over them. This is a bad plan, for the under garments are in a continual bath of perspiration, and are never allowed to get dry and be sweetened by fresh air, as they might be during the eight hours of bed time, were they removed as they should be from the body.

Moreover, linen or cotton should be the material for night garments—except for children, who are so apt to kick off all bedclothes—as the body is in a uniform temperature under the bedclothes.

Howard says, in a note,¹ "May not one great cause of the unhealthiness of our prisoners be the want of

¹ Appendix to "Prisons," p. 65.

proper *bedding*, which obliges them to lie in their clothes? How different did these prisoners appear at the Castle from many that I have seen in Prussia and at Vienna! I was struck with the same good appearance of the *women* prisoners at several of the spin-houses in Holland. This reminds me of what I heard an old general say, 'That he always found his men subject to illness and diseases when they lay in camps, not from dampness, but *from lying in their* clothes, and the want of *proper bedding*; for at the same time all his officers had been quite healthy and well.' Whatever be the *cause* of this difference, whether a *more free perspiration* in bed, *taking off bandages*, or *ventilation of the clothes*, I am *fully* convinced of the *fact*."

While I have spoken strongly of the importance of wearing flannel next to the skin, I must add that the wearing of it should be uninterrupted. Instead of this, many *ladies* will wear flannel at all times, even high up the neck, by day; and yet, if they are going to a ball, or the opera, will take it off, so that they may wear a "low bodice." How many have suffered from this unwise plan, either by having a severe acute illness, or a prolonged chronic illness, or even have lost their lives, I should be afraid to say. The practice cannot be sufficiently condemned.

In clothing *children*, it should be remembered that they are less capable of resisting heat and cold than adults.

A word is necessary concerning *excessive* clothing, for

it is most injurious. Many people consider themselves, or their children, delicate, and in consequence put on an inordinate amount of clothing. I have seen from four to six layers of flannel on a child who was considered delicate. With such a burden how could the child be otherwise than delicate? Its skin was never dry, but in a continual state of poultice. As soon as it was properly clothed, it ceased to be delicate.

Again, one sees continually a chest preserver here and a back preserver there; an abdominal belt here and a loin belt there. I believe them all to be bad. They produce a local hyperæmia of the skin, which is thus abnormally damp, and therefore much more subject to chill—which they are supposed to avoid or prevent. But do they? I maintain, not. The man who has an abdomen sensitive to chill, or a chest which readily takes cold, does not suffer there from insufficient flannel next to those regions; but, almost always, from getting damp feet, or from going out in a cold damp day or night insufficiently clad all over. Nay more, the local warmth and dampness of skin, caused by these local patches of flannel, render those regions—which are supposed to be protected—unnecessarily sensitive. Moreover, this local clothing is not required, if a suitably thick flannel—according to the season—be worn over the whole of the skin. This excessive under-clothing is even more deleterious than deficient under-clothing, where no flannel is worn at all.

Woollen material, as represented above, is the best of all garments to be worn next to the skin. It is also the most porous to the passage of air through it, and so it tends to allow the skin to keep sweet, and to dry the flannel as fast as it absorbs the moisture of insensible perspiration. It also not only keeps in the heat of the body in cold weather, but keeps out the excessive heat in hot weather ; and in all temperatures, however suddenly they may be varied, it tends by its bad conducting power to hinder too rapid a change both to the circulation of the blood in the skin and the secretion of the skin itself.

The under-clothing should always be worn loosely, as it keeps, by means of a layer of warm air near the skin, the temperature of the skin more equable still.

The aim of all clothing should be to keep the skin warm, but short of moist, under all conditions except very active exertion. The moment there is perceptible moisture on the skin, under ordinary circumstances, it is a sign that too much clothing is worn.

2. *Outer-clothing*.—I have not much to say on this head, as my paper is limited to the consideration of clothes from the point of view of cleanliness and the preservation of health. But a few words are necessary, as the outer-clothing should be varied according to age, sex, and season.

Children and old people need warmer clothing, and women more so than men ; whereas women often go insufficiently clad for health ; and the clothing too is

badly apportioned, being of great weight round the hips, and often all but nothing over the upper part of the body.

Colour, too, is a very important point in discussing the question of outer-garments ; but into this question we must not enter, beyond stating in passing, that *black* is a great absorber, and also a great radiator of heat ; while *white* is a feeble absorber, and a still more feeble radiator.

3. *Boots*, from the point of view of health, should always be well fitting, and made for the feet according to their shape, and not according to the prevailing fashion. If fitting properly, they fail to deform the feet, and chilblains are less likely to occur.

We laugh at the Chinese about their voluntarily deformed feet ; but I could show instances without number which a Chinaman would be heartily ashamed of, so great is the deformity just as wilfully produced by fashionable (!) boots.

The bootmaker is usually abused for making such boots ; but how is he to avoid it ? He exists for the public, and not the public for the bootmaker. He must make what he can sell ; therefore he can only make what there is a demand for, and not what he may think best.

Again, every one should possess a sufficient number of pairs of boots, so that he may have a dry pair to put on, while others, worn in the wet, are drying, the wearing of damp boots being one of the most frequent sources of chronic ill-health.

Warm woollen socks—never cotton—and dry boots are really requisite for the preservation of health ; for then the feet are warm and dry—cold feet being a fertile source of innumerable small ailments, which often constitute what is called “delicacy.”

4. *Linen should be aired.*—Not only is clean linen necessary for health, but that it should be thoroughly aired and dried is still more essential. When this condition is not carried out properly, which is often the case in schools, hotels, etc., where a number of persons have to be cared for, illness is very commonly produced.

Moreover, inasmuch as the secretion from the skin not only saturates the *under* garments, but passes through them and permeates the *outer* garments as well (a process which can be seen in any stable on a cold day, where a horse is covered, while heated, with two rugs, the under one feeling warm and dry, while the upper one will not only feel wet, but be covered with dew-drops), it is necessary that, for perfect health and sweetness, they should be aired and beaten in the sun, or, even better, stoved in a chamber of heat, similar to the disinfecting chamber.

Howard understood the value of this process as a cleanser, and as a destroyer of parasites, for he says, “Every prisoner who comes to gaol dirty, should be washed in cold or warm water, *and his cloathes should be put in the oven, in a sack, on a pair of iron dogs.*”¹

¹ “Prisons,” p. 59.

(iii.) **Cleanliness of House.**—We have hitherto spoken of personal habits of cleanliness, as far as it concerns the cleanliness of the person and of the clothes which cover the person. But this is of little avail alone—much as it is to be desired—for the preservation of health, unless the house and surroundings are healthy. There is as much need for cleanliness here, as there is in the person, as is testified by the *filth diseases* that still exist from unsanitary residences.

We shall have to consider briefly—for the subject is a wide one—all that appertains to the residence, from the point of view of preservation of health.

The great object we should strive to attain for all residences is, that there should be provided a plentiful supply of air and light, inside and out.

The lesson cannot be too strongly impressed, that health is, and must be, the work of the individual—a personal question mainly.

Sanitary officers may do much to guide and direct; but they cannot take the place of the individual in helping himself, no more than they could clean the person and clothes of the individual. It is the duty of every one, rich and poor, to himself, his household, and his neighbours.

1. *Situation.*—In order to enjoy good health, it is of the utmost importance that the residence should be suitably placed in adjustment with the needs of the constitution of the individual.

The first requisite is the *elevation*; and here two points are to be considered. First, the actual height above the sea-level; for on this depends, usually, the dryness of the soil and sub-soil, and the exposure to light, air, and wind; the air itself too is dryer and purer. Next, and very important indeed, though rarely considered in the choice of a residence, is the *level* of the site compared with the immediately surrounding land. For a house may be situated many thousand feet above the sea-level, and yet be badly placed and damp, because the immediately surrounding land is higher, and the site therefore may be on the natural watercourse from the higher ground. The most dangerous spots are depressions below the level of a plain, or dips in a hill, into which the water drains. Moreover, the quality of the *deep* soil must be investigated; for if it be clay beneath gravel, sand, or peat—as is often the case—it may be very unhealthy for a residence, owing to the retention of water saturated with decaying organic matter, though the *superficial* soil may be all that could be desired.

2. There are various *soils* which are more or less healthy and suitable for a residence, according to their power of allowing natural drainage.

But first, I must mention that it is most undesirable to build a house on "*made ground*," for it is usually foul with refuse, which is especially dangerous when it contains animal and vegetable matter. For the heat within the house naturally draws air from every quarter,

and, consequently, sucking up this foul air from the soil forms a very common source of ill-health.

Clay, from its nature, holds water, and will not allow it to drain away; so that it is not only always more or less damp in itself, but gives off continually damp emanations. Thus, there is always present a layer of damp air, several feet thick, which becomes cold after sunset, and can be felt by every one who rides or drives in an undulating country in the evening. As he passes along he will feel in every dip in the country where there is clay as if he were in an ice-house, the damp cold air being seen, too, in still weather as a white mist several feet thick. For this reason clay, and especially low-lying land with clay, is most unsuitable for a residence for any one. While the robust may not perceptibly suffer on account of it, yet those who are not quite strong, and those who inherit a tubercular or scrofulous constitution, or who suffer from gout or rheumatism or kidney disease, or who are subject to chilblains, do not thrive as well as they might were their residence on a more suitable soil. This applies even more strongly to the young and growing—hence the importance of the soil on which “schools” should be established.

It is, however, less applicable where a town exists, which is well-drained and paved. Not only so, but in towns the temperature is more equable, being lower by day and higher by night than in the country; whereas, in the country, the days are hotter and the nights colder.

The difference between the temperature of the day and the night may often be twice as great in the country as in a town.

Gravel, sand, and chalk, being good natural drainers, and not allowing moisture to remain in them—except where the bed of clay underlies—are very suitable soils on which to live, for they are always dry. They are suitable soils for all; but of inestimable value for those who have any delicacy, whether hereditary or caused by mal-nutrition, or from acute disease, and for all during their years of growth.

All soils contain mineral, vegetable, and animal substances, together with air and water in the interstices. The various soils contain various amounts of water, thus—

Loose sand may hold 2 gallons of water per foot.

Ordinary sandstone may hold 1 gallon of water per foot.

Chalk, 13 to 17 per cent.

Clay, 20 per cent.

Humus, 40 to 60 per cent.

Dry granite and marbles only .4 to .4 per cent.

In this country,

25 per cent. of rain penetrates into sand rock.

42 „ „ „ „ chalk.

60 to 96 „ „ „ „ loose sands.

And it is well to remember that the upper layers of all soils are the wettest, because of evaporation.

3. Further, not only are all soils moist in their texture,

but there is also *subsoil* water, which varies to an enormous extent : being sometimes all but absent ; sometimes only two or three feet below the surface ; sometimes several hundred. It is the subsoil water which so often renders land unsuitable for dwellings, causing catarrh, rheumatism and therefore heart disease, neuralgia, phthisis, and malaria. And if ever zymotic diseases are to be diminished, it can only be by getting rid of this and many other unhygienic conditions of residence concerning which we shall speak in this paper ; for it is such conditions which prepare the human body for the suitable reception of the various micro-organisms which make such havoc with the human race.

Vegetation always has a very marked influence on all soils. In *cold* countries, it obstructs the sun's rays, and so evaporation from the ground is slow ; the ground is therefore cold and moist, and the removal of wood renders the climate milder and drier. But in *hot* countries, vegetation shades the ground and makes it cooler, owing to the evaporation from the vegetation itself. Trees possess a very marked power over the soil. Thus, the oak will evaporate eight and a half times the rain-fall ; and the *Eucalyptus globulus* absorbs and evaporates eleven times the rain-fall. Hence trees dry the soil and moisten and cool the air. Herbage is always healthy, and all vegetation also, except where it is so thick as to render the air almost stagnant. (Parkes.)

The *temperature of the soil* is raised by drainage, some-

times as much as 3° Fahr. All soils cool more rapidly than they heat. Schübler, as quoted by Parkes, gives the following table :—

POWER OF RETAINING HEAT ; 100 BEING ASSUMED
AS THE STANDARD.

Sand, with some lime	...	...	...	100'00
Pure sand	...	...	...	95'6
Light clay	...	...	...	76'9
Gypsum	...	...	...	72'2
Heavy clay	...	...	...	71'11
Clayey earth	...	...	...	68'4
Pure clay	...	...	...	66'7
Fine clay	...	...	...	61'8
Humus	...	...	...	49'

Therefore, in *cold* countries, clay soil is cold and damp, and causes catarrh and rheumatism ; and the sandy soil is the healthiest. In *hot* countries, sands are too hot.

Parkes suggests for a *suitable foundation* for a house—

(1) That the subsoil should be drained, so as to lower the level of the ground water.

(2) That the surface of the ground under all houses should be paved, so as to prevent the air from rising from the ground within the house, which the warmth of the house will suck up.

(3) That the soil should be kept from the penetration of impurities of all kinds, by proper arrangements for carrying away rain, surface, and house water, and all house impurities.

He adds, "Whoever considers carefully the record of the mediæval epidemics, and seeks to interpret them by our present knowledge of the causes of disease, will surely become convinced that one great reason why those epidemics were so frequent and so fatal was the compression of the population in faulty habitations. Ill-contrived and closely packed houses, with narrow streets, often made winding for the purpose of defence; a very poor supply of water, and therefore a universal uncleanness; a want of all appliances for the removal of excreta; a population of rude, careless, and gross habits, living often on innutritious food, and frequently exposed to famine from their imperfect system of tillage,—such were the conditions which almost throughout the whole of Europe enabled diseases to attain a range, and to display a virulence, of which we have now scarcely a conception."

The great essential for the existence of health is "perfect purity and cleanliness of the air." Therefore, to attain this, the house should fulfil these five conditions, which Parkes has suggested, and which cannot be improved upon:—

(1) A site dry and not malarious, and an aspect which gives light and cheerfulness.

(2) A system of ventilation which carries off all respiratory impurities.

(3) A system of immediate and perfect sewage removal, which shall render it impossible that the air shall be contaminated by excreta.

(4) A pure supply, and proper removal, of water ; by means of which perfect cleanliness of all parts of the house can be insured.

(5) A condition of house construction which shall insure perfect dryness of the foundation, walls, and roof.

Howard also saw clearly what was required ; for he says ¹ "In respect to *healthiness*, the situation at Islington is much more eligible than any of the populous parts of the city—so that by providing airy apartments, free ventilation, plenty of water ; and by promoting cleanliness, accompanied by wholesome food, and a proper degree of labour ; the convicts may there enjoy better health than falls to the lot of many thousands of reputable tradesmen and mechanics," etc.

For many people a southern *aspect* is of the greatest value, whether for day or night rooms ; for the air in such rooms is much purer than in sunless rooms, as well as much warmer.

Protection from the prevailing *wind*, or from the coldest wind, is with some also an essential point, with others a matter of comfort only. It may be obtained by site or tree-planting.

It is usually stated that hot weather is relaxing and unhealthy, while cold weather constringes and generates health. But this popular statement, like many others, is not borne out by facts. I think the majority of people will admit that in warm weather, when they can live out

¹ "Lazarettos," p. 225.

of doors, they feel much better in health, and more vigorous than during cold weather, when many hours are spent indoors. Besides which, under warmth all our functions, mental and physical, are more active; while sluggishness and depression prevail during cold weather, and, if we go a step further, we see that excessive cold arrests all the functions of the body, and causes death.

The weather most deleterious to all is that which is cold and damp. This kind of weather is even worse than cold with east wind; for this, though keen, is dry. Damp is the great poison to human beings. The temperature of the air suitable for most people, is from 60° to 75° Fahr.

4. *Air*.—The first expression used by Howard in speaking of health, is “fresh and sweet air.” This is the chief essential to all living matter, whether animal or vegetable. Without it animal and vegetable life fails to develop to its best,—it is vital to all living tissues.

There can be no cleanliness, either in or out of the body, without pure air.

Air enters the human body, and being circulated to every portion of tissue by means of the blood, unites, by oxidizing, with all the worn-out materials of bones, muscles, blood, nervous tissues, and waste products from food, forming thereby chemical compounds, which are got rid of by the various excreting organs, acting as scavengers. This air is supplied by a special function,

called respiration, by which means fresh air is inhaled, and effete air exhaled. By this process the blood is oxygenated and decarbonized and, thus purified, is fitted to perform its vital functions; without this process, stagnation instead of circulation would ensue. The purer the air, the quicker and stronger the circulation, and consequently the more active the vital changes in the system.

External to the human body, too, air is the greatest cleanser and purifier. Whenever it is deficient in quantity, or impure in quality, immediately our noses testify to the presence of filth, which is in need of removal by this greatest of purifiers. Even the external surface of our body cannot be kept clean and sweet without a plentiful supply of air; for the secretion of the skin itself soon becomes malodorous, owing to the absence of the oxidizing power of the air. The stench from such secretions is unfortunately only too well known to medical men. Soap and water are invaluable as cleansers; but their power is as nothing compared with the cleansing power of air.

I have spoken several times of pure and impure air,—what do I mean by these terms? All air consists of oxygen and nitrogen, and everywhere in the same definite proportion. But there is no such thing as pure air, though it is called pure when the impurities are only slight; impure, when it is mixed with impurities in considerable quantities,—the chief of these being carbonic

acid gas, whether generated from human beings or from burnt products. Moreover, it is necessary to remember, that air is rendered impure, not only by the *abstraction* of its oxygen in respiration and combustion, but also by the *addition* to the air of the products of this combustion, chiefly in the form of carbonic acid gas.

The air of town and country is of course originally the same in composition. But town air is always more or less laden with these impurities ; while country air is more or less free from them. Hence, the exhilarating feeling of breathing fresh country air, as a contrast to town air often saturated with poisonous gases.

The virtues of fresh air are also great in their effect upon infectious poisons ; for these fail in their power in the presence of a free supply of fresh air. They become either absolutely inert, or of greatly diminished intensity.

That pure air is a necessity for a healthy well-being is well expressed by Parkes when he says, "The average mortality in this country increases tolerably regularly with density of population. Density of population usually implies poverty and insufficient food and unhealthy work, but its main concomitant condition is impurity of air from overcrowding, deficiency of cleanliness, and imperfect removal of excreta ; and when this condition is removed, a very dense and poor population may be perfectly healthy."

"The same evidence of the effect of pure and impure air on health and mortality is still more strikingly shown

by horses ; for in that case the question is more simple on account of the absolute similarity in different periods and places of food, water, exercise, and treatment. Formerly, in the French army, the mortality was enormous. Rossignol states that, previous to 1836, the mortality of the French cavalry horses varied from 180 to 197 per 1000 per annum. The enlargement of the stables and the *increased quantity of the ration of air* reduced the loss in the next ten years to 68 per 1000."

Air is composed of 79 parts of nitrogen to 21 parts of oxygen, together with watery vapour to the extent of 65 to 75 per cent. of saturation ; and in this form it is inhaled, the oxygen being the active ingredient and the nitrogen, probably, only a simple diluent, the air exhaled consisting of carbonic acid gas, nitrogen, and watery vapour.

In twenty-four hours about 400 cubic feet of air enter the lungs. Every ordinary expiration expels 20 to 25 cubic inches of air, which contains about 4 per 1000 volumes of carbonic acid, while a deep expiration exhales about double this amount. The proportion of carbonic acid in ordinary pure air before inhalation is estimated at about .2 per 1000 volumes.

The temperature of expired air is raised, however low when inhaled, to that of the blood, which is from 97° to 99° Fahr. And Parkes says, "In a room, the air of which is at first perfectly pure, but is vitiated by respiration, the smell of organic matter is generally perceptible when

the carbonic acid reaches $\cdot 7$ per 1000 volumes, and is very strong when the carbonic acid amounts to $1\cdot$ per 1000 volumes."

But it should be remembered that it is the foul organic matter and the excess of moisture that are most perceptible to the senses, and render the rooms, to use the usual phrase, "stuffy."

The question is, How shall the air we breathe be kept so pure, when we are indoors, that it shall not be injurious to health? De Chaumont showed that air containing $\cdot 2$ per 1000 volumes of carbonic acid was pure, and that at $\cdot 4$ the air began to smell close.

5. This raises the subject of *ventilation*—one of the most important concerning which we have to speak in this paper. For there is no personal habit more common, none more deleterious, and none more uncleanly, than living, working, and sleeping in ill-ventilated rooms, and breathing the same air over and over again. It causes ill-health from the imperfect working of all the internal functions of the body, and renders the human being predisposed to the successful attack of poisons from without.

By ventilation we mean the process of changing air in buildings and rooms so as to render them habitable, that thus they may be as far removed as possible from the condition of the "Black Hole of Calcutta," and the condition of the gaols in Howard's day, where the want of ventilation was so great that he says, "And as to air,

which is no less necessary than either of the two preceding articles (bread and water), and given by Providence quite *gratis*, without any care or labour of our own, yet, as if the bounteous goodness of Heaven excited our envy, methods are contrived to rob prisoners of this *genuine cordial of life*, as Dr. Hales very properly calls it: I mean by preventing that circulation and change of this salutiferous fluid, without which animals cannot live and thrive. It is well known that air which has performed its office in the lungs is feculant and noxious. Writers upon the subject show that a hogshead of it will last a man only an hour; but those who do not choose to consult philosophers, may judge from a notorious fact. In 1756, at Calcutta, in Bengal, out of 170 persons who were confined in a hole there one night, 154 were taken out dead. The few survivors ascribed the mortality to their want of fresh air, and called the place, from what they suffered there, *hell in miniature*! Air which has been breathed is made poisonous to a more intense degree by the effluvia from the sick, and what else in prisons is offensive. My reader will judge of its malignity when I assure him that my cloaths were, in my first journeys, so offensive that in a postchaise I could not bear the windows drawn up, and was therefore often obliged to travel on horseback. The leaves of my memorandum-book were often so tainted, that I could not use it till after spreading it an hour or two before the fire; and even my antidote, a vial of vinegar, has, after using

it in a few prisons, become intolerably disagreeable. I did not wonder that in those journeys many gaolers made excuses, and did not go with me into the felons' wards."¹

It cannot be too clearly recognized that where human beings live in a space which is not supplied with a free amount of fresh air, this air very soon becomes poisoned, not only on account of the abstraction of its oxygen for the purposes of respiration, but by the giving out of the poisons, carbonic acid and organic matter, in its place; added to which we must include the cutaneous exhalations, and the products of combustion from lights.

Hence the necessity to change this air, to supply fresh oxygen, and to allow an exit for the carbonic acid gas and animal matter. This change is effected by what is termed ventilation.

The prime fact to be borne in mind in considering this question is, that pre-breathed air is a poison.

We have already seen above, that the air of the atmosphere always contains some carbonic acid—about $\cdot 2$ per 1000 volumes; and we have now to consider what state of purity is essential for the air of habitations, for they cannot be expected to be as free from impurities as the external air. And it seems that the best practical criterion, according to Parkes and De Chaumont, is that as the organic impurity of the air is not perceptible to

¹ "Prisons," p. 12.

the senses until the carbonic acid gas rises to the ratio of $\cdot 6$ per 1000 volumes, this ratio should be regarded as the limit of impurity. And, allowing this as the *maximum* impurity that should be permitted, they estimated that the necessary amount of pure external air that should pass through a room per head per hour, in order to keep the carbonic acid at this ratio, is about 3000 cubic feet, and they give this excellent table to show the degree of contamination of the air (in terms of CO_2 or carbonic acid) by respiration, and the amount of air necessary to dilute to a given standard of $\cdot 2$ per 1000 volumes of air, exclusive of the amount originally present in the air :—

Amount of cubic space (= breathing space) for one man in cubic feet.	Ratio per 1000 of CO_2 from respiration at the end of one hour, if there has been no change of air.	Amount of air necessary to dilute to standard of $\cdot 2$ during the first hour.	Amount necessary to dilute to the given standard every hour after the first.
100	6.00	2900	3000
200	3.00	2800	3000
300	2.00	2700	3000
400	1.50	2600	3000
500	1.20	2500	3000
600	1.00	2400	3000
700	.86	2300	3000
800	.75	2200	3000
900	.67	2100	3000
1000	.60	2000	3000

In our climate we cannot change the air more frequently than three or four times per hour without causing

draught, and so each person ought to have from 1000 to 800 cubic feet of space, the air of which should be changed three or four times per hour respectively.

The *minimum* amount of cubic space supplied for healthy human beings should be about 800 cubic feet, provided the air be changed about four times in an hour, *i.e.* at the rate, as above stated, of about 3000 cubic feet per head per hour. This is what Parkes' experiments indicated; and we have the same answer supplied by Howard himself a century ago, which he probably discovered by the keen observation of his nose.¹ "It may be asked of what size I would wish prisoners' solitary *night-rooms* to be? I answer, ten feet long, ten feet high, and eight feet wide. Warming the rooms in any manner is unnecessary to those in health, but the sick must be provided for." He also said, "None of the rooms for confinement should be lower than the ground floor; rather a storey above it. Each work-room should have a thoroughfare for air; but the opposite windows need not be equal; the back windows half the size of those in front, and six feet from the floor."

But for large rooms Howard recommends (and it would be well if it were carried out in this nineteenth century in our churches and chapels, which are so atrociously unventilated), "in the centre of the ceiling of the new chapel is an aperture, covered by a small turret, which keeps this room airy and pleasant. All prison

¹ "Lazarettos," p. 202.

chapels should be thus supplied with fresh air." See Dr. Priestley's experiments, etc., page 281, his words are,—
"I would advise, therefore, that when large rooms are built, provision be made for letting out the vitiated air at the top of them."

In discussing the ventilation of dwellings, another point to consider is the necessary amount of air required for the products of *combustion*. Where these products enter a room, as is usually the case in most houses, Wolfert says, that for every cubic foot of gas burnt, 1800 cubic feet of air must be supplied, so as to render the air innocuous. And Parkes considers that this is not too much; for one cubic foot of gas produces two cubic feet of carbonic acid, sulphurous acid, and other gases. Our ordinary gas-burner consumes about three cubic feet per hour; and in an evening of four hours, will burn from 10 to 12 cubic feet of coal-gas, so that 18,000 to 21,000 cubic feet of air will be required for this combustion.

Much has been said in society about the various artificial lights in use; and the upholders of the virtues of *candles* condemn, in scarcely measured terms, the abominations of *gas* in private dwellings.

Dr. Meymott Tidy sets this question at rest by the following excellent and convincing table, showing the oxygen consumed, the carbonic acid produced, and the air vitiated, by the combustion of certain bodies burnt so as to give the light of 12 standard sperm

candles, each candle burning at the rate of 120 grains per hour :—

Burnt to give light of 12 candles, equal to 120 grains per hour.	Cubic feet of oxygen consumed.	Cubic feet of air consumed.	Cubic feet of carbonic acid produced.	Cubic feet of air vitiated.	Heat produced in lbs. of water raised to 10° Fahr.
Cannel gas	3'30	16'50	2'01	217'50	195'0
Common gas	5'45	17'25	3'21	348'25	278'6
Sperm oil	4'75	23'75	3'33	356'75	233'5
Benzole	4'46	22'30	3'54	376'30	232'6
Paraffin	6'81	34'05	4'50	484'05	361'9
Camphine	6'65	33'25	4'77	510'25	325'1
Sperm candles	7'57	37'85	5'77	614'85	351'7
Wax	8'41	42'05	5'90	632'25	383'1
Stearic	8'82	44'10	6'25	669'10	374'7
Tallow	12'00	60'00	8'73	933'00	505'4
Electric light } (Hammond) }	None	None	None	None	13'8

The preceding figures prove the necessity of resorting to the electric light for our dwelling and sleeping-rooms, the moment it can be carried out at a price within the reach of all. But, of course, where gas is employed, the proper mode of using it is to allow the fumes to escape by some means of ventilation at the level of the ceiling—as by Potts' cornice, or the various ventilating gas chandeliers, which conduct the fumes away by a pipe; by such an arrangement the burning of gas in dwelling-rooms becomes a valuable mode of artificial ventilation.

We have at present spoken of ventilation as it affects adults in ordinary life; and many would have us

believe that in nurseries, schools, etc., children need only be supplied with half the amount of air space, because of their size. No greater mistake was ever made—a mistake serious in its effects. For children cannot thrive well without the purest air; they are peculiarly sensitive—together with the young of all animals—to pre-breathed air. Air is the greatest essential to life—greater far than water or food. We cannot exist a few moments without air; though we can live many days without water, many weeks without food. Yet schools, as a rule, where the young reside during their growth and development, provide plenty of food, are less particular about the quality of water, and have very little regard as to the amount, and therefore as to the quality, of the air supplied. Parents will take any trouble, and make any complaint, about the quality and the quantity of the food at schools, but take no trouble whatever about the quantity of air provided. They continually find fault with the appearance of their children when they go home for the vacation; and immediately assign as the cause that the food is bad. Whereas in a large proportion of cases, the reason is solely that the pupils have to live and work hard in insufficient air-space; and have to sleep in still less.

One of the most important axioms which it is essential to learn and remember, is, that the greatest sufferers of all, from bad ventilation, are the young. This has been proved over and over again by the fact, that as soon as

more air has been supplied, mortality—which had been great—diminishes. The active functions of the children, together with their quicker breathing, necessarily produce more rapid tissue changes. Infants, especially, often die or fail to grow, from the abominable practice (prevalent amongst mothers and nurses) of covering over their heads with shawls, or burying them in the bedclothes, so that they necessarily breathe the same air over and over again, until they become almost asphyxiated. When the covering is complete, death from carbonic acid poisoning is as certain to the infant, as is death from the fumes of the lime-kiln to the labourer who ventures to sleep near it. This fact cannot too strongly, or too often, be brought before the notice of mothers.

There is also another prejudice—nearly as deleterious to all, and especially so to the delicate—which will not bear examination. Even those who will grant that 800 cubic feet of space are requisite for a day-room, consider that half that amount is sufficient for bedrooms, because respiration in sleep is slower, and all tissue changes less active. Let those who hold this theory make a little practical experiment by entering a bedroom immediately after it has been vacated, after eight hours occupation, with 400 cubic feet alone supplied—and ascertain by smell the condition of the air! Is it forgotten, too, that one-third of every day is spent in a bedroom; more than a third of a lifetime?

Moreover, in every room, means of ventilation should be provided, so as to allow an inlet of 3000 cubic feet per head per hour without draught.

How is this to be effected? In considering the matter it is important to remember what we have to deal with.

We have two kinds of air which we wish to exchange, one for the other; the one spent air, which is warm; the other, fresh air, which is usually cooler. It is also necessary to bear in mind, that whatever be the temperature of the air inhaled, that exhaled reaches the temperature of the body (98.4° Fahr.); and it is saturated with watery vapour.

Now we know that heat expands everything; and, therefore, air which is warm is specifically lighter, and so ascends to the upper part of the room; the cooler air, being heavier, remains at, or sinks to, the lower part of the room.

It is, therefore, clearly manifest, that to provide an *exit* for the warm impure air which always ascends, the aperture or outlet should be at the upper part of the room. For this purpose various means are employed. Thus, Dr. Arnott's ventilator into the chimney is used, which is an equally poised valve, made of talc, that closes if there be a down draught, and so only allows air to flow one way—that is, out of the room into the chimney; also Boyle's chimney-breast ventilator; Potts' cornice; Benham's gas globes; and, where rooms are large and lofty, Howard's plan for chapels—spoken of

above—may be effective, or, open windows on the opposite sides of the upper part of the room. But above all, for large rooms and halls, Boyle's air-pump ventilator—an excellent exhauster, and with freedom from draught. And last, but not least, for all rooms—large and small—the ordinary fire-grate, as we use it in this country; here the chimney extracts air sufficiently for four or five persons in an ordinary sized room.

But the great difficulty is to provide an *inlet* for fresh air, without a cold draught. Where the incoming air is previously warmed, this is easy enough; and it may enter anywhere, and at any rate. But where the entering air is cold or cool, it is generally difficult to allow the entrance of sufficient air without causing an inconvenient draught.

Every room needs treatment in its own way, according to its size, the number of occupants, the aspect, and according to the direction and force of the wind.

It is clear that there is only one mode in which the external air should enter; for cold air being specifically heavier than warm air, if it enter a room near the floor, it must remain there and exist as a stratum of air many degrees colder than that above it. It should, therefore, enter at the upper part of the room, so that as it naturally descends—being heavier—it may mix with the warm upper air of the room, and thus be warmed somewhat in its descent. This, however, often causes a draught, the fault being, not with the principle, but with the

method used in carrying it out. For instance, if much air be required in a room, which is well-warmed inside and the air very impure, it is palpable that with one ventilator only provided, nine inches by three, as is so frequently the case, the rate of entrance will be exceedingly rapid, and the stream of cold air consequently pour down in a rushing continuous current,—resembling a ray of light through a small hole ; to avoid this, sufficient inlets should be established.

This defect may be remedied by Sheringham's ventilators ; or by Ellison's conical bricks inserted not too near the ceiling.

There is also another plan—that of Tobin's inlets—which answers the same purpose ; Hinckes Bird's inlet between the two sashes of the window may also be adopted, by means of which the air enters with a rush, about half-way up the height of the room, and gradually falls warmed by the upper stratum of air in the room.

I have hitherto spoken chiefly concerning the ventilation of rooms ; but another requirement of even greater importance—for without it, the rooms themselves are poisoned—is the ventilation of passages, staircases, and halls, by some of the various modes already mentioned. The defect is of very frequent occurrence, as it is generally forgotten that all rooms greatly depend for air upon these passages.

Every nook and corner, in and out of cupboards

is in want of ventilation ; otherwise mildew is apt to arise, and bring in its train ill-health and disease.

6. *Fires*.—The question of *warmth* in houses is one of great moment ; especially for the aged and young, who cannot live or thrive well in cold weather without artificial warmth. And many are the poor who go without food, or stint their supply, in order that they may have their morsel of fire.

It is the same with the young of animals ; they either die, or fail to thrive, for want of warmth. Not long since, by the provision of warmth, I saved a thoroughbred foal of great value for a friend. It had lost its dam, and was wasting away daily for want of the warmth of its mother ; I put it into a loose box and with it, but separated from it, the largest cart horse I could find. This generated the warmth required ; and the young animal's condition being at once altered, it was able to be reared.

Howard knew the importance of warmth, too, for he says,¹ “ I have mentioned the necessity of *firing* in bridewells, but, perhaps, have not sufficiently insisted on it in gaols. I therefore take occasion here to observe, that this is not only what humanity demands in our climate, but that it is essential to the preservation of the health of the prisoners, by promoting the circulation of air, and preventing those mortifications of the feet to which they are so liable. I well know, that the want of firing, joined to scanty provisions, has been the cause of great mor-

¹ “ Prisons,” Appendix, p. 196.

tality in our prisons during the winter." It is a well-known fact that warmth and light are essential to all human beings.

The best warmth we can have in a room, or a house, is that which combines warmth and ventilation. Any thing is better than "close stoves" which do not ventilate; or gas-stoves which discharge their burnt fumes into the room.

Under ventilation, I spoke of the means of inlet for fresh air being provided near the top of the room. This is undoubtedly the best plan, where the fresh air is obtained from outside and is cold; but if the fresh air enters warm, the place of entrance should be below, and not above, for by this means, after entrance, it rises to the upper part of the room; whereas, if it enter above, it remains there, being specifically lighter, and little circulation takes place in the room. For the ordinary healthy individual, the living rooms should be cool, without being cold; between 50° to 60° Fahr.

For the sick, where the illness is attended with high temperature of the body, cool rooms, for most cases, are unquestionably also the best,—we do not "stew" fevers nowadays. But, for all ordinary illness, warm rooms, from 60° to 65° Fahr., are more advisable.

Convalescents from any illness always need artificial warmth in cold weather; and even then the temperature of the body is generally subnormal, varying from 95.5 to 97.5 Fahr.

Where there is no artificial warmth, the individual must be well fed, well clothed, and well exercised in order to maintain health. Where these conditions are present, artificial warmth is often immaterial in ordinary cold weather.

For the sick, the aged, and the young, artificial warmth is a necessity in the cold seasons.

Our open fireplace is an excellent plan for warmth and ventilation combined: in small rooms especially. For larger ones, hot water pipes form an admirable method, especially if means be provided for passing fresh air over them which becomes warmed in the transit. Hot-air flues also will sufficiently warm a large room, or a whole house, when the entering air is carefully obtained, when the flues are large enough to be properly cleaned out, and when the air is not heated above 70° to 75° Fahr., since at such a temperature it retains sufficient moisture, is not burnt, and thus is never oppressive.

Besides the preceding arrangements, we have Galton's Grate; George's Calorigen, and Bond's Euthermic—all of them admirable plans for warmth and ventilation.

7. *Light*.—From what I have hitherto said concerning *fresh air*, it must be manifest that its constant presence is necessary for a healthy and active life. I shall now strive to show that we cannot obtain what Howard regards as essential for health, "*fresh and sweet air*," without *Light*.

All the higher forms of organic life—animal and vege-

table—are dependent on light for vigour. None of them can thrive without it ; and according to its abundance or deficiency we find them looking luxurious and healthy, or dwindling and wasting.

Light is the great stimulus to life and vigour—especially in the young. Hence the importance of children not only being out in the sun as much as our uncertain climate will allow ; but, also, having their rooms, night and day, facing the sun, especially the southern sun.

Many will admit that the day rooms should face the south ; but do not allow the importance of night rooms also having a sunny aspect. Yet, it should be known to all that, quite apart from the question of warmth from the sun, the air in rooms which get the sun, is quite different from that in rooms into which the sun never shines. The air is said to be more ozonized where the sun shines ; but whatever be the reason, air of this character is a very important condition of health, especially for the young and those who are delicate—even although they are never actually in the rooms during the time the sun is shining in them. Moreover the organic matter given off in respiration and perspiration from the bodies of those who occupy rooms thus situated, is oxidized, burnt up and so destroyed, more completely ; and thus a source of uncleanness is more thoroughly removed. The importance of this is still more plainly seen however, when we consider the

number of hours which children spend indoors, compared with the number they pass out of doors in the open air. Taking the yearly average, the ratio is about 18:6, or 75 per cent. of the whole time indoors to 25 per cent. out of doors.

That children, like plants, need the sun, we can see by the colour of their faces, and their unbounded activity when they get plenty of it; their pallor and their lethargy where it is denied to them.

This requirement is also true for healthy adults, for no one can thrive without it; it is still more true for the sick and injured. I remember well, when I was house surgeon to my *alma mater* in London, that one of our "wards" was very dark; and here even simple fractures would take seven to fourteen days longer in uniting than they would have done in a well-lighted ward; while bad compound fractures we were afraid to place in the ward at all, as they were always most unsatisfactory in mending, and when we were compelled to place them in the ward, we sought a bed where the light was greatest.

Those whose occupation deprives them of light, even where the supply of air is plentiful, carry the trade-mark in their faces—absence of light. Without the sun, the great source of light, the necessary chemical changes which go on in our body are more or less impeded; and instead of health and vigour of mind and body, mental and bodily depression take their place, and subsequently disease and death.

Light is not only the great preserver of health, but a great preventer also of disease ; for Tyndall found that sunlight arrested the growth of organisms. So that, as Dr. Murphy states, sunlight serves the double purpose of aiding the growth of those organisms which are necessary for man, as well as of man himself ; while it retards the production of those which are antagonistic to his existence.

It is also well known that all the lowest forms of life “love darkness rather than light,” probably, “because their deeds are evil.” Where do we seek mildew and fungi ? Nothing is so certain to destroy them as to turn plenty of sunlight *upon* them, when they at once begin to dwindle and die, as readily as the higher organisms under the *deprivation* of sunlight.

It must, therefore, be borne in mind that absence of colour in the lips and cheeks means deficient vitality. For this colour depends on the proper oxidation of the blood, necessary to make good red corpuscles. When these are deficient in number, and poor in colour, all the tissues of the body are imperfectly nourished, and consequently wanting in vigour, and more liable to become victims to disease.

To provide for this light in our dwellings, where we all spend so much time, large windows are necessary. The Local Government Board requires that windows shall be one-tenth the area of the floor of the room.

Those who delight in æstheticism, and revel in a “dim

religious light," with stained glass window screens, and heavy curtains to the windows, which diminish their size, must not only cause their own health to deteriorate, but that of their children also, and thus contribute to the extinction of their name.

In treating of the "personal habits" of the individual, we shall have to consider him "*at home*," with all that relates to his health and habits there; and thus, we are concerned in his dwelling, his water supply, his house drains, and his disposal of house refuse, etc.

8. *Habitations*.—I have already discussed the surroundings of a house for residence, so that life may not be shortened by unhygienic conditions. I have now to refer to the house itself. And, first, we must think of the foundation on which the dwelling is to stand; and here the most important condition of all is, that it should not be built on "made ground," as this renders a house most unhealthy, causing sometimes chronic ill-health; at others, acute fatal illnesses; and here, as well as under all the other sanitary conditions of which I have had to speak, it is the young who suffer most often and most severely.

There should also be a solid concrete foundation under the whole surface of the house, and not only (which is the usual plan) under the walls, so as to prevent damp rising into the house from the surface of the soil on which it stands. Moreover, the whole of the surrounding soil should be well drained from all possibility

of surface and subsoil water remaining near the surface of the ground ; for there is no greater cause of ill-health, and especially of consumption. In the place where I reside, effective drainage has diminished the deaths, from consumption alone, by forty to fifty per cent.

A "damp course" in the walls is also a necessity ; otherwise the damp from the soil rises up the bricks, and the walls are always spotted with mildew.

The walls themselves should be sufficiently thick to keep out damp and cold ; and if built with an air space between the inner and outer bricks, called "hollow walls," they are always drier, air permeates them more easily, and the house is cooler in summer and warmer in winter.

The walls inside ordinary dwelling houses may be papered ; but where many reside, as in nurseries, and schools, cleanliness is better preserved by having the walls lined with wood, called "match boarding" or panelling—painted or varnished ; or the walls may be "distempered," so that they may be scraped of all adhering organic matter, and recoloured once a year.

Howard's advice for prisons was that, "Every ward and room should be well scraped twice a year. Each ward and room should be swept and washed every day, and sometimes by hot vinegar." Further, he adds, "In addition to what has been said with regard to cleanliness, it may be observed, that when quicklime is slacked in boiling water, and immediately used, it not only destroys

vermin, but is found to be one of the strongest *antiseptics*. In confirmation of this fact, I shall take the liberty of mentioning a remarkable instance of its efficacy in this respect. Dr. John Hope, the first physician to the Royal Infirmary at Edinburgh, informed me, on one of my visits there, that two or three years before a putrid fever had prevailed in that hospital, and that one large ward in particular was so deeply infected as to prove fatal for some time to the patients that were lodged in it; but that lime-whiting the walls had *eradicated* the infection after washing the ward *repeatedly* with vinegar had failed of this effect, and that this *salutary* practice had been continued ever since.”¹

It should also be the duty of every head of a house to see that his walls are not made a source of poison to himself and his family by containing arsenic or other poisons, either in the paper-colouring matter, in distemper, or in paint; for it frequently causes ill-health. Before papering the walls of my own house, I sent every paper to an analytical chemist. I had carefully selected all those that, from their colour, I thought must be free from arsenic; yet all but one or two, on analysis, were found to contain it in large proportions. There are wall-paper makers now who guarantee a freedom from arsenic, so that non-poisonous wall-papers are not so difficult to obtain as formerly.

Living rooms should, as far as possible, be placed on

¹ “Lazarettos,” p. 118.

the ground floor ; those inhabiting them can then go in and out of doors freely.

The *kitchen* should be constructed as an outbuilding where it is feasible ; if not, it is better placed upstairs rather than under the dwelling-rooms.

The *larder* should be cool, properly situated, and well ventilated ; and there should be no drain in it. I once knew every inmate of a house to become dangerously ill with typhoid fever, because there was a drain in the larder which ventilated the sewer ; and the whole of the food was saturated with sewer-gas. I also knew a large house where the larder was divided into two ; one part was used as a larder, the other as servants' water-closet, with what effect may be imagined.

Bedrooms are usually and wisely situated upstairs. They should be bedrooms only, not sitting and bedrooms combined. The windows should be opened at the top and bottom by day, closed before sunset in winter ; and they should be sufficiently ventilated by night by some one or more of the modes mentioned under ventilation. They should allow eight hundred cubic feet of space for each occupant. For ordinary healthy adults they should not be warmed ; but for the young, the aged, and the delicate, warming is a necessity during cold weather.

All *bedding*, blankets, pillows, etc., should be frequently turned out of doors to be aired and dried, so as to get rid of all moisture and the organic matter

with which they are saturated from their nightly use. Yet how few people take any trouble to even ventilate their beds and bedding; for as soon as they are out of them the beds are re-made, whereas they should not be re-made until they are ready to be re-occupied. As at present used, beds and bedding need airing, sunning, and brushing, or being placed before a fire every few weeks.

In schools, as a rule, in the vacation, the mattresses, pillows, and blankets are all piled together in a heap, which allows the organic matter with which they are soaked to ferment; instead of which, they should be all separated and exposed to the sun and air as much as possible. Moreover, in how many schools are the beds aired before being re-occupied after the vacation? Do they amount to five per cent. in the schools in this country? I think not. The sick-beds and bedding in all schools, being used for all manner of illnesses continually, should after every occupation be placed in the disinfecting chamber and treated just as if they were poisonous; by this means they can be always kept clean and sweet, and produce no harm to any occupant.

Bedrooms are sometimes converted into poisonous chambers through an improperly constructed water-closet being near; through an untrapped housemaid's sink; or through a bath-waste or cistern overflow acting simply as a ventilator to the sewer.

While speaking of bedrooms, I must just allude to the importance of teaching the poor—and helping them to realize it—the necessity of the separation of the unmarried sexes; whereas, sometimes not only both sexes of the young and old of one family are herded together, but even of more than one family; with what effects is only too well known.

9. *Water Supply*.—Every dwelling-house should be amply supplied with clean fresh water (not by meter, lest it should be scantily used), for without this necessary article of daily use, health cannot exist. Water is an essential in food; and for cleaning purposes, whether of the person, clothes, house, or surroundings.

The rule should be, if health is to be preserved, pure water and plenty of it, about twenty-five gallons per head being provided per day for all purposes.

An *insufficient* supply causes want of cleanliness in person, clothes, and surroundings, and thus entails not only deterioration of health but actual disease, for example, enteric fever, skin disease, vermin, etc. An *impure* supply is usually contaminated with animal or vegetable organic matter and salts; and with foetid gases,—*animal* matter causing diarrhoea, enteric fever, dysentery, cholera, and entozoa; *vegetable* matter producing malaria and dysentery; and *foetid gases*, as from grave-yards and sewers, causing diarrhoea and enteric fever.

In the Rivers' Pollution Commissioner's sixth report, the following table of the quality of waters is given :—

Wholesome.	{	1. Spring water.	}	very palatable.
		2. Deep-well water.		
	{	3. Upland surface water.	}	moderately
		4. Stored rain water.		
Suspicious.	{	5. Surface water from cultivated land.	}	palatable.
Dangerous.	{	6. River water to which sewage gains access.		
		7. Shallow-well water.		

In *towns*, nowadays, there is usually a good and plentiful supply of water furnished to every house. Where a *constant supply* is feasible, we should avail ourselves of it; the only objection to it being, that when it is interrupted for repairs to take place, the pipes are apt to become filled with air, not always fresh, sometimes very foul. Also, during repairs in the town, a whole section of houses may have the water “turned off” for several consecutive hours. Water should always be “laid on” upstairs as well as downstairs, so that there is always a plentiful supply close at hand.

In other cases, *cisterns* are in use—an excellent arrangement, when they are properly constructed, properly situated, properly protected, and periodically cleaned out; but a frequent cause of impure water—and its necessary ills—when this attention is not bestowed

upon them. Care should also be taken that the water is not poisoned from the material of the cistern and pipes; and that the house, and water also, is not rendered deadly by a wrongly constructed overflow pipe.

Wells in towns are always dangerous, owing to the ramifications of drains underground, which are more or less leaky, and thus allow their contents to enter the wells. Such water is usually "sparkling." A friend of mine, in whose well-water you could see the organic matter swimming about, informed me that it was so sparkling and beautiful that he always offered his friends a glass of it instead of wine; his wife had already had typhoid fever.

Again, there is a well in a court in the town near which I reside, which for many years has borne the character of being the best spring water for miles round; consequently rich and poor come to draw there, even although the town water is excellent. It was analyzed, with this report, "that it is very largely contaminated with sewage, and highly dangerous for use for drinking purposes."

In the *country*, wells are, at the present time, a necessity, and they may be quite safe, if means be taken to keep out the surface water, which is the great source of danger as it is usually contaminated with organic matter. (See the table given on page 78. Deep-well water, wholesome; shallow-well water, dangerous.)

I once knew a gentleman who took great pains to

have his well-water pure ; and, inasmuch as the drain from the house passed very close to the opening of the well, he gave orders that the well-mouth should be carefully bricked over and all the space between it and the drain pipe puddled with clay ; by this means he hoped not only to keep out all surface water, but to prevent, as far as possible, a leakage from the drain pipe finding its way into the well. Presently, a house flannel found its way into the drain pipe and stopped it, so that a leakage occurred, and the well became terribly poisoned. I was asked to investigate the matter, as he had taken so much trouble without success. All had been carried out as he desired, as far as the bricking and puddling were concerned, *only*, they had bricked and puddled the drain pipe inside, instead of outside, the mouth of the well, thus converting the well into a cesspool.

Wells should be on a higher level than, and at a distance from, the cesspool, the farmyard, and the refuse-heap ; and clear of all neighbouring drains. The reverse of this is often the case, and in a large school, where scrupulous care had been taken in all other sanitary matters, the well, I found, was on a lower level, so that, in a wet season, the cesspools filled with water and overflowed, and we could trace the sewage as a black slimy substance trickling down the side of the well. In this case many cases of typhoid fever occurred, and one of diphtheria, which ended fatally.

An acquaintance, who took great interest in sanitary matters, built his house on a pretty hillock, with every detail carefully carried out ; but, unfortunately, his well was placed on a lower level of the hillock than the cesspool. Presently the cesspool contents found their way down the hill to the well, and he was attacked with typhoid fever.

Filters.—In *towns* the water companies always filter their water before it leaves their premises. This is necessary ; but it is always better for every householder to filter his own potable water ; it may have been imperfectly carried out by the companies, or it may have become contaminated in its transit or in the cistern.

For this purpose several excellent household filters have been manufactured. For instance, the “Spongy Iron,” which not only arrests suspended matters, but oxidizes organic matter ; “Carferal,” “Silicated Carbon,” “Dr. Bond’s Aërating,” and the ordinary Block-carbon filters.

But where water is known to be deleterious, no filter is competent to purify it ; and the only process by which it can be safely used is to boil it, and then let it stand to deposit, or better still, filter it. But even here it is a question whether all “bacteria” can be destroyed—unless it be, as Tyndall suggests, by repeated boiling.

The Rivers’ Pollution Commissioners state, that “We desire it to be distinctly understood that, although this

purification of water polluted by human excrement may reasonably be considered on theoretical grounds to be some safeguard against the propagation of epidemic diseases, there is not, in the form of actual experience, a tittle of trustworthy evidence to support such a view. Nothing short of abandonment of the inexpressibly nasty habit of mixing human excrements with our drinking water can confer upon us immunity from the propagation of epidemics through the medium of potable water."

10. *Drainage*.—I have said a great deal hitherto about cleanliness in various forms; how necessary it is for a clean skin to exist by continual removal of the *débris* from its surface—hence bathing, etc.; how necessary, too, that the breathed air should be changed quickly for fresh air—hence the virtues of ventilation.

It is just as important that the solid and fluid excreta from the bowels and kidneys should be so removed that they may neither offend the eyes or nose nor cause illness by their decomposition.

How much disease and death were occasioned, through the utter neglect of this wholesome rule, in past ages is only too well known; but, even in this nineteenth century, we must not boast too much, for we still have a large mortality from *filth* causes—from unprevented preventible diseases. In towns, this is perhaps especially true; but still, even in the country, even in isolated houses, even in the country mansions of our princes and

nobles, filth diseases are only too common, owing to the slovenly and unscientific way in which such refuse is removed. In fact, it is, in a large proportion of cases, not removed at all, but is allowed to stagnate about the premises, and poison the well water ; or, being received into a tank, or cesspool, is carefully covered over, and there allowed to decompose and generate gases, which flow back up the conveying pipes to the house. And so this poisonous gas is supplied in a similar way to that in which coal gas is "laid on" to houses ; the gasometer being the hermetically sealed cesspools, and the drain-pipes *from* the house acting as the conveying gas-pipes *to* the house. This sewer-gas has been conveyed all over houses from various points, such as the cellar, and scullery drains, the water closets, housemaid's sinks, and cistern overflow ; and has been even "laid on" to bedrooms, there to generate chronic ill-health, *malaise*, typhoid fever, diphtheria, or puerperal fever.

We may be, and are, a cleanly nation ; but a long way off yet—indeed not within a measurable distance of—perfect cleanliness of our persons, clothes, dwellings and their surroundings.

It will, therefore, be seen that, in order to preserve health, it is as important that means should be provided for the removal of *dirty water*, as that there should be a constant and plentiful supply of clean water. Also, it is necessary that the solid and fluid *excreta* from the body should be quickly and safely got rid of—not thrown simply

outside the front door in the primitive fashion still seen in many places from time to time ; but completely removed, not only out of sight, but out of harm's way.

The amount of refuse that is daily removed from the body is about four ounces, by weight, of solids ; and fifty ounces, by measure, of water.

In this paper, we are only concerned in the disposal of all refuse from the *house* for purposes of cleanliness. I shall not therefore allude to the system of *town drains*, and the final disposal of sewage ; but only to the necessary *house drains*.

Cesspools.—I shall speak first of the most primitive ways for getting rid of the excreta from a house, such as occur in the *country*.

(1) A hole is dug in the garden ; and this serves as the midden. The fluid drains away, when and where it can, perhaps into the well ; the solid remains, and is periodically removed, as necessity demands, or as it is required for use in the garden. This plan, while not cleanly, is the least harmful of all such primitive plans ; and, if the well can be protected, perfectly safe.

(2) The Rev. Henry Moule improved on this primitive fashion, so that it could be used safely in and out of doors, by his *earth-closets*. His method shows a great advance, however, for the excreta are enclosed in a receptacle and *dry* earth is added, which renders them inodorous and innocuous ; the material is then retained for service in the garden as a most valuable fertilizer.

For country places, this is the best plan of any ; it is safe, cleanly, and useful ; but it can only be used, *at present*, where there is a garden—the dirty *water* of small houses being emptied into a tub in the garden ; in larger houses, being conveyed by drain-pipes on to the land for irrigation.

(3) Englishmen are so enamoured with *water-closets*, that many of us are not content without them, especially ladies, who have a great antipathy to earth-closets. Where they are used in the country, as in mansions, the excreta are removed from the water-closet by drain pipes emptying their contents into a tank, which retains some solids, a system of irrigation for the more fluid portion being provided in various directions over the land. Or the pipes convey all the refuse, solid and fluid, direct into a large brick-built cesspool constructed on the premises. Now, if this system be in force, it can only be used with safety, if certain precautions be followed. The *cesspool* should be constructed at the farthest possible point from the house, on a lower level than the well, and at a distance from it. It should be freely ventilated, and cut off from the conveying house drain and soil-pipe absolutely, just as if it were a town sewer, for it is just as poisonous. By this means, gas, which is necessarily generated where organic matter decomposes, cannot “back” into the house through the drain-pipes. This object can be effected by various traps, the best of which—invented by a friend of mine—I shall mention pre-

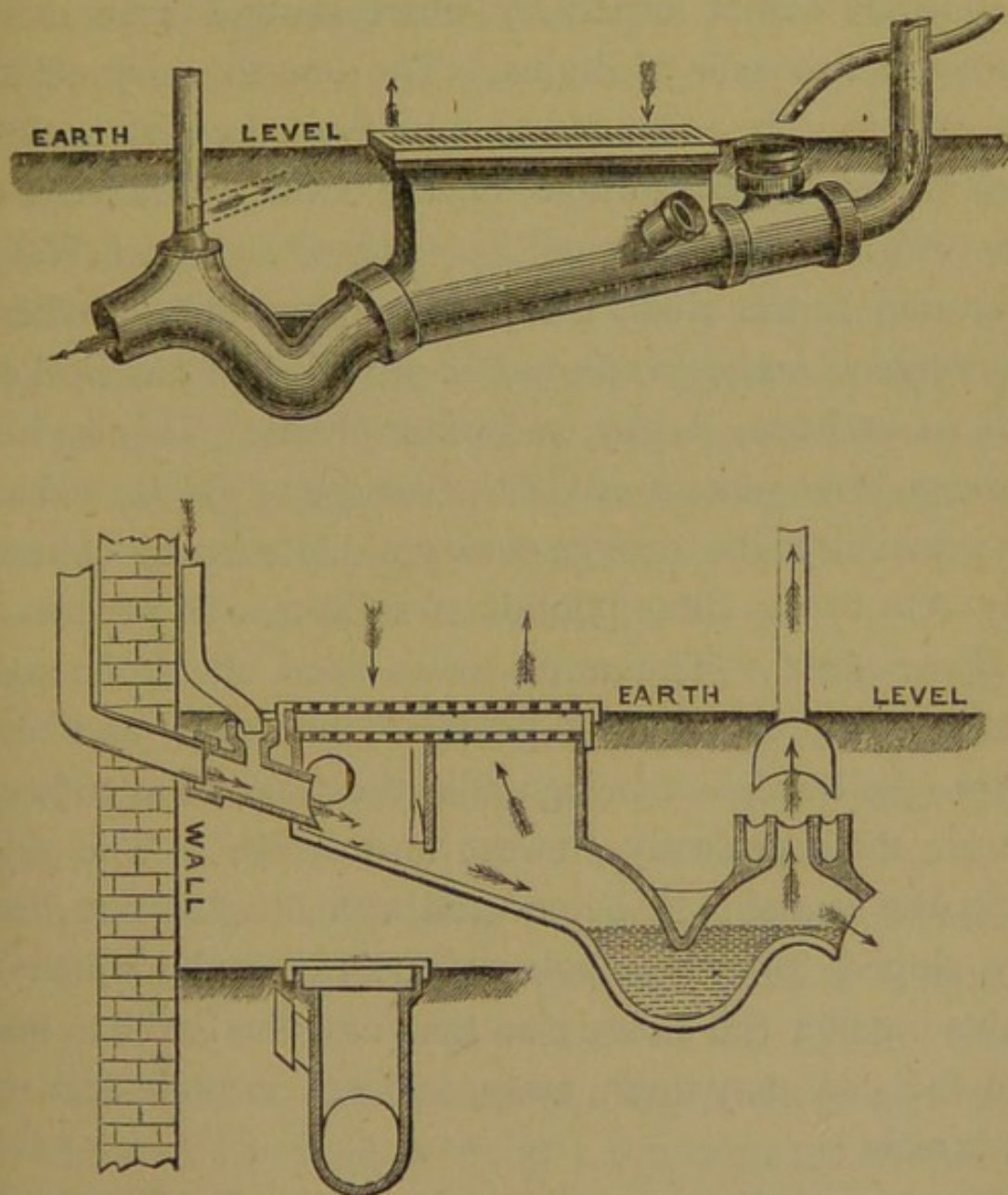
sently. The cesspool, of course, needs periodical emptying, which can be effected by a portable pump; and the contents can be utilized on the land, or garden, with profit.

House Sewers.—In nearly all towns, sewers are established now; and the refuse from every town house should leave it in this way. But town sewers, where they are insufficiently ventilated, are a source of great danger; and connecting a house with them has often been simply bringing disease and death to its inmates. Now the question with which we are alone concerned in this paper is—a town sewer being in existence, how can the house drains be connected with it without “laying on” this fatal sewer-gas? This can be quite safely done, though by one plan alone—that is, by disconnecting absolutely the house sewer from the town sewer by a large space of fresh air.

How may this be accomplished? Very easily indeed. There are several traps provided, suitable to be adopted by all, which carry out the method perfectly. The one I use at my own house—and I would never live in a house without some such trap—is an absolute preventive against sewer-gas entering, whether it comes from a town sewer or a cesspool. It is called the “Edinburgh air-chambered-sewer trap;” and was invented by a school-master, who, having had several pupils ill with diphtheria, and the misfortune to lose one of his own children from it, set to work with numerous sanitary arrangements;

amongst them he resolved to keep sewer-gas out of his premises, and constructed this trap—the pioneer of its principle.

Every pipe in the house, which is laid for the purpose



of carrying off excreta—from the water-closets, and housemaid's sinks; or dirty water from the baths, scullery, cellar, etc., and the cistern overflow—should

open into the air-chamber alone. And there should be no other house connection with the town sewer, except at the syphon end of the air-chamber. The drawing plainly shows its action, without any explanation.

In some towns, especially where sewage farms exist, there are two sets of drains. The one to carry off all the excreta ; the other set to take away the dirty water, rain water, and the whole of the surface drainage of the town, in fulfilment of the famous saying of Ward, "the rain to the river, the sewage to the soil." Where this *surface drainage* scheme is provided, it has worked well, as at Eton, Rugby, and other places. This surface drainage arrangement makes the sewage of greater value ; for previously the sewage was so dilute as to contain only from two to three pounds of solid matter per ton.

Water-closets.—The water-closet itself should be well ventilated at the highest point of the room, and also below (the best place being under the seat), so as to keep the air there perfectly "sweet and fresh." The *floor* under the seat should be covered with a well-fitting lead tray, sloped towards a hole at one corner, by which it drains outside the house ; so that any fluid which falls over the pan may drain away, and not saturate and rot the boards.

The *pan* of the water-closet should be of white china, and so constructed as to have no crevices to which excrement can adhere and decompose ; the patent "Wash-out Closet" fulfils these requirements admirably. The

soil-pipe is the means of communication between the water-closet and the Edinburgh trap. It is better placed outside a wall of the house; and at its highest point it should be ventilated by a pipe three to four inches in diameter, which ought to be carried above the highest point of the house or eaves, and as far removed as possible from a window or a chimney.

Every closet should have a small *cistern* of its own, holding from two to three gallons of water. One is made called "water-waste-preventer." The pan supply may be made automatic in its action through an arrangement with the door or the seat of the water-closet. The cistern which supplies the drinking-water of the house may feed these small cisterns, but should not be connected with the pan of the closet itself.

Housemaid's Sink.—The housemaid's sink, or slop-receiver, should be provided in a convenient situation for the use of the servants; this discourages the emptying of the slops down the water-closet, which is always a dirty plan, soiling the seat, overflowing on to the floor, and there decomposing. White china is cleaner and sweeter than lead or stone, which allows the salts of the urine to deposit, where they decompose and stink. The hole in the sink for drainage should be three to four inches in diameter, protected with a wire-cradle or sieve, so as to prevent solids—such as house flannels—passing down. The pipe from this should be syphoned immediately beneath the sink, and the lowest

point of the syphon should be provided with a screw, so that any refuse that might accumulate may be removable. By reason of this syphon, also, air is prevented rushing up the pipe from the external air below. This pipe should empty itself into the air-chamber of the trap; or on to the open iron grating of the ordinary gully trap, which in its turn should be connected with the air-chamber, and should not communicate with the sewer directly.

The *kitchen and scullery sinks* should, by their pipe, open on to an iron grating outside the house, and this grating should cover a good grease-trap in order to collect all the grease from the kitchen, and prevent it entering and obstructing the drain-pipes. The pipe from the grease-trap should open into the Edinburgh trap, and not communicate directly with the sewer.

The *larder* drain, if there must be one, the bath waste, the cistern overflow, and the cellar drains should be similarly treated; a complete absence of sewer-gas in the house will thus be ensured, and a cessation of its necessary ills.

Dry methods.—There are various dry methods for the disposal of sewage—such as mixing with ashes, charcoal, earth, or sawdust; the pneumatic system, and its opposite, Shone's ejector system. But with these we are not now concerned.

II. *Dust-bin.*—The disposal of house dust, and kitchen refuse, is always a source of difficulty and anxiety in every house, especially in towns.

In the *country*, the refuse heap should be removed as far as possible from the house, at the remote end of the garden, where it can be utilized for fertilizing purposes. The "bones" can be "ground" and used as a valuable manure for the garden.

In *towns*, no dust-bin or dust-heap should be permitted; but a galvanized iron box, as large as two men can carry, provided with a wire cinder-sifter on the top, should belong to every house. It should be placed under cover, close to, but not in, the house, and should be emptied by the sanitary authorities twice a week at least. Vegetable matter should be burnt rather than thrown into it.

12. *Laundry*.—I have mentioned the importance of clean linen; and this implies that the *dirty linen* must be cleansed for wearing again. That all dirty linen should be boiled and washed, and then thoroughly dried before wearing, is one of the most important conditions of cleanliness and health; without it, we can have neither.

Most houses, nowadays, get their soiled linen washed away from the house, by laundresses, who make it their trade. For houses which are small, and for large houses in towns, this is the best plan. But vigilance is required to see that infectious illness is not brought into the home by this means, either through infectious diseases being in existence at the house of the washerwoman, or in consequence of her washing for some other family in

which infectious illness is present. But for all large houses in the country, and for all large schools, the washing should be carried out on the premises; or by a private laundry maid.

The importance of *airing linen* before it is worn cannot be too strongly impressed on every individual; for a neglect of this—the wearing of damp linen or sleeping on damp sheets—is the cause of much illness every year, and many deaths. Yet this is too often considered to be an affair of the laundress, and no trouble is taken about the matter at home. The laundress is too much employed to carry it out as it should be, and thus it is totally neglected.

IV.

TEMPERANCE.

I HAVE now fully discussed (as much as space will permit) the question of personal cleanliness in all its details, and proceed to the further division of our subject, or the consideration of "temperance" in all its bearings, so far as it relates to the preservation of health by personal habits.

Briefly, this will include temperance in eating, drinking, and sexual affairs; temperance in work, recreation, and sleep. It is secured chiefly by a regular and abstemious mode of life.

I fear that most, if not all of us, are intemperate in one or more particulars, at some time or other of our lives: some in eating, others at work, and yet another in sleep. Intemperance in any form, by the inexorable law of nature, carries its own punishment, and tends to curtail health and consequently life.

All things in this world are meant for use, and not abuse. The highest virtues, when abused, become unseemly vices, deserving of condemnation only.

Is there any more becoming bodily function, than the regular daily eating of food to satisfy hunger, which nature has made to be attended with pleasure? This is its *use*—temperance.

Is there any sight more repulsive than to watch the bloated glutton, who lives only to gorge himself, to make a “god of his belly”? This is its *abuse*—intemperance. But what does the *denial* of food, or its insufficient quantity or quality mean? Disease and death; and during its progress the most melancholy sight a medical man can witness—starvation, with its terrible delirium and heartrending wasting from day to day.

Again, is there any holier state on earth than the happy married life of man and woman, with their well-trained family around them? This is *use*—temperance.

Is there aught more hateful than the libertine, with all his consequent degradation? Is there any sight more sad than to watch the rake’s progress? This is the *abuse*—intemperance—of one of nature’s highest functions.

Is there any function more necessary or more wholesome than legitimate sleep?—temperance in sleep. Yet, is there a more despicable individual than the sluggard?—intemperance in sleep.

Is there any state more injurious than the *denial* of, or the total abstinence from, sleep? It simply tends to fill lunatic asylums and cemeteries.

In this section of my paper I shall strive to show the value of temperance in all things; and we shall see that

without temperance cleanliness cannot exist. Howard observed, "that such men as he could induce to be more cleanly than they were disposed to be of themselves, became at the same time more sober, more orderly, and more attentive to their duty." The converse is also true, that those who become more temperate become also more cleanly.

Milton, too, recognized the advantages of temperance when he said—

"If thou well observe
The rule of *not too much*, by temperance taught
In what thou eat'st, and drink'st, seeking from thence
Due nourishment, not gluttonous delight,
Till many years over thy head return :
So may'st thou live, till, like ripe fruit, thou drop
Into thy mother's lap, or be with ease
Gather'd, not harshly pluck'd, in death mature."

We must now proceed to consider our subject in detail, and first I shall speak of

(i.) **Temperance in Eating.**—Eating is a necessity of our existence ; and nature has made the process, like all our appetites, one of pleasure—hence its capability of abuse.

1. What we eat is called *food* ; but food should include everything taken internally. Thus, air, water, and all else thus taken should be recognized as food,—all are necessary in definite proportions. Technically, however, we regard food as any substance, fluid or solid, which is capable of being absorbed into the system,

and of forming new blood with which to nourish the whole body.

As a fire cannot continue to burn without a constant supply of fuel, so our bodies cannot continue to live without a constant supply of fresh food ; but this must be in suitable proportions, so that health may be maintained, and diseases not engendered.

Food is used for two purposes—to supply wear and tear of body, and in the young, growth also.

As wear and tear takes place in daily life, so fresh material has to be supplied to, and assimilated by, the digestive organs ; and the detritus has to be removed by the excreting organs, which act as scavengers. The amount of food required depends, therefore, not only upon the waste that takes place in the daily working of all the functions ; but also upon the growth and development that is going on.

In the young, it is often astonishing to see the vast amount of nourishment required to cover their wear and tear and growth. But for the *aged* it is different ; little food is needed, and should be lessened as years increase. What would be a most temperate diet for the young and growing, would prove too much for the adult, and be most intemperate for the aged. This fact is too often ignored. To avoid this intemperance in eating, it is necessary that there should be a just balance between work and recreation, between waste and supply, between activity and repose.

Hard work, whether of exercise or employment, and plenty of proper food are good for all. It is not easy for the work or the food to be in excess. The same amount of food, taken without work or exercise, is most injurious, and amounts to intemperance.

Hard work, with insufficient or improper food, which is only too often necessarily accompanied by anxiety, leads to untold misery in the adult; and eventually lung-disease, insanity, etc. In children at school, who are rapidly growing and developing, hard mental work, with insufficient food, is equivalent to overwork, and tends to brain disease and death.

But different individuals require different amounts of food. "What is one man's meat is another man's poison," is true even in the question of amount of food; and this is scarcely ever regarded. Some persons are capable of consuming, and do not seem to thrive without, a large quantity of food; while the same amount to another would prove a positive poison, and cause ill-health and disease.

Moreover, it is essential for the healthy performance of all the functions of the body, that the supply of food should be equal to the demand. Where work, mental or physical, has to be done, food must be sufficiently supplied to do it; while during repose and idleness, a very small quantity suffices. So that it is good, morally and physically, that the man who will not work, neither shall he eat.

But it must not be forgotten that the body does a

large amount of work of its own for which food must be supplied. Thus, every beat of the heart day and night, every respiration, every thought, means the expenditure of force—which requires food to provide for it. Again, force is exerted by the excreting organs, which, acting as scavengers, have to get rid of the refuse caused by the heart beats, breaths, and thoughts. Moreover, the temperature of the body has to be maintained at a certain point— 98.4° Fahr.—under all conditions. Now, if the weather be hot, very little food, comparatively, is required to raise and keep up the temperature; but in very cold weather a large amount of food is a necessity to raise the temperature to and maintain it at 98.4° , while the external temperature may be many degrees below freezing; for if no food be supplied the temperature gradually falls, until at a certain point life becomes extinct. It will therefore be seen that more food is essential during cold weather to maintain the bodily heat, than during hot weather; it must also be rich in heat-forming properties.

Of course it will be understood that I am speaking of keeping up the bodily temperature by food, and am not now discussing the question of warmth from fires. And here it may be well to remember, that so great is the need of artificial warmth from fires in cold weather, that the poor, who are unable to purchase food *and* coal, will purchase the coals in preference, in order to maintain the temperature of the body.

Food, to nourish thoroughly, must be varied, wholesome, well-cooked, and sufficient for the work undergone.

In hot countries it is known that the inhabitants thrive best on a diet chiefly vegetable. On the other hand, in cold countries, animal food, with plenty of fat, is the best diet.

Animal and vegetable substances possess the same nourishing principles in varying degrees; so that both are capable of nutrition. Moreover, some individuals have a greater taste for, and can digest more easily, the one kind; while others prefer the other kind. It is also well to bear in mind that the need for the one or other kind varies not only according to hot or cold weather, but also according to the severity of the labour done. With animal food more arduous labour can be effected; for nourishment can then be more easily and quickly absorbed, in smaller bulk, and at less cost to the digestive organs in assimilation.

2. *Milk* is the grand type of all diets, consisting as it does of albuminous, oily, saccharine, saline and watery principles. A standard diet contains some or all of these constituents in various proportions.

In speaking of "temperance in eating," it seems to me that we should consider, not only the question of *quantity*, but that of *quality* also. For I cannot but regard the man who eats what he knows will disagree with him, simply because he enjoys it, as intemperate as he who eats to gluttony.

And I think we should also, in speaking of temperance in eating, regard those who are fed, as well as those who feed themselves.

I shall accordingly speak first of the *feeding of infants*—a matter of vast importance, not only because of the large mortality amongst infants from improper feeding; but also because of the deteriorated digestive organs, and consequent ill-health of those who survive.

The first question which must arise to the mind of every one who thinks on the subject is, Why do so many mothers who can nurse their children fail to fulfil their duty?

Also, why do so many *poor* mothers, who have plenty of milk, prefer to give their children some other food,—in fact, anything save milk? Is it in imitation of richer neighbours? There can be no doubt whatever that it is the imperative duty of every mother who can “nurse” her child to do so—it is better for the mother in every way; and a lifelong gain to the child. This duty should be impressed on every mother, rich or poor. Would those in “high life” set the example more frequently, it would become more common amongst the middle-class and the poor, who are great imitators of the rich in all their habits—who like to be “fashionable.” But where the supply fails, and the mother is unable to nurse in consequence (as is too often the case, unfortunately), what is to be done? Is it still necessary in this nineteenth century to teach that infants’ food should be milk and milk only? Next to mother’s milk,

the best is that of a foster-mother; then ass's, mare's, goat's, and cow's milk, in the order named.

If none of these can be obtained, then condensed milk, and then only; but it is not to be recommended as an ordinary aliment for infants, for it does not nourish properly as milk should, but is a very fertile cause of rickets and other infantile diseases. I repeat, it should only be given when every other supply of milk fails; its only use being, that it is better than starch foods, when no other milk supply can be obtained.

But on what do mothers feed their children, in the very large proportion of cases? On everything except milk! From port wine to cream, and on to raw starch! Most frequently, perhaps, something out of a box, or bottle, made chiefly of starch; starch being—such is the perversity of human nature—really the only standard article of diet not contained in milk at all. Now starch—represented by the various corn flours, arrow-roots, and patent foods—is a substance most difficult of digestion by infants, and should never be given to children under eight months old. These foods kill more children than all the infantile diseases put together. Not always directly, but indirectly, by entailing imperfect nourishment, and so permitting diseases to exert their sway fatally; though also directly, by causing diarrhoea and vomiting. Such feeding comes under my second class of intemperance in eating, viz. that of eating what is well known to disagree.

One hears much of *woman's work* in the world. Is there any work in the world that needs woman's help as much as this proper feeding of infants? It is not merely a question of the "preservation of health," it is more—it is the question of the preservation of "life." Proper feeding would save the lives of many thousands of children annually.

Every mother who can be induced to feed her infant at the breast, or, failing this, to give it fresh milk—instead of something out of a box, bottle, or paper—will be doing a good work which will last a lifetime; saving life, and preventing the misery of ill-health.

Continually, amongst hospital patients, do I see the most pitiable-looking children. Were I asked what disease they were suffering from, causing them to look so wretched, I could only answer, "They have never had a drop of milk." Educated women may help their poorer neighbours, both by their example, and by aiding them to obtain milk for their infants; and it should be remembered that skimmed milk is better than none at all, for it contains all the ingredients for growth and nourishment except fat, which can be added in other ways. Country cottagers also should be taught, by example and precept, to keep a goat instead of a pig where they have children—generally milk is more easily obtained in a town than in country districts—for a goat will eat nearly all that a pig will, and can almost keep itself tethered by the side of the road.

One often hears, not only of "woman's work," but also of *woman's rights*; yet there are others who have rights, and are unable to claim them, though equally deserving—I mean *infants' rights*. Infants have rights—hereditary rights—inherited from one of their first parents, viz. *milk*, and that milk, if possible, their mothers' milk.

If the infant raise its voice against the deprivation of its hereditary right, and bitterly complain, night and day, against the confiscation of its birthright, its cry is hushed by "Mrs. Winslow's Soothing Syrup," and other vile mixtures. A parent has no right to sell its infant's right for less than a mess of pottage, often for a whim, sometimes from ignorance or poverty.

I must now say one word—having spoken of deficient nursing—on *excessive* nursing; both are forms of intemperance in feeding. It occurs where mothers go on nursing their infants too long—sometimes for two years. This is bad for the mother, as is shown by various forms of debility; one marked symptom of excessive nursing being failure of eyesight. It is also bad for the infant, as the milk, after about nine months, begins to fail to nourish properly.

While speaking of milk, a word is necessary concerning our *milk supply*. Seeing what a great necessity it is for our modern civilized life, it is imperative that all should be able to obtain a pure supply, and not, in place of it, find disease and death in the milk-can. It has

been proved over and over again that, between the cow's udder and the human stomach, the milk may be so poisoned as to cause death in the recipient. Not only this, but there is some question whether disease in the cow itself is not propagated to the child.

So great has the mortality been, that it seems to me to be the imperative duty of a Government to inspect most carefully the cattle, their byres, and the dairies continually; and to visit criminal neglect and fraud with severity.

Mr. Ernest Hart read a paper before the Social Science Congress, in the autumn of 1883, in which he recorded 83 milk *epidemics*, which represented 5000 *cases of disease*, and 580 *deaths*, in about 10 years.

It is now necessary briefly to consider of what food consists—*milk* being the type of all foods, since it contains every requisite for the healthy nourishment of all the tissues of the body. Foods consist of—

(1) Nitrogenous substances, represented by casein and albumen chiefly.

(2) Carbonaceous substances, represented by fat or cream; and sugar, in the form of lactic.

(3) Salts.

(4) Water.

Considering these essentials of food somewhat in detail, we shall speak first of *nitrogenous* or albuminous food, represented in the diet of daily life by flesh, eggs, cheese, etc. It is from this class of food, that

most of the tissues of the body are formed and repaired—a large amount of nitrogenous food, whether derived from the animal or vegetable kingdom, being required for hard work, mental or physical. All substances represented by this class contain from 15·4 to 16·5 per cent. of nitrogen.

To supply the requisite amount of nitrogenous food, about three-quarters of a pound of uncooked meat daily is required; but for adolescents growing rapidly, or adults doing very hard work, one pound is necessary; 20 per cent. of this includes weight of bone; and 20 per cent. of weight is lost in cooking—leaving 60 per cent. of cooked meat. Those taking no exercise at all do not, of course, require so much.

This is the quantity for a temperance diet; but excess of nitrogenous food—whether it be absolute or relative, as where there is a normal quantity taken but a deficiency of exercise—accumulates in the system, and leads to congestions and inflammations, gravel, gout, or hæmorrhages, acting as vents. One sees this continually in the aged, who, forgetting that food should be lessened as years increase, take their usual meals, while undergoing no exercise—perhaps because the weather is bad for a day or two—and get overloaded with fuel, which will only smoke, and not burn. This makes them feel feeble, because their organs have more work than they can do without the help of air and exercise; and, getting hampered and acting imperfectly, they fail to deplete the

blood. Instead of checking their diet, and by a little more air and exercise enabling the fuel to be burnt up, they, feeling weak, increase it in the form of dainties—the appetite having failed because there is already too much food—such as beef-tea, port wine, etc. This is adding insult to the already overloaded and injured organs; and they become so choked and fouled that they fail to work at all, and the blood becomes more impure and tends to stagnate, causing congestions and hæmorrhages. Such intemperance in eating and drinking can only have its natural result in the form of various discomforts, or illnesses and death. It can only be got rid of by recognizing the intemperance; for then with less food, and that of a lighter and less stimulating kind, together with more “draught,” the organs are allowed to burn up the excess, and they may resume their work as before, and health and strength return.

It is too frequently forgotten that waste must be proportioned to the supply; and that supply must not exceed the capability of the organs to get rid of the waste, which in age, debility, and in the absence of exercise, are less vigorous and capable: otherwise the system will be overcharged and must explode somewhere—either in the form of gout, gravel, gall-stones, bilious attacks, or bleeding piles, etc.

The nitrogenous foods are considered the great nourishers of the nitrogenous structures of the body; for every structure which produces energy contains

nitrogen, and if the nitrogen be not supplied, the same energy cannot be produced, and consequently the functions are more or less impeded.

Pettenkofer's and Voit's experiments show that it is the nitrogenous structures which cause the absorption of oxygen—without which energy is impossible. Meat may be regarded as the type of nitrogenous food. It is largely nitrogenous, and is combined with fat and salts. It is easily cooked, very digestible, and eminently antiscorbutic ; but it contains no starch. It is cooked at the temperature of about 160° Fahr., according to Liebig.

Carbonaceous food is taken into the system in the form of starch, saccharine, and oleaginous matter. This food is the great supplier of animal heat ; and where it is in excess of the requirements of the system, it is piled up in the form of fat. It consists of carbon, hydrogen, and oxygen, in varying proportions, as found in the fat of animals and vegetables, and in starch and sugar derived from the vegetable kingdom.

The inhabitants of cold climates require much of this food to keep up their animal heat ; while in hot climates much less is required. Moreover, less is requisite where little exercise is taken and artificial warmth supplied, whether from clothes or fires ; while more must be supplied when good exercise creates more wear and tear of tissues. The young and old need much heat-forming material, varying according to the natural activity of their functions, and to the artificial warmth supplied.

But why are we so unwise—especially amongst the poor, to whom every morsel of nutritious substance is of the greatest moment—as to throw away the most nourishing part of the grain in the making of bread, the staple article of diet? Could the poor obtain bread easily, made with the whole of the grain of wheat, and be taught its great value, instead of throwing away its most nutritious portion, they would be nourished and grow much better, and do more work, for it would be nearly as nourishing as meat. Two pounds of bread daily will nourish and give good health.

Fat and starch are used in the diet of all nations; usually much starch and little fat. And it is well to bear in mind that fat will not take the place of starch; nor will starch take the place of fat—both being requisite for health. In hot countries much starch and little fat; in cold countries much fat and little starch, is required for proper nourishment. Here, again, it is necessary to point out that a due proportion of all substances is essential to a healthy diet. If there be too much nitrogenous matter supplied, we have seen that it amounts to intemperance; and the body is poisoned by material which it does not want, which it cannot utilize, and which Nature does her best to get rid of; and, failing, is unable to prevent deterioration of health, in the form of gout, gravel, gall-stone, etc. But if the excess have been of carbonaceous material, we see it in the form of obesity; and temperance is requisite in the form of “Bantingism.”

Salts are as essential to health as either of the above; they are absent from none of the tissues. They occur in the form of carbonates, lactates, phosphates, etc., of lime, magnesia, potash, soda, iron, etc. Without them, malnutrition arises in the form of general ill-health and scurvy.

Aqueous Constituents.—Without water no life is possible, vegetable or animal. In human beings it is contained in all their foods, forming about 90 per cent. in their constitution. It suspends or dissolves the nourishment; and it holds in solution, or suspends, the worn-out materials of the body; and so enables the system to get rid of them. About two and a half to three pints of water is daily required to provide against *thirst*, irrespective of the water contained in the food.

The *amount of food* varies with the individual, and according to his age, exercise, and climate.

The usually accepted standard diet is that of Moleschott's scale, thus :—

STANDARD DAILY DIET FOR A MAN IN ORDINARY WORK.

	Oz., Av.	Gram.
Albuminates ...	4.59	130
Fats	2.96	84
Carbo-hydrates ...	14.26	404
Salts	1.06	30
Total water-free food	22.87	648

It is given another way by Moleschott, thus :—

STANDARD DAILY DIET FOR AN ADULT MAN IN
ORDINARY WORK.

Nitrogen	...	...	...	...	317 grains.
Carbon	...	...	...	...	4750 „
Hydrogen	...	...	...	...	202 „
Sulphur	...	...	...	...	24 „
Salts	...	...	...	...	461 „

Although I have taken meat as the type of nitrogenous food, yet it is only as an example, and I am unable in this paper to do more ; yet it must be remembered that the chemical composition of animal and vegetable albuminates is very similar. The man who lives on corn, peas, rice, etc., is equally well nourished with the man who eats meat, but it is in the form of a more bulky diet, and takes longer in assimilation ; and so, in hard labour, may not be assimilated with sufficient rapidity to cover the waste occasioned.

Diseases connected with Food (Parkes).—Health and happiness depend on good food, properly cooked. Its digestibility varies with the age, constitution, and exercise of the individual, and it should be varied accordingly.

3. *Excess*, or intemperance.

(1) Where the excess is so great that it *is not* absorbed. It then passes into the intestines and there putrifies, and so generates flatulence, diarrhoea, constipation, skin eruptions, ophthalmia, foetor of breath, jaundice, etc.

(2) Where the excess *is* absorbed.

(a) Excess of albuminates. Where this occurs we find congestion and enlargement of the liver, congestion of the kidneys and albuminuria, general plethora, gout, malaise, diarrhoea, and skin eruptions.

Some time since I had a classical instance of this excess, produced by too much animal food. Meat, as a new line of departure, was provided for breakfast amongst a large number. Roughly speaking, the number consisted of eight separate fifties. Amongst some of the fifties the meat was apportioned; amongst others the supply was unlimited. In every house of fifty where the supply was limited nothing abnormal happened; in every house of fifty where it was unlimited there was an epidemic of eczema. I attribute this eczema, not only to the excess of nitrogenous food, but also to the want of a compensating quantity of green vegetables; for I see the same thing, on a smaller scale, amongst a large number every autumn where certain individuals eat much meat and no green vegetables, whereby many cases of eczema are produced.

(b) Excess of carbonaceous food. This causes obesity, acidity, and flatulence.

Deficiency of Food.—When food is only lessened in quantity, it produces deficient vigour, muscular debility, loss of mental power, anæmia, and prostration. During some of our famines in India, when it proved difficult and expensive to obtain food for the millions, a certain amount, sufficient in quantity, was allotted to each

individual to keep him in health. It was then thought advisable to insist on a certain amount of labour on public works in return. Immediately the diet, ample before, was found to be really a starvation diet when work was forced. If the quantity be still less, apathy and inertness arises; starvation, when completely absent.

4. *Meals*.—The diet, of course, should vary according to the age of the individual. Thus, the infant, until eight months old, should have nothing but milk. The young child, milk, eggs, and farinaceous food; as it gets older, soups, fish, chicken, and meat; and vegetables and fruit should be added by degrees. The adult should eat, in moderation, whatever he can get that is wholesome. The aged must gradually diminish this adult food, and partake more of that which is suitable to the child as years increase and according to the vitality of the individual.

As the food of different individuals varies, so does their manner of taking it. Some divide their daily food into several parts or meals; others take it in two, while another will take his food chiefly in one meal.

Of course the circumstances of every individual must be considered, as it is only a very few who are able to control their circumstances at all. Some are only able to eat *when* they can get it; others are only able to eat *what* they can get.

But the chief fact to remember for the proper preservation of health is that digestion, as a rule, takes from four

to five hours to be completed, after which the stomach needs some rest before it receives further food. It is a fact, however, that people have a tendency, not only to eat too much at a time, but to have fresh food supplied before the previous meal is disposed of by the stomach. This is *not* temperance in eating. But while it is injurious to eat too much and too often, it is also unhealthy for the intervals between meals to be too long. Therefore another rule should be, *not* to eat freely when exhausted from long fasting or hard mental or physical work. He who sits down to a meal and eats freely after severe mental labour ; he who, after such severe exercise as mountain-climbing, sits down with hunger and eats freely ; and he who acts similarly after a hard day's work, is sure to find his meal disagree with him. The practice just mentioned is one of the commonest causes of indigestion, and a form that should not arise ; it is intemperance in eating. Rest and a light amount of food should be partaken of first ; then the heavy meal will not disagree, but will provide for the wants of the system occasioned by the excessive wear and tear.

Of course all feeding must, more or less, depend on circumstances, and on the custom of the place and people. Our English custom, breakfast at 8 a.m., lunch at 1 p.m., and dinner at 7.30 p.m., is a good plan. The French custom, coffee at 8 a.m., breakfast at 11 a.m., and dinner at 6 p.m., suits many people well. Those in health do not require, and should not have, the

frequent meals—and the snacks between meals, too—which are so customary, viz. food at 8 a.m., 11 a.m., 1.30 p.m., 5 p.m., and 9 p.m.

Whenever food is taken it should be with regularity. One day a full meal at a certain hour, and the next day nothing at all at that time, is a bad plan, and nature does not like it. Therefore, whatever hour is fixed for meals, let punctuality be observed. We are all creatures of habit, and where good habits are established they should be maintained.

Considering the extent to which railway travelling is pursued by so many in this country, a word in connection with it may not be out of place here, for a large proportion of travellers are doomed to eat at railway stations, and are thus exposed to a frequent cause of ill-health from indigestion. For instance, a traveller leaps out of a train, rushes to the refreshment-room, bolts his food—generally something very indigestible—and runs back to his seat. What can be expected but indigestion from such a meal?

The proper way, on a long journey, is to take food from home and eat it quietly in transit ; or, for those who live by travelling, to stay an hour and dine, and then continue the journey. Failing this, they should not eat in the refreshment-room, but purchase the food there and eat it at leisure in the railway carriage.

It will therefore be seen that “temperance in eating” is to eat sufficient for our daily wants. It should be

taken regularly, and proportionately to the amount of work performed or exercise taken. To eat more than we require, and to eat what is known will disagree, is "intemperance."

(ii.) **Temperance in Drinking.**—As a matter of fact, most people take daily more fluid than is requisite to satisfy thirst ; whereas this simple satisfaction is all the system needs to perform its functions healthily.

It should be the rule of life, if the highest state of health be desired, to take as little fluid as possible. From two to three pints daily is the amount generally required by an ordinary healthy adult, except in hot weather and under great exertion which causes free sweating.

Many will say that they are always so thirsty that they must drink freely to live at all. It will be seen that this is not true ; it is a question of habit pure and simple. It would be just as true for the "drayman" to say he needs five gallons of beer a day ; whereas the truth is, he has simply indulged in this bad habit until his system, with its wonted generosity, has learnt to accommodate itself to the inconvenience by degrees.

The habit of drinking more fluid than is required to supply the actual wants of the system, gives more work to all the organs to perform. It is, moreover, a frequent source of indigestion ; the stomach being required to absorb the excess of fluid before the gastric juice is able to act upon the food which it contains.

Besides this, those who acquire the habit of taking

liquid of any kind to excess in any form, are apt, through the indisposition it causes, to learn to take stronger liquid to excess, because the latter relieves the discomfort for the time, and also quenches the artificial thirst which has been induced.

In speaking of temperance and intemperance in drinking, we shall, however, chiefly refer to it as it is ordinarily understood, viz. the taking of too much alcoholic stimulants. We shall not, therefore, include (for want of space) tea, coffee, and cocoa, which all cause gentle stimulation, though without the subsequent depressing effects of ordinary stimulants; they induce wakefulness and attention, and also increase the power of perception, and give tone to the nervous system. But we have already mentioned how they may be injurious by quantity of fluid simply.

We shall have to consider alcohol in its *use*, its *abuse*, and its *absence*.

1. To my mind the virtues of *temperance* far exceed the virtues of *total abstinence*. What we want for the preservation of health is, not that every man and woman should be deprived of even their glass of beer, but that every man and woman should look with abhorrence on any one, rich or poor, who takes to excess.

But how can this temperance be carried out amongst the largest class in this country, while the rich so often indulge as they do; while songs and pictures represent intemperance as fun and frolic; and while it is allowed

to be an "extenuating circumstance" when crime is committed under the influence of "drink"?

2. That *alcohol* has a beneficial action is unquestionable, I think; but that excess of alcohol has a baneful effect is also beyond a doubt.

Alcohol, like every other meat and drink—like venery, like work, like pleasure, and like everything in this world—is to be used and not abused.

It would be just as reasonable to try and make every man and woman celibate, as to endeavour to make every man and woman a total abstainer. Continence is good for all, morally and physically; so is temperance. Because this man and that woman are so incontinent that no one, married or unmarried, is safe from them, is no argument for the enforcement of celibacy, or even for its recommendation; and the fact that one man or woman cannot be temperate furnishes no reason why total abstinence is to be enforced on, or even recommended to, all.

The incontinent and the intemperate are to be condemned; but every one is not to be made a celibate or total abstainer because of their excess. Perhaps more good would be done by education in the virtues of continence and temperance than by condemnation of the vices of incontinence and intemperance. How are the poor and ignorant to recognize those virtues, while the rich and educated, whom they look up to and imitate, too often practise those vices without shame, and with little penalty from "society"?

The teetotallers argue that life is prolonged by total abstinence. I have no doubt whatever that this, in the main, is perfectly true; but not, from *their* facts, to the extent they would have us believe.

It is also true that the perfectly continent are also longer lived; but this is no reason why every adult should become a celibate. The one argument is just as reasonable as the other. But some will say, there was a command to be "fruitful and multiply."

On the other side, our Saviour also provided, as His first miracle, wine for the marriage feast; and it was a recommendation of St. Paul, in his letter to Timothy, to "Drink no longer water, but use a little wine for thy stomach's sake, and thine often infirmities."

I believe alcohol to be, not a necessity, but often a great advantage to the adult; sometimes a necessity for old age; but positively harmful for all children in health, and also to those who have not ceased growing and developing. I believe it is as important for the young to abstain from it, as to refrain from all and every excitement of the generative organs. Both are bad, and all the young should be warned against them. The value of alcohol in disease is beyond question too; but with that we are not concerned in this paper. It should, as a rule, be taken at meal-times, and not between meals.

Now let us consider in detail the *physiological* action of alcohol, as Parkes shows it. He says that taken into

the stomach it is absorbed, and distributed throughout the body, and some passes out again by the excretory organs; whereas the larger portion is destroyed, probably converted into acetic acid, which unites with the soda of the blood, becoming a carbonate, and is eliminated by the urine.

Alcohol is a distinct food, like sugar. It undergoes combustion or oxidation in the body, supplying heat. Not only so, but a diet which is insufficient in itself, is rendered sufficient by the addition of alcohol, as Hammond proved by experiments on himself.

In very large quantities, or in small quantities in a concentrated form, it causes contraction of blood-vessels and depression. But in small quantities it stimulates, and, through the vaso-motor nerves, causes dilatation of all the blood-vessels.

In the *stomach*, large quantities of alcohol in a concentrated form arrest its action, depress it, and induce chronic catarrh. While in small quantities it aids digestion, by helping the gastric secretion, and stimulating the muscular movements of the stomach.

On the *heart*, when taken in large quantities, it is a depressant, and, as is only too well known, frequently causes death. But in smaller quantities it acts as a stimulant, its first effect being to increase the force and quickness of the beating. Now, as this means that the heart's period of rest is shortened, the nutrition of that organ, if the alcohol be frequently repeated, eventually

suffers, and it becomes exhausted and feeble ; and with this we necessarily get palpitation and breathlessness. Alcohol also causes dilatation of the superficial blood-vessels, as is well known from the flushed face it occasions, more especially in those not used to it. These superficial blood-vessels after a time become permanently enlarged ; and we recognize the drinker's face.

When speaking of the action of the skin, in the former part of this paper, I explained how it acted as the great regulator of heat, through the power it possessed of dilating or contracting its blood-vessels ; how in cold weather it contracted them, so as to retain the heat of the body internally. Now, it will be readily seen that if alcohol have the faculty of causing dilatation of these blood-vessels, it must possess considerable power as a regulator of heat ; and, in fact, in consequence of this power, it does allow the body to part with its heat in cold weather. Where the quantity of alcohol has been slight only, this action may be compensated by increased circulation of blood through its stimulating power ; but in larger quantities it is a well-marked depressor of temperature. In cold weather this action is very marked, and the body is thus cooled rapidly ; but in very hot weather this increase of circulation would, of course, tend to increase the heat of the body, which would be compensated by increased sweating, and this, in turn, would soon produce a sensation of coolness of the skin. The value of this property of alcohol is manifest after

prolonged exposure to cold, where the blood from the skin has been driven internally, and kept there so long that it tends to over-distend the vessels and stagnate. Alcohol here would come to the rescue, owing to its power of dilatation of the superficial vessels, which would at once relieve the over-distended internal vessels.

Speaking of the effects of alcohol in cold weather, Howard says,¹ "In Dr. Aikins' remarks on the different success, with respect to health, of some attempts to pass the winter in high northern latitudes, in the 'Memoirs of the Literary and Philosophical Society of Manchester,' vol. i. p. 89, having related several accounts, he thus observes as to the important article of their *drink*: 'It appears that, in all the unsuccessful instances, vinous and spirituous liquors were used, and probably in considerable quantities. Thus, in one of the Dutch journals, notice is taken that an allowance of brandy began to be served to each man as soon as the middle of September. Writers on the scurvy seem, almost unanimously, to consider a portion of these liquors as a useful addition to the diet of persons exposed to the causes of this disease; and due deference ought certainly to be paid to their knowledge and experience; but convinced, as I am, that art never made so fatal a present to mankind as the invention of distilling spirituous liquors, and that they are seldom or never a necessary, but almost always a pernicious, article in the diet of man in health, I cannot

¹ "Lazarettos," p. 81.

but look with peculiar satisfaction on the confirmation this opinion received by the events in these narratives.

“‘The temporary glow and elevation caused by spirituous liquors are, I imagine, very fallacious tokens of their good effects ; as they are always succeeded by a greater reverse, and tend rather to consume and exhaust, than to feed and invigorate the genuine principles of vital energy. Another extremely pernicious effect of these liquors is the indolence and stupidity they occasion, rendering men inattentive to their own preservation, and unwilling to use those exertions which are so peculiarly necessary in situations like those described in the foregoing narratives.’ ”

All must agree with the above remarks, but they relate chiefly to the taking of excess of stimulants ; and it is now well known and agreed to by all, that stimulants are not good in cold weather or cold climates, except in small quantities taken with meals.

The effect of alcohol on the *nervous system*, owing to its action on the circulation in the brain, is to cause a feeling of comfort and exhilaration, to excite the imagination, and set the tongue free. Later, or in larger quantities, it acts as an anæsthetic, deadening the sensibility, and it diminishes the rapidity of impression, the power of thought, and the perfection of the senses. In still larger quantities, it paralyzes all muscular and nervous power.

Remote Effects.—In the first instance alcohol, when

taken internally, causes increased circulation, and arrests tissue change. This increased circulation, after a time, over-distends the capillaries, and, as they fail to recover themselves after the effects have passed off, we gradually get the whole system more or less in a passive congested state, which we observe in the bleared eyes, red nose, etc. Now, chronic congestion causes plastic exudation in all regions and in all organs. This plastic exudation becomes organized into fibrous tissue, and chokes up all the proper tissue of the organ, which gradually degenerates into fat. As a further process, this fibrous tissue, by its increased growth, by its retractile force, and by its constricting power, gradually causes a shrivelling or cirrhotic condition.

The effect of alcohol, therefore, on all organs is one of degeneration. Dickinson said, "Alcohol is the genius of degeneration." All organs suffer; but not all equally. In some the brain suffers most, and we get insanity and paralysis; in others, the stomach, and gastric catarrh arises; in others, again, the liver, and we get a fatty liver and cirrhosis; in others, the kidneys, and we see granular kidney.

Use.—The question which will arise to every one's mind is, seeing that alcohol is admitted to be a most dangerous weapon, is it ever of any use at all to the human being? Without a doubt, I think, in many persons it improves the appetite, and they are able to take more food, and to digest it better, as is shown by

their increased health and weight while using alcohol. It increases a feeble circulation with signal benefit. And its narcotic effect is often of the greatest value, deadening the sensibility of sensitive persons, and enabling them to face trouble. Doubtless the beneficial effect is often so great as to become *the* baneful one—leading to excess and drunkenness.

Further, the late Dr. William Farr, commenting on the action of alcohol as a “preventive of disease,” said, “Alcohol appears to arrest the action of zymotic diseases ; as it prevents weak wines from fermenting. Like camphor, alcohol preserves animal matter. This is not now disputed. But may it not do more? May it not prevent the invasion of some kinds of zymotic diseases? I invite the attention of those who have portrayed the bad effects of alcohol, to consider whether it does not prevent the action of various infections in the temperate. The neglect of this side of the question throws a doubt upon many of their inferences. The *deaths* attributed in 1876 to *zymotic diseases* were 96,660 ; to *alcoholism*, 1120. Now it is evident that any effect depressing the prevalence of zymotic diseases that kill their tens of thousands, will save the lives of hundreds.”

Abuse.—But when alcohol is used in too large a quantity, it has an inhibitory action ; and its chief influence is on the nervous system *generally* ; and on the regulating nerve-centres of the heart, and vaso-motor nerves in *particular*. It also impairs appetite, lessens muscular

strength, and remotely, as stated above, produces degenerations (Parkes).

But is there a boundary-line between its use and abuse? Anstie said that an ounce and a half of *absolute alcohol* caused the appearance of alcohol in the urine, which he regarded as a sign that as much has been taken as could be disposed of by the body; an ounce to an ounce and a half, therefore, should be the allowance of alcohol.

Parkes states that when an ounce is taken none is found in the urine; this, therefore, is a safe standard. Further:

1 ounce of alcohol	=	2 ounces of brandy, containing 50 per cent. alcohol.
„ „	=	5 ounces of wine, as port or sherry, containing 20 per cent. alcohol.
„ „	=	10 ounces of wine, as claret, etc., containing 10 per cent. alcohol.
„ „	=	20 ounces (a pint) of beer, containing 5 per cent. alcohol.

But if we increase these quantities by half an ounce we reach the utmost limit that should be taken.

Again, I repeat, alcohol is very injurious to children, a small quantity producing intoxication.

Presently I shall speak of the vice of intemperance; but before doing so there are some extraordinary facts, stated by various authors, concerning the increased length of life of *total abstainers* as compared with *moderate drinkers*—not including the intemperate, but only those who are strictly temperate.

I do not think it possible, without more reliable statistics, to compare the *health* of those who take alcohol moderately with that of those who take none ; for every individual must know many among both classes who live in apparently perfect health to a good old age. And also some of our greatest intellects are found under both classes. Even old Cornaro, looked upon as the type of temperance in all things, partook daily of the wine of his country to the amount of about fourteen ounces.

Dr. Drysdale read a paper before the British Medical Temperance Association on November 27, 1883, in which he quoted statistics, from various sources, in favour of total abstinence against the moderate drinking of alcohol. Thus, Dr. Lees, of Bradford, from 1870 to 1877, reported the following facts :—

Name of Society.	Years of experience.	Sickness per annum per member.	Mortality per 1000.
Bradford Rechabites	8	4 days 2 hours	7·9
Oddfellows	8	13 „ 10 „	22·9

Also :—

Name of Society.	Years of experience.	Sickness per annum per member.	Death-rate per 1000.
Colne Rechabites	10	5 days 18 hours	9·9
Wesleyan Friendly Society	10	10 „ 9 „	13·9

A few insurance offices are so satisfied that the mortality is less amongst total abstainers, that they insure them at a lower rate. The following offices give this advantage : the Emperor Assurance Society, the Briton, the United Kingdom Temperance and General Provident Institution, the Whittington, the London, Edinburgh and Glasgow, and the Sceptre. From this list it will be seen that total abstinence has a distinct market value, which is the best evidence of the reality of a gain in length of life. But even this does not prove the fact which total abstainers are so anxious to establish ; for total abstainers who receive the benefit of the advantages offered by the above-named insurance offices, and to which they are justly entitled, have to declare annually that they have been, and are still, abstainers, a requirement which, I need scarcely add, affords a very powerful and proper protection to the office ; whereas, amongst those insuring in the ordinary way at the ordinary rates, many become considerable drinkers, taking far more than is good for them, or even more than comes within the limit of moderate drinking. Could such persons be weeded out, I doubt very much indeed whether there would be any difference between the moderate drinkers—according to the table I have quoted on page 126—and total abstainers. In the ordinary way of insuring life, what is there to prevent any man who has insured when young becoming a hard drinker—of course, short of drunken-

ness—when he reaches middle life, and thus make havoc with the statistics ?

Moreover, quite apart from the question of alcohol, total abstainers are, as a class, much more thrifty, and lead far more temperate lives in general. They do so, not because they are abstainers from alcohol ; but they are total abstainers as a part of the excellent character they bear for temperance in all things. No class, in my mind, is to be more highly commended. They are often the very backbone of the society in which they move ; but they are not this because they are abstainers. It cannot be too much borne in mind that this is owing solely to their temperate disposition in all the affairs of life ; total abstinence is one feature only in their character. They are total abstainers because of their characters, and they do not possess their high characters because they are abstainers.

The Sceptre Life Insurance Association reports for the *six* years ending 1881—

Sceptre—six years.	General Section.	Temperance Section.
Expected claims	373	130
Actual ,,	287	64
Percentage of } Expectancy }	77	46

The same society for *seven* years ending 1883, says :—

Sceptre—seven years.	General Section.	Temperance Section.
Expected claims	438	165
Actual „	335	73
Percentage of } Expectancy }	76	44

The United Kingdom Temperance and General Provident Institution gives the following synopsis of its mortality :—

TEMPERANCE SECTION.				GENERAL SECTION.			
Years.	Deaths Expected.	Actual Deaths.	Per cent.	Expected Deaths.	Actual Deaths.	Per cent.	Excess per cent. in General Section.
1866-70	549	411	74	1008	944	94	20
1871	127	72	57	234	217	93	36
1872	137	90	66	244	282	116	50
1873	144	118	82	253	246	97	15
1874	153	110	72	263	288	110	38
1875	162	121	75	273	297	109	34
1876	168	102	60	279	253	90	30
1877	179	132	73	291	280	96	23
1878	187	117	63	299	317	106	43
1879	196	164	84	305	326	107	23
1880	203	136	67	311	304	98	31
1881	203	131	61	320	290	90	29
Total for 16 years from 1866 to 1881 inclusive ...	2418	1704	70	4080	4044	99	29

That is to say, in another form, in the sixteen years :—

	General Section.	Temperance Section.
Expected claims	£833,792 0 0	£481,000 0 0
Actual „	£869,058 0 0	£321,840 0 0
	£35,266 0 0 An <i>excess</i> of actual over expected = <i>Loss</i> .	£159,160 0 0 A <i>diminution</i> of actual over ex- pected = <i>Gain</i> .

In the institution just mentioned, the general section insures 20,000 lives, the temperance section insures 10,000; and the quinquennial bonuses in the temperance section have been $17\frac{1}{2}$ per cent. greater than those in the general section.

Dr. Norman Kerr quotes Colonel Sykes as stating that more than thirty years ago he found in the Madras Army :—

Madras Army.	Deaths.	Death-rate per 1000.
Abstainers	5 in 450	11·1
Temperate	102 in 4318	23·1
Intemperate	42 in 942	44·5

In the Whittington Life Assurance Company it is stated, September, 1881, that the—

DEATH-RATE PER 1000 was—

In the General Section	...	...	...	50
„ Temperance Section	...	...	...	23

The above facts are very satisfactory to total abstainers who wish to insure their lives, and they should reap the benefit of their abstinence; but they do not prove the case of temperance *versus* total abstinence.

I think the utmost that can be said as to the *use* of alcohol is—

(1) That to many people, rich and poor, intellectual workers, and bodily workers, a little alcohol is a help, and not a hindrance, to them in their work when taken with their meals, and soothes them after their work is over.

(2) That it can be, and has been, used by myriads in all ages and in all countries with benefit as an adjunct to food; and that apparently it has been used by them without any injury to their health, and without curtailing their length of life.

(3) Further, is it possible that nearly the whole human race should be wrong in considering that alcohol is of benefit in small quantities, and hurtful in large?

(4) Is it useful under certain conditions?

(a) During *great cold*? It is harmful as a rule, as already discussed.

(b) During *great heat*? By virtue of its power of dilating the cutaneous blood vessels, alcohol tends to cause the sensation of coolness in hot weather; for by withdrawing the blood from within, and causing a determination of blood to the skin, sweating occurs, and in its evaporation from the surface of the body a large amount of heat is withdrawn from within, and the surface of the skin—the seat of the chief sensation of heat—feels cool. Notwithstanding this physiological action of alcohol, the testimony of every one goes to prove that alcohol, except of the lightest kind, and in the smallest quantity, is most injurious in hot weather, and in hot climates. It seems to be greatly owing to the too free use of alcohol by Englishmen in India, that so many ruin their health and shorten their lives there. They generally say the climate does not agree with them; but frequently it would be truer to say that they suffer from the imprudent use of “brandy and soda” at all hours of the day, rather than from the climate.

(c) In *mental and bodily* work, it is, to many, a help in their occupation.

(d) Where there is a *deficiency of food*, it not only acts as a stimulant, keeping the heart going, but it also supplies a carbonaceous food, arrests waste of tissue, and enables the individual to thrive on a less diet.

Parkes sums up as a *conclusion*, that alcohol is often a valuable article of diet ; that it is not invariably hurtful ; that it is not a necessity ; that many are better without it altogether.

As at present used, it is often more powerful for evil than for good, rendering it imperative for all to strive to get rid of its *abuse*, that it may be used only with the strictest temperance.

As to the various *kinds* of alcohol in use, wines are of value from the sugar, salts, and ethers they contain, as well as the alcohol ; beers, from the extractives, sugar, bitters, free acid, and alcohol.

We have, at present, discussed chiefly the use and value of alcohol when used temperately. But we cannot close this alcohol question without considering the side of *Intemperance*. For that the evil of intemperance is great in itself, and widespread in extent, there can be no doubt.

Parkes goes so far as to say, that the *abuse* of alcohol produces a misery so great, that it may be truly said that if alcohol were unknown, half the sin, and a large part of the poverty and unhappiness in the world, would disappear. It is an undoubted fact that the *effects of intemperance* in any alcohol cause premature old age, produce numerous diseases, and greatly lessen the chance of living.

The effects of intemperance, as given by Neison, in his Statistics, p. 217, are thus shown :—

RATIO PER CENT. FROM THE UNDERMENTIONED CAUSES TO
DEATHS FROM ALL CAUSES.

Cause of Death.	1847.	Gotha Life Office.	Scottish Widows.	Intemperate Lives.
Head diseases	9.710	15.176	20.720	27.10
Digestive organs, especially liver	6.240	8.377	11.994	23.30
Respiratory organs	33.150	27.843	23.676	22.98
Total of above } three classes	49.100	51.396	56.390	73.38

Also in intemperate persons the mortality at 21 to 30 years of age is *five* times that of the temperate; from 30 to 40 years of age it is *four* times as great. It becomes gradually less. Thus :—

A <i>Temperate</i> person's chance of living is	An <i>Intemperate</i> person's chance of living is
At 20 = 44.2 years	At 20 = 15.6 years
„ 30 = 36.6 „	„ 30 = 13.8 „
„ 40 = 28.8 „	„ 40 = 11.6 „
„ 50 = 21.25 „	„ 50 = 10.8 „
„ 60 = 14.285 „	„ 60 = 8.9 „

The average duration of life, after the commencement of the habit of intemperance, is—

	Years.
Among mechanics, working, and labouring men ...	18
„ traders, dealers, and merchants ...	17
„ professional men and gentlemen ...	15
„ females ...	14

Those who are intemperate on *spirits* have a greater mortality than those intemperate on *beer*; those intemperate on *spirits and beer* have a slightly greater mortality than those intemperate on only *spirits or beer*. Thus :—

MORTALITY PER ANNUM.

Spirit-drinkers ...	5.996 per cent.	nearly 60 per 1000
Beer-drinkers ...	4.597 „ „	„ 46 „ „
Spirit and beer drinkers ...	6.194 „ „	„ 62 „ „

Brunton says that the *causes* which lead to intemperance are various, although the reason why men drink is to obtain pleasure and avoid pain. Some drink in order to stupefy themselves, and thus destroy the effect of surrounding circumstances, whether it be poverty, shame, or unhappiness; others take it to help them to overcome weakness, and so enable them to effect their daily appointed task in spite of themselves.

The *effects* of intemperance are terrible to contemplate. Perhaps the most lamentable fact of all is, that the drinker does not affect himself alone, but brings ill-health and misery to all connected with him. First, his offspring suffers, and his child not only inherits the tendency

to become a drunkard, but is apt also to become scrofulous, idiotic, gouty, epileptic, etc.

Intemperance creates discord in families, fills our hospitals with sickness and accidents; and fills our unions, asylums, and prisons.

Lancereaux calculates that one death in every twenty taking place in Parisian hospitals was due to alcohol. The Rev. J. W. Horsley, chaplain to Clerkenwell Prison, states that of every twelve persons sent to gaol, nine were there directly, or indirectly, through the curse of strong drink.

In the Report of the Lunacy Commissioners, January 1, 1881, of 73,113 persons of unsound mind in asylums, intemperance was the cause of 12·6 per cent. of the new admissions. 20 per cent. of the insanity of the country is said to be traced to intemperance.

A century ago even, Howard wrote,¹ "On a resolution at a vestry meeting in a vestry room of St. Mary's, Dublin, April 2, 1788, to wait on the Lord Lieutenant, the gentlemen stated, 'That upon a most accurate inquiry, it appears that *dram-shops* amount to a number alarming to humanity; there being in the parish in which they were assembled above one-seventh of the total number of houses; in St. Werburgh's, no fewer in proportion; in St. Mark's, one-fifth; and in St. James's, one-fourth of the whole.'"

Again, Howard says,² "The habit of drinking spirituous

¹ "Lazarrettos," p. 80.

² Ibid., p. 202.

liquors to excess has become so frequent among the common people, that we can hardly walk the streets without seeing its shocking effects. . . . When the practice is confirmed by habit, they must have recourse to strong liquors to brace their trembling nerves ; so that even in a most abject state of poverty, every pittance they receive is expended in this manner."

And this, to our sorrow, continues still ; although in other respects civilization has made such strides in the century. Perhaps open drunkenness is not quite so palpable ; but if this gain has taken place, it is largely at the expense of secret drinking, now terribly common, even in my small experience ; and largely owing, I believe, to "grocer's licences."

In the United Kingdom, at the present time, there is about £130,000,000 spent annually upon "drink." This enormous expenditure is not so much an evil in itself, as an evil by reason of the fact that, in a large proportion of cases, it is drawn from the pockets of those who need the money to spend on necessary articles of daily life for themselves and their families. As a rule, however, "drink" is a most selfish vice ; for the drunkard only too often feeds and clothes himself well, while he is regardless of his wife, children, and other relatives who may be dependent on him.

But we have, as yet, said nothing of the *indirect* cost of "drink," which includes the cost of crime, insanity, pauperism,—this latter alone requiring about

£25,000,000 per annum, a large proportion of such pauperism being due to drink.

Mr. Alexander McDougall, of Manchester, has written a paper collecting facts concerning the relation between pauperism, drunkenness, and improvidence in Manchester. His investigations included 254 individual cases, excluding epileptics, and omitting lunatics. There were 120 outdoor cases, 100 indoor, and lock and vagrant-ward cases. These he divides into ten classes :—

(1) Pauperism, caused by *old age* or infirmity without any discredit, equal to one-eighth.

(2) Pauperism, caused by *disease* (not brought on by misconduct) or accidental injuries, involving inability to work, one-seventh : three times as many men as women.

(3) Pauperism, caused by the head of the family being *unable to find* employment, though willing to work, one-fortieth.

(4) Pauperism, caused by *idleness* and thriftlessness, *apart from* drunken and immoral habits, not one case.

(5) Pauperism, caused by *drunkenness in the man*, one-fourth ; more prevalent in skilled than in unskilled employments.

(6) Pauperism, caused by *drunkenness in the woman*, one-twentieth.

(7) *Widows* and *children of drunkards*, one-fifth.

(8) *Widows* and *children of well-conducted husbands*, one-sixth.

(9) *Widows* of well-conducted husbands, who have *drunken sons*, 1 per cent.

(10) Pauperism, in *women*, caused by *immoral conduct*, not drunkards; proportion not being given,—hope of recovery entertained.

From this it is seen that 51·24 per cent. is from *drunkenness* and 48·76 from *other causes*.

Out of the 254 cases only *one case* was found where the individual *had begun life as a pauper*, so that the pauperism in every instance except this was produced by personal misfortune or vice, and was not hereditary, as is often supposed.

That restrictions to the sale of drink in Howard's day were needed we have already shown; and that they are still more needed now few can question. That much can be done by wise restrictions to obviate the curse of drink is shown by the case of Sweden—once so drunken—now a pattern to most countries in this respect.

The "Commissioners in Lunacy" have also pointed out that lunacy is increasing in a greater proportion than the population increases. But whether intemperance helps to cause this increase, or whether insanity tends to increase intemperance, is not so clear. No doubt both are true, and without a doubt too, both are hereditary.

Bucknill, the greatest authority on insanity in its relation to drunkenness, points out that intemperance is one of the great factors of insanity, and that there is

"no element of survivalism more potent than temperance."

He also says that drunkenness not only produces insanity directly, but also by its effects upon other organs which react upon the brain, and by a variety of causes—by domestic brawls and discomfort to which it gives rise; and that it also produced insanity to a frightful extent by leaving it as a fearful inheritance to the children of drunkards. He stoutly maintains that drunkenness is a vice, not a disease.

Habitual drinking is a frequent source of all kinds of disease of the brain. Thus—

(1) Drink may be a *direct* cause of insanity, as a toxic agent acting on the brain.

(2) It may be one agent among many in the evolution of insanity.

With reference to the statistics of drunkenness as a cause of insanity, Dr. Clouston, of the Morningside Asylum, stated in 1876, that during 1873, 1874, and 1875 there were 878 admissions, and that of these, 112 cases (that is, 13 per cent.) were assigned to intemperance.

At the Richmond Asylum, Dublin, the similar percentage was about 15. In the Warwick Asylum, it was about 15.5 per cent.

Dr. Major, of the West Riding Asylum, says that of 428 patients admitted to the asylum during 1882, 85 cases were supposed to have become insane in consequence of alcoholic excess—68 men, 17 women—or about 20 per cent.

The same authority, at the same asylum, states that out of 511 cases of insanity during 1883—

- | | | |
|--|-------|-----------|
| (1) Direct action of alcohol caused | 11.35 | per cent. |
| (2) Hereditary tendency to insanity | 1.56 | „ |
| (3) Alcoholic excess, plus adverse
physical circumstances | 2.93 | „ |
| (4) Alcoholic excess, plus mental
causes | 1.95 | „ |

The alcoholic cases were,	}	17.79	„
therefore, in all			

M. Le Grand du Saulle stated that, at the Salpêtrière from 1870 to 1884, 25 per cent. of the total number of insane patients was traceable to alcoholism.

Again, we have in—

Bethlehem Hospital.	Years.	Males.	Females.
Total of patients admitted	1875, 1876	208	267
Percentage of cases attributed } to intemperance	„ „	6.25	5.61

Bucknill has struck the true chord when he says, “Drunkenness is not so much a vice to be punished, as *temperance* a virtue to be encouraged.” And, further, he adds, “Consider the great part which grief and anxiety, worry and overstrain, play in the production of insanity; the depressing effects of poverty, and the failing struggle for existence; of misery in all its forms. Then

consider to how great an extent the use of alcohol oftentimes tends to make the burden of life bearable, if not by stimulating the powers, at least by deadening the sensibilities of men; and, I think, you will agree with me that, by the occasional help of strong drink, a man may sometimes be able to weather that point of wretchedness upon which his sanity would otherwise have been wrecked."

To sum up, alcohol is an aid to digestion, and so may be taken safely by the healthy for this purpose, or as a luxury. It is not, however, a necessity to those in health. It is a stimulant to the heart, and a sedative to the brain. It gives pleasure, owing to its stimulating property; it allays pain, owing to its sedative faculty. It is injurious to the young and growing. It is injurious to any one descended from those who have taken to excess. It is harmful when taken, as "nips," between meals.

Excess induces weakness, shortens life, tends to poverty, crime, and insanity. It fosters disease and the craving for alcohol in the offspring. Therefore temperance in alcohol cannot be too strongly recommended, and I regard it as a higher virtue than abstinence.

(iii.) **Temperance in Tobacco-Smoking.**—The personal habit of "smoking" has become so rife in this country, that a word is due on the subject in this paper. It has become an "appetite," and, like all other appetites, is open to use and abuse.

Howard¹ quotes Dr. Hodges, who was in large practice in London during the plague in 1665, as saying, "Whether we regard the narcotic quality of this American henbane ; or the poisonous oil which exhales from it in smoking ; or that prodigious discharge of spittle which it occasions, and which nature wants for many other occasions ; or, lastly, the exercise it gives the lungs in drawing it ; besides the aptitude of the pestilential poison to be taken down along with it ; I must confess myself at uncertainties about it ; though, as to myself, I am its professed enemy."

"And," Howard adds, "to the advocates for such a habit, who use the argument of its being anti-pestilential, I would only ask—In which country is smoking more used than in Turkey?"

It is evident from this that Howard disapproved of the habit altogether, and that he thought it prejudicial to health.

Few would now uphold its use as being anti-pestilential. All would condemn the "prodigious discharge of spittle" which nature requires for other purposes. For the young and growing, too, it is injurious. Yet we cannot but regard its use as beneficial when used on the side of temperance. It soothes and helps in work—many are the irritable men whose irritableness at once disappears under the use of tobacco ; in *excess* it causes depression, fainting, and loss of sight, and in some may, perhaps,

¹ "Lazarettos," p. 210.

unfortunately lead to drinking. Moreover, with an unsuitable pipe or too many cigars a day, cancer of the lip and tongue may be caused. But this is abuse, and not use.

(iv.) **Temperance in its relation to Sex** is a division of our subject, which it is an imperative duty to face, however much one's feeling recoils from touching the question at all. I now proceed to discuss, therefore, one of the most important personal habits, in relation to the preservation of health, from the side of temperance.

Temperance and cleanliness in all the relations of life are important; but in this point, of very great moment indeed.

The appetites and passions of most human beings are strong, and wisely so. This sexual passion is the strongest of all, and necessarily so. In men, what will they not face to gratify it! How few are lawfully continent! How many unlawfully incontinent at all ages! Which class of society is most lawfully continent—the upper, middle, or lower? Sexual passion, in most men, has such power as to defy all dangers and risk all consequences.

“O ye men, it is not the great king, nor the multitude of men, neither is it wine, that excelleth; who is it then that ruleth them, or hath the lordship over them? are they not women?” (1 Esdras iv. 14).

Continence, by some, is supposed to be impossible in

early manhood ; or, if practised, to be so only at the cost of the habit of secret solitary vice.

But it is certain that the passion can be accelerated or delayed, excited or lowered, by various measures ; and continence may then become not only possible but comparatively easy.

In discussing this most difficult and delicate question, it will be my earnest endeavour now to set forth why this continence—sexual temperance—in manhood is not more often obtained ; to show that its failure is owing to the terrible temptations to which young people are unnecessarily and unadvisedly exposed ; and to point out how this security may be effected, so that the adult may be temperate or *continent*, and the young total abstainers or *chaste*,—a habit more important to them in this relation of sex than even in the alcoholic question.

In order to postpone the advent of uncontrollable sexual desire in the young, there should be an absence of exciting thoughts and temptations throughout early life ; and in their place a systematic use of mental and physical exercise. Instead of this, the minds of the young are too often aroused to think of such things, and permitted to dwell upon them ; sometimes owing to obscene companions ; sometimes to inappropriate and exciting books as are many novels, such reading rousing sensations of great force, that are only too readily relieved in early life by secret vice, later on by illegitimate gratification of the passion.

But where does the evil begin? Amongst the *poor*, while very young, and owing largely to the herding together of both sexes, at all ages, in one room. I think we should not be surprised at the immorality amongst many of the poor ; but should only wonder that there is any morality at all, when we consider the way in which they are housed and brought up without any approach to decency. It is to be hoped that the Royal Commission, now sitting to discuss the question of Housing the Poor in town and country, may devise some means of helping them to separate the unmarried sexes, which may become the first step in leading to a higher and a purer life.

But the poor should be able to look up to those above them, who are better off in this world—better educated, better trained, and better cared for—as an example ; and yet what do they see? In a large proportion of cases, vices as flagrant as their own ; perhaps a little less coarse, owing to a better education ; yet just as immoral—often far more so—considering the difference in circumstances. If the higher classes would set a better example, and so render such vice “unfashionable,” purity of life in themselves would also make them strive to help those beneath them, and they in their turn would aim at imitating those above them ; and thus there would be a tendency to elevate the whole of “society.” But what can the poor man think when he reads the revelations of high life in the Divorce Court in his Sunday paper (*Lloyd's Weekly London*

News)? Have words any power in influencing a man or woman in the face of such debasing examples?

The question of all others therefore, is, Where does the evil begin in the *upper and middle classes*? What is its origin? We all know that this passion is possessed to such a degree, that it perpetually strives for the mastery; but that it can be, and is, fostered or controlled, so as to be brought within the range of moral education, is beyond dispute. It is very much like traits of character; for example, "temper," which can be so nourished as to become a demon, almost at length rendering the individual unaccountable for his acts; or it may be so brought under control as to be, to all outsiders, non-existent—though it may entail actual suffering to the individual in his efforts to subdue it. In the same way "courage," by the practice of self-reliance, becomes an easy virtue; while feeble relying on others tends to the most mean-spirited weakness that can be imagined.

But it will be said, if this virtue of continence be simply one of education, why is it that in these days, when, if anything, the young are over-educated, it is as little practised as it was a century ago, when education was so much more neglected? Because the education which takes place is far more intellectual than moral; and intellectual education—when vice does arise—rather tends, as is shown in history, to increase the heinousness of all immorality and crime.

How many parents, I would ask, in parting with their children for *school*, warn them of the dangers of the immorality they are sure to meet with, to whatever school they go? A large experience makes me certain that not 1 per cent. of parents ever help their children to guard against this evil when they first part with them for school. Evils, known to all parents, exist at schools, and will always occur to a certain extent where a number of boys are congregated; yet, when the child is sent to school, not a word of warning is given him to put him on his guard.

What can the boy think? He will say to himself, "My father knows of all this vice at schools, and yet he has not said one word to me about it. He has warned me about most things; he told me how to take care of myself; he urged me to be truthful, to keep my temper, to be upright and manly, to say my prayers, to be courteous to those above me and considerate to those below me; he pressed me never to get into debt, never to 'drink,' and never to use bad language; and he said, too, I ought to change my boots and clothes, when wet, so as not to get ill; and yet he has not said one syllable about this. My father is a good man, and loves me; and if he wanted me not to do this he would surely have told me. It can't be so wrong as I at first thought it, else I am sure he would have protected me and told me all about it, and would not have thus passed over and winked at the matter."

Every schoolboy—even the youngest—may be taught to meet all his temptations with a manly courage if he be shown what they are. Whereas, he is turned adrift into this new world, warned of all temptations but one, and this the one which meets him most insidiously, usually under cover of the dark, and when no eye or hand is near to help him to withstand it.

What can a boy think of this silence, but that his parents, masters, and schoolfellows wink at the matter? Silence in such a matter is connivance. It is an indubitable fact that the vice is one which meets with too little discouragement on all hands; and is therefore practised with too little shame.

I am aware that this is a terrible accusation to make; but it is true in 95 per cent. of cases, and I must state it, however painful. I would even say it is, in my opinion, a bare 5 per cent. of parents, masters, and schoolfellows, who warn the young of this fearful evil.

Most men and boys are strong if they have to face a *known* enemy; but who is strong to face an *unknown* one? It needs a lifelong battle. A stripling is not equal to it. I find this pertinent remark by Acton: "I have noticed that all patients who have confessed to me that they have practised this vice, have lamented that they were not, when children, made aware of the consequences; and I have been entreated over and over again to urge on parents, guardians, schoolmasters, and others interested in the education of youth, the necessity

of giving their charges some warning or some intimation of their danger."

I believe that the reason of the existence of so much incontinence and prostitution in the world is largely owing to this vice of *masturbation* in the young.

And I believe that the reason why it is so widespread an evil—amounting, I gather, although from the nature of the case no complete evidence can ever be accurately obtained, to somewhere about 90 to 95 per cent. of all boys at boarding-schools—is because the boy leaves his home in the first instance without one word of warning from his parents that he will meet with bad boys who will tell him that "everybody does it;" and thus he falls into evil ways from his innocence and ignorance alone. He is overcome with such persuasions as these, "that it is proper," "that it is manly," and "that he will be ill if he does not."

This immorality is estimated by some¹ at 80 per cent., by others at 90 per cent. Another says that not 10 per cent. of boys are innocent. Another, that it has always begun at from 8 to 12 years of age. Others, that it is always worst amongst the elder boys. Others, that "it is universal."

And I would further assert, without fear of contradiction, that in those schools where *supper* is provided

¹ The names of authorities are intentionally omitted, because they have not been publicly printed; but they will be found in the publications referred to in the list of authors.

at 9 p.m., consisting of meat, tarts, cheese, and beer, the physical conditions, on going to bed at 10 p.m., engendered thereby are such that it is almost a physical impossibility for any boy of a certain age, with his bounding passions, to continue pure, however much he may desire it, or however far impurity may be removed from his mind. Such a mode of living amongst boys is a very heavy premium indeed on the commission of sin at the age of puberty. Without a shadow of doubt it occasions, at first, involuntary excitement, discomfort, and relief during sleep, which eventually, owing to its very frequent recurrence, becomes transferred, almost from necessity, into a voluntary act of vice. Then a habit is established which is as hard to be master of as is the habit of "drink." Such an unwise arrangement of meals, especially if accompanied by the cubicle system,¹ puts a premium, as I have stated, on impurity at school; and further, entails all but certain impurity after school years are over. Are not the national results of this evil—moral and physical—important enough for parents to take the matter in hand; and for masters to seek by every means in their power to prevent the evil?

An author says, "I cannot resist the conclusion that the practice of solitary vice among schoolboys is prevalent to a most dangerous and deplorable degree, and that in a great number of cases, perhaps the majority,

¹ See Author's paper, "School Dormitories," read at the International Health Exhibition, London, 1884.

it is learnt at the private school. Doctors testify to the hideous fact that children are taught this habit in the nursery. Some learn it almost as early from evil associates at home, either elder brothers, or schoolboys on a visit in the holidays, or any chance acquaintance." Again, "The two great causes, however, curiosity and dirty talk, are still at work, and it cannot be doubted that many fall into bad ways at the time of puberty, either from suggestions of companions, or, what seems very likely, from the awakening of new desires, unchecked by knowledge of consequences or strength of will. This is the history of many a boy left to face these dangers unaided."

I have no doubt that this is perfectly true, and I cannot but believe that the cause of it rests essentially with the parents in a large majority of cases. Yet, every one is censured but the parent, and the blame is attributed to the boy himself, his schoolfellows, his masters, or the school itself is abused generally. Unhesitatingly, I repeat, it is the parents who are mostly at fault. Boys—and men—have told me themselves, that it was innocence and ignorance at first, and in the trouble at their sin have uttered stinging reproaches that they had never been previously warned, but had been left to be taught by that stern master—bitter experience.

But how is this to be obviated? parents will ask. "Do you *really* expect me to talk to my son on such a matter? I send my son to school to be educated, and

it is the master's duty to educate him in that too, to keep his school pure, and to prevent him doing evil."

To my mind, nothing could be worse—if any good is wished to be done in the matter—than to regard the question as a master's duty. Even the wisest of masters, I venture to say, could not do it as it should be done. To require him, with fifty boys under his care, to admonish each "new boy" from year's end to year's end, must necessarily produce, after a time, a mere mechanical form of speech, to be lightly regarded by some, and ridiculed or ignored by others.

An author, quoted above, says, "Boys, associated together at school, cannot be dealt with collectively in such a matter as this. The danger amounts to a certainty that the oft-repeated advice or warning from the master will deteriorate into a mere professional form, to be met (collectively) with cynicism and ridicule, and end by becoming a mockery and a scandal. The object in view would be wholly defeated."

The *young* boy should be told *before he leaves home* "of the evils others may teach him, those of his own age no less than the bigger boys; and that at the least sign of dirty talk he is to be prepared to do battle for what is right; that such tempters are cowards generally, and if he stands firm will give way before him; and that instead of being contemptible and despised by the best boys, he will gain respect and a good name which will be his all through life."

Moreover, the *parent* knows how to broach the subject to his own son at the right time, and in the way most suitable to his disposition. Whereas the *master* cannot choose his own time; for if he waits for a right moment he may be too late; while if he avail himself of the most fitting opportunity to speak to all "new boys," individually or collectively, as they leave the master's study the bad boy (and there are few schools who have not one or more such amongst their number) can in an instant undo the good impression made, by jeering at what he knows has been said. That it is the office of a master—except under special circumstances—to speak of it should, therefore, be banished from every parent's mind; for not only would the end desired not be obtained, but the risk—in some hands—of "the Confessional" creeping in (as is already the case in some schools), with all its attendant evils, is far too great for parents to trust the matter out of their own hands.

I, therefore, repeat *it is the parent's duty, and his alone*. One or other of the parents should quietly and kindly warn the boy before he leaves them at the very beginning of school life, that he will, wherever he goes, meet with some bad companions who will try to teach him bad thoughts, bad words, and bad habits; and if the parent do not wish to give him a lesson in purity of life, or to explain to him the immorality of the evil, let him put it on the ground of its dirtiness and filthiness.

I do not understand the delicacy of a parent who will not warn his son of what he may—nay, of what he is sure to—meet with, lest he should poison his son's mind, when the evil will, probably, within a few days, stand before him in all its ghastliness, and sink him at once because not forewarned.

Again, an author says, "It is false delicacy, it is cruel mercy, to keep silence. To ignore sin is not to conquer it, and innocence is blind virtue. Instead of what may be called a *negative innocence*, there should be a positive opinion formed, and a definite standard set up, if the body is to stand out against the storm of temptation when it comes. Remember, that the knowledge of evil must come to your child sooner or later; and the question for you to decide is, not whether it shall come to him, but whether it shall be as a tender, loving warning, accompanied by your motherly prayers, or in the shape of a sudden, unexpected, overwhelming temptation." It behoves every parent to take these words to heart.

I have spoken thus strongly on this subject, because I do not regard the evil, as so many do, as inevitable, and therefore wisest to let it alone. Moreover, I hold that it can be, and must be remedied, if we, as a nation, are to hold our own; for I believe that it is this commencement of evil which leads to so much debauchery *after school life* is over. The habit has become so fixed, and the sexual organs have been brought so prematurely into use,

that the desire is already present, and every other excitement and temptation is ready waiting, and little persuasion is requisite.

The author I have already referred to several times, says, "Every one knows that the least defilement in boyhood enormously increases the difficulty of continence in manhood; hence all the talk so common of fornication being a necessity, and chastity injurious to health." Moreover, it should never be forgotten, as Newman, in his "Oxford Sermons," said, In subduing our evil nature the first steps alone are in our own power; a few combats seem to decide the solemn question, whether the sovereignty is with the spirit or the flesh.

It is, without a doubt, comparatively easy for the young human being—and all young animals too, as is well-known—to abstain *altogether* from every form of mental and physical sexual excitement; but it is next to an impossibility for them to be occasionally incontinent, and then continent—the force of the passion once indulged is too strong for most wills.

Acton says, "It is my deliberate and earnest advice to all boys, as well as young men, to live a perfectly continent life in thought, word, and deed. It is quite possible, by regular training of the will, by careful attention to exercise and general hygienic treatment of the body, and by true religious feeling."

Is it not, therefore, the imperative duty of the parent

to strive to prevent the *first fall* by a timely kind warning such as I have urged?

“Who would not give a trifle to *prevent*
What he would give a thousand worlds to *cure*?”

I have now stated how I believe the evil could be prevented in our schools; not entirely perhaps—for I am not sanguine enough to believe that it will ever be wholly eradicated. But I feel sure it could be so far removed as to cause the numbers to change places, so that we might obtain a percentage of ninety to ninety-five of those who lead pure lives while at school, as against five per cent. who are impure, reversing the lamentable ratio that now exists.

But many will ask, if this evil occur as you say it does, how is it at present dealt with? Is it, and can it be handled at all? The way to get rid of so terrible a social evil is *not* to punish an occasional flagrant example of the vice, or to ignore the existence of the mischief. The *right way* is so to teach and train the young that they will not commit the sin; yet almost no trouble is taken by parents to effect this,—sometimes largely owing, I fear, to that unwillingness of parents to believe that *their own* children could or would commit such a wrong.

Again, others will say, you have spoken a great deal about incontinence in the young, and of their vicious habits. If the matter be thus widespread, is it such an evil after all? Yes, it is an evil, and one that lasts a life-

time too. The harm which results is moral, intellectual, and physical. *Physically*, it is a frequent drain at a critical time of life, when nature is providing for growth and development and is ill able to bear it; it is a powerful nervous shock to the system ill prepared to meet it. It is *early abuse*, and *not* abstinence, that tends to produce atrophy of the generative organs; whereas this is used as a terror to urge on the innocent. It is early abuse, too, which renders the organs incapable of retention of secretion. It also causes muscular and mental debility, loss of spirit and manliness, and occasionally insanity, suicide, and homicide. Moreover, it leads to further uncontrollable passions in early manhood. It is a frequent observation instilled into the young at all ages, "I am told it is very bad for me to be continent; my health will suffer from it." No greater lie was ever invented. It is simply a base invention to cover sin, and has no foundation in fact.

Further, this vice enfeebles the *intellectual* powers, inducing lethargy and obtuseness, and incapacity for hard mental work. And last, and most of all, it is an *immorality* which stains the whole character, and undermines it for life.

In conclusion, I would urge that were a little *physiological* knowledge taught in all our schools, the *interest* taken in it would be great, owing to the natural curiosity of human nature,—the *good* effected, greater.

When I made a tour of inspection of schools, I was astounded at

some of the arrangements I saw. It seemed as though the constructors, even in modern-built schools, had set themselves this question to solve, "How to foster immorality in schools?" or, "How *not* to prevent immorality?" It seemed to me to be forgotten that the moral question is really to a great extent a material question—often largely one of bricks and mortar; that morality largely depends on the physical condition of the body itself, and on the circumstances under which it lives. For instance, if I were asked which are the worst schools, public and private, in this country, I should answer without any hesitation—

1. Those where the cubicle system is in force, and covert available thereby for purposes of immorality.

2. Those where hearty meals are given at supper time.

3. Those where the authorities affirm that immorality is unknown in their schools; for such a statement shows that they do not even recognize the evil, much less strive to eradicate it.

4. Those schools where parents are so foolish as to believe that "discipline is maintained without punishment."

Again, were I asked to advise in the choice of a school, I should say that, *given* large, open, *lighted* dormitories only; a reasonable prefectorial system; an absence of stimulating and exciting food after midday dinner; a recognition of the inevitable existence of immorality unless masters are always on the alert; and above all a timely word of warning from parents,—we should then see the commencement of an absolutely needed *reformation in all our schools*.

Further, masters will state, and honestly believe it, that immorality only breaks out every few years. True; but would that they could see the smouldering fire which goes on day by day! they would then understand its breaking out into a blaze every now and again. The smouldering fire they do not see; the blaze is manifest enough. But the open blaze cannot arise without the prior smouldering; and if the blaze is ever to be prevented, it is this incessant smouldering that must be watched for.

Again, masters, when they have tried their utmost, will say in despair that the evil cannot be prevented. Under the present *régime*, and with inappropriate school dormitories, with sorrow I admit it; but I cannot state too strongly my firm opinion, that if

parents would only take the matter into their own hands, as it is their imperative duty to do, it could be largely stopped. Why do not parents recognize the fact, and act up to it, that it is an unnatural condition to crowd boys together in houses of from thirty to a hundred, at the most critical time of their lives, practically to live by themselves, away from the humanizing influence of mothers and sisters, for eight months in every year? Is it to be wondered at that immorality should occur, unless little boys are put on their guard before they enter such an unnatural state? Ignorance is not innocence; it is a fatal mistake to suppose that it even can, or ever does, secure it.

Yet this education in centres where high-grade schools are founded is the only way in which boys can be well educated. Surely no sane person would advocate the education of boys in tenth-rate schools placed in every *parish*, or even that boys should be educated in large *towns*! No; our system of high-class education is right; but there is this great blot in it, which can be removed in the main by the parent alone. To hand this duty over to the teacher, the doctor, or the clergyman is, in my opinion, wrong; to leave it to take care of itself, as is at present the case, has the same effect as connivance. With great earnestness I would again say, that it is most unwise and unjust to turn a little boy into a boarding-school amongst a number without one word of warning to put him on his guard. His chances of falling an easy prey to impurity, in one form or other, are certainly too great for his age.

There are some who, while admitting the condition of things I have described, will say that I have overstated my case—that, in fact, I have exaggerated the degree of the evil. I, however, believe, with others capable of judging, that I have faithfully handled a very delicate subject, and have not erred on the side of exaggeration. However, for the sake of argument, I would say, let it be granted that I have exaggerated. I care not whether the numbers be so many or so few; but I do care whether this boy or that shall be allowed to fall, or prevented from falling by a timely warning from his parents. Let me bring it still more home to each parent by asking, Is it to be *your own* boy who is to fall? It is a *personal* question to every parent and every boy.

At present, be the evil great or small, it is an unprevented preventible evil. I have raised my voice against it in the hope that the very simple measures I have advised may be taken, so that one and all concerned in the training of boys may use the right methods for stamping it out, and not leave it to take its chance, to the utter ruin of innumerable individuals.

This evil, of which I have spoken so long and so freely, is I believe *the root of the evil of prostitution*, and similar vices ; and if this latter evil is to be mitigated, it can only be, to my mind, by making the life of the school-boy purer.

How is it possible to put a stop to this terrible social evil ? How is it possible to *elevate women*, while the demand for them for base purposes is so great ?

We must go to the other end of the scale, and make men better ; and to make men better, we must train young boys more in purity of life and chastity BEFORE their passions become uncontrollable—to make them feel that—

“Life every man holds dear ; but the dear man
Holds honour far more precious dear than life.”

Whereas, the cry of every moralist and philanthropist is, Let us put a stop to this prostitution, open and clandestine. This cannot be effected at present, much as it is to be desired ; the demand for it is too great, even possibly greater than the supply. If we wish to eradicate it, we must go to the fountain-head, and make those who create the demand purer, so that the demand falling off, the supply will be curtailed.

It is of no use whatever, I repeat, attacking the *women*, while the demand for them is so great, for the law of demand and supply is inexorable ; nor the *men*, for their passions have got beyond their control. We must go back further, to the *boys* themselves ; and by example and precept prevent the habit being formed, at or before school life, which after school life, in the temptations that exist in the world, becomes uncontrollable in a large proportion of instances.

Many are trying by "Social Purity Alliances" and by "White Cross Guilds" to induce the young men and women of this country to lead pure lives. But, estimable as these are, it is no use *beginning* there. These may reclaim the *fallen*, but they cannot prevent the *falling*. Parents must begin to teach their children the value of purity of life before they ever part with them. Only to begin when they are young men and women is about as useless as to try to get on and stop an express train when it is going at full speed. It cannot be done. But any one can get on the engine before it leaves the *station*, and can keep it under perfect control throughout its journey. So with this immorality ; if parents will only start their children in life forewarned, before they leave *home* in the first instance, the result is easily accomplished. After this stage, effective action is all but impossible, so strong are human passions ; it needs then superhuman help even to keep them under reasonable control.

Now, let us follow the boy who has left school, where he has, only too frequently, been taught and practised one form or other of sexual excitement.

Does he get into a more favourable moral atmosphere? He has left his school companions generally; or he may meet them again at the university; or he commences his life in "Society." Do his mother, sisters, and sisters' friends at home *help* him, by their own modesty even, to lead the life *they* would wish? I think, in many instances, not. The poet has so much better expressed what I mean, that I cannot do better than cite his statements on the subject of "Ladies' Evening Dress."

"And yet I can't but own that modern spouses
In his opinion seem to acquiesce;
I've seen, in many fashionable houses,
The ladies waltzing in complete undress;
A custom which no sort of feeling rouses
Amongst their husbands—and I must confess
(Being unmarried) that I see no fault in
Ladies young, lovely, and half-naked, waltzing.

"I must say I enjoy it—'tis a pleasure
Good-natured fair ones grant to amorous swains;
I like to whirl to that bewildering measure,
Which, 'just like love'—or brandy, turns one's brains;
I like to view my partner's charms at leisure,
Till scarce a secret for the bride remains;
While round her waist each wanton finger strays,
And counts the whalebones in her panting stays.

"Let jealous husbands (if such still there be
In this *improving* age) cry out, 'For shame!'

Let Quakers say our manners are too free,
 And gouty folks, quadrilles and waltzes blame ;
 I here protest I never will agree
 In such reproaches—till I'm blind and lame.
 Let maids of fifty prate of immorality,
I'm for the sexes' rational equality.

* * * * *

Lest these three stanzas startle folks Platonic—all
 My eulogies on waltzing are ironical."

MOULTRIE.

That this fashionable mode of dressing—or *undressing*—in the evening is unbecoming no one will venture to deny. What would be thought, I would ask, of any lady who appeared in such a state of undress at breakfast time? All—men and women alike—would at once say it was indelicate. I would urge, that what is improper or indelicate at breakfast, is just as indelicate in the evening—it is fashion alone which sanctions the custom, the character of it remains the same. It is time it was admitted by all, especially ladies themselves, that to be sufficiently clothed is as becoming in the evening as the morning. When this point is gained, we shall be one step nearer to purity of life in the young.

It is such appeals to the passions which are apt to make continence so difficult with some young men ; and there are many who would be continent but for these and similar appeals to their already ardent passions. Is it imagined that young men do not take a pleasure in looking at what it gives some ladies a pleasure to show ?

The next question for us to consider is, "How can youths who have left school be helped to lead the life they should lead in this respect?" First, a parent should again speak to his son when he has left school, or even before, and urge on him the unspeakable value, to himself, his wife, and his children, of a pure and chaste life. For the youth will be told by some—and he in his innocence will believe it, as so many do—that there are physiological reasons against continence. There are absolutely none. As I have said before, it is simply a false assertion to justify sin.

But if a parent cannot summon up courage to broach the subject again himself—now that his son is older—let him put that novel (excellent in most ways) into his boy's hands, called "Gerald and his Friend the Doctor,"—a book written for the purpose by the Rev. Henry Solly, and dedicated to the memory of the good Frederick Denison Maurice. Some such book (there are several written) given to a senior boy at the right time, and in the right way, would keep many a one from the commission of his first act of open evil after his school life, and help him to retain his manliness, self-respect, and purity; so that, when marrying, he may possess "a maiden love for a maid." A parent will then himself feel that he has done what he could; and the boy will not have the excuse of saying that he would not have sinned had he only been forewarned.

Moreover, there are powerful aids that each boy can

achieve for himself, and in which, too, his parent can still help him. Mental and physical exertion are great aids, for, by such means, nervous energy is expended, and erotic desires become less prominent; constant and agreeable employment, bodily and mental, is most valuable,—idleness being one of the greatest causes of every form of debauchery; and temperance in eating, drinking, and sleeping are essential.

It will thus be seen that I regard the bad habits which are formed in early youth as among the chief causes of incontinence in early manhood, and thus one of the most urgent sources of prostitution. It therefore behoves all who have this question of individual chastity at heart, to strive to teach that abstinence from excitement of the sexual organs of any kind is most important in early life; and further, that it is the practice of early bad habits—chiefly during school life, and most frequently started at the first school—which is one of the main causes of so much fornication during early manhood,—only too often before the school days are even ended. This practice frequently leads to drinking, in order to keep up excitement or to cover shame,—producing double ruin.

What I have said above is meant for those who would not go wrong were they only started on the right road by their parents in early life—those who fall from ignorance in the first instance; and this includes a very large class indeed.

I am, of course, only too well aware that there is still a class who have no desire to be continent, whether married or unmarried, and who tell us that they see no wrong in incontinence. For these prostitution must and will continue, for the present at all events. But could not this social blot be placed more under control, so as not to offend the sight and the conscience of those who do not desire to see it in all its ghastliness?

How is it possible for young men to keep innocent—to have continent personal habits—while it is always exhibited before them as it is? They have not to go out of their way to seek it—it stands before them with only too great effrontery.

Is it not time that this open solicitation was recognized as a great source of evil, and checked; so that those who do not seek the evil shall not have it forced upon their vision whether they will or not?

Is not this demanded at the hands of a Government by those who desire continence in the young?

I would ask, is not even recognized private prostitution less objectionable than this open vice which every innocent girl and boy is compelled to see, however much he or she may desire to avoid it?

It is not enough for us to have discussed thus fully this terrible personal habit; it is essential that we should proceed a step further in order that we may see its full meaning.

I have hitherto spoken one-sidedly, chiefly in the

interest of the young men exposed to the temptation. But is nothing to be said in the interest of the *girls* themselves? So recently as February 22, 1884, a deputation waited on the Home Secretary to urge on him the protection of the *persons* of young girls; their property is thought of value and protected, but not their persons. Surely some protection to girls—often under sixteen years of age—is demanded for humanity's sake, even in spite of themselves.

I do not understand the outcry against the Contagious Diseases Acts, which were doing so much good in *preventing disease*—a disease too terrible to contemplate, in the way it affects the individual throughout life, and only too often his wife and children also—and in arresting many girls in their career of evil.

As far as *withdrawing girls* from their sinful life is known, Mr. Square says, "that of the patients received into the Royal Albert Hospital, 45 out of every 100 had been induced to refrain from returning to an evil life."

And as to the *deterrent effects* of these Acts in the subjected districts, the *Lancet* points out that, "In the eight years, 1873–1880, 1642 girls and women, who had been found in improper places, and in bad company in the several districts, returned to their friends on finding that they were under the observation of the special police, before it was certain that they had commenced a career of vice. Of these, 194 were under

15 years of age, 628 were between 15 and 18 years of age, and 414 were under 21 years of age.

"The number of girls and women who *discontinued* their immoral lives on being cautioned, and who consequently were not registered, shows a similar satisfactory result. The total number is 1407 in eight years, of whom, 33 were under 15 years of age, 284 were between 15 and 18 years of age, and 408 were under 21 years of age."

Does not a Government fail in its duty when it does not protect its subjects from all these evils? Would a British subject be allowed to stand at a corner of the street suffering from small-pox or scarlet fever? Yet this disease does far more harm, morally and physically, and destroys the health and happiness of a far larger number.

Gihon said, at the International Medical Congress, held in London, August, 1881, "If the wretched harlot, licensed by public tolerance to ply her calling in the most frequented thoroughfares; or the heedless youth, untaught by parent and impelled by the physical cravings of his new manhood, attracted by meretricious allurements, which no one attempts to conceal, have no claims upon society, the innocent maiden who becomes that young man's wife surely has the strongest possible claim to be protected from that hideous evil, for the existence of which 'society' is responsible."

If the "State" cannot prevent prostitution (as I am

sure it cannot), ought it not to place it under some control, so as to prevent its being thrust in the face of every one, and so as to minimize the terrible ravages it occasions? These Acts were called by some, the "State Regulation of Vice;" but this is not their true name, they should be called the "State Prevention of Disease." The State protects its subjects against small-pox; why should it not preserve them against this worse evil—an evil which affects innocent and guilty alike? We shall be answered that this is a voluntary infection, and therefore has no claim to protection from the State. Is it a voluntary infection on the part of the wife and children?

Were the sinner himself the only one to suffer, perhaps so much need not be said about protecting him. But when one sees the innocent wife suffer as she does so frequently, or the still more innocent infant when only a few days old, it makes one feel that no man or woman should be permitted to disseminate this contagious disease—even though it be at the cost of making the commission of the sinful act of less risk to the sinner himself. The question for us to consider, as practical men, is, Can we prevent prostitution by any means at the present time? And there is only one answer, however painful,—No!

Then the next question is, Can we mitigate the evil? Yes! And these "Acts" were doing their work well morally and physically; and should have been made general rather than cancelled.

And if parents would help their sons, in the beginning of their school life, as I have advised, they would aid still more to prevent the evil ; for the demand diminishing, the supply would diminish too, to the great gain, in health and morals, of the community.

But it seems to me that the opponents of these Acts do not care at all about facts or statistics ; nor for the testimony of the clergy, medical men, and nearly the whole of the inhabitants of the districts where they were in force. They regard the Acts only from the side of sentiment.

Have parents—opponents of the Acts—helped and warned their sons early in life, as I have advised, so as to prevent evil and disease ?

It is about as useless to discuss facts with some of the opponents of these Acts (which were *meanwhile* doing much good) which lead to temperance and abstinence in sexual matters, as it is to discuss facts with the opponents of the Vaccination Acts, which prevent small-pox. In both cases the facts are there for all who will see them ; but both cases are opposed by unreasonable sentiment alone.

While I have spoken thus freely about the importance of total abstinence from sexual excitement in the young ; why it is such an uncommon virtue ; and how it is to be more easily obtained ; I have hitherto said nothing of its value when conscientiously carried out. Here I shall say only one word, for the value of purity of life

and chastity is known to all. It leads to manliness, uprightness, and truth ; generosity towards the weak, and straightforwardness with equals. Moreover, what can be worse to the whole moral being than impurity in thought, word, or deed ?

I have only now to add that temperance in relation to sex should be, as in all other points we have discussed in this paper, the rule of adult life. Intemperance in this, in the adult, is bad morally and physically, leading to inordinate desire, with consequent physical disease.

I fear this section of temperance is inordinately long, and has involved much reiteration. This is owing to my desire to make every division of the subject clear in itself, so that there may be no misunderstanding on this important "personal habit."

I know full well that it is regarded as impolitic to say a word on this far-reaching sexual question. It is a question usually discussed only in a whisper ; it is a subject which, as a rule, is only dealt with—when all the evil has been committed—by quacks ; the victims swindled by charlatans ; and the sinner compelled to endure intolerable mental anguish. But prevention is better than cure. The pure should be kept pure by a word of warning from fathers and mothers, rather than permitted by false delicacy to go astray ; thus becoming the victim of a loathsome tribe of quacks who prey upon their lonely terror.

In the words of Channing I would conclude this section, "The truth is, that a man, who looks through the present disguises and humbling circumstances of human nature, and speaks with earnestness of what it was made for, and what it may become, is commonly set down by men of the world as a romancer."

(v.) **Temperance in Sleep.**—Sleep is as necessary to all organized matter, vegetable and animal, as eating and drinking. And like those appetites, the exercise of the function is associated with pleasure; the omission of it with pain. Hence the gratification of this necessary habit, causing pleasure, is liable to be abused and indulged in to excess.

No one left to his own free-will will take too little sleep, any more than a sane individual will take too little to eat and drink; but the inexorable force of circumstances, over which he has little control, compels many a man to allow himself too little sleep, by reason of his occupation.

Moreover, most school authorities allot the young and growing far too little of this "tired nature's sweet restorer," and the result is seen in their faces, while parents recognize it in the vacations when they notice the sleepiness of their children.

Therefore, the whole natural tendency is towards excess; and those who indulge in too much sleep are at least as numerous as those who are intemperate in eating and drinking.

Sleep is the period of rest, or repose, during which all the organs of the body are renovated. And while all the functions of the body go on during sleep as they do during the waking hours, they are at the same time all lowered or diminished in their force: thus, the heart beats more slowly; breathing is reduced in a like proportion; and the digestive organs are almost in abeyance, so much is their action retarded; while the whole muscular system, during perfect rest, lies midway between flexion and extension.

After sleep we rise in the morning refreshed, and with renewed energy; while during our waking hours this energy is gradually expended until at last nature falls to rest, and sleep ensues.

Different individuals and different ages require various *amounts of sleep*; and each individual should have his normal quantity, which varies slightly according to disposition and constitution; any beyond this amount is simply intemperance in sleep.

Sleep should vary according to the amount of labour effected. Those who work hard mentally and bodily require more rest to re-invigorate their system, more time to repair the wear and tear that has been caused, if fresh work is to be undertaken with effect.

Often when persons say they pass bad nights, the reason is that they do nothing during all the hours they are out of their beds, except eat too much, drink too much, and idle too much. Some vigorous exercise, a

little less food, and fewer hours in bed in a morning, constitute the only sedative they require. "To live on a shilling a day, and earn it," is *the* remedy.

1. If there be one personal habit more than any other, next to cleanliness, that tends to health and vigour, it is that of *early rising*, for not only is the time itself a gain, but the vigorous constitution it engenders is a still greater benefit. Moreover, it is the great preventive of intemperance in sleep; the indulgence is in the morning, not at night. Few go to bed too early; many get up too late. Many of the best observers, and the greatest workers, have said that neither health nor age is possible without early rising. It also engenders thrift, activity, and consequent cheerfulness and happiness.

2. *Amount of sleep.* For the ordinary healthy *adult* about eight hours in bed are required as a rule for perfect health.

For the *aged*, the time should vary; but each should have as much as he feels he likes. With this latitude, it will not be found that the aged are intemperate in sleep. They should also rest after food; for the digestive organs requiring all the blood they can obtain for the performance of their functions efficiently, there is less blood in the brain, and thus the feeling of drowsiness is induced, and should be satisfied.

It should be remembered that every function that is being actively performed, demands all the blood it can get, and should be allowed to have it, so that it may do

its work with greater vigour ; moreover, no two of them should be required to take place at the same time ; the brain requires the blood for mental work, the muscles for exercise, and the digestive organs for the performance of their functions.

Children always need a very large amount of sleep.

Infants will sleep from eighteen to twenty hours daily.

Children under four years will thrive best if they have fifteen hours sleep a day ; thirteen hours from 6 p.m. to 7 a.m., and two hours during the middle of the day.

Children under eight years should be allowed twelve hours, from 7 p.m. to 7 a.m.

But sleep for growing boys at school, doing a large amount of brain work, is a matter of very great importance, if their head and body are to be developed and not remain stunted through being stinted in sleep.

The tendency in schools is towards too strict a temperance in sleep rather than towards indulgence ; so strict that sufficient is not allowed for brain and body repair, and thus the boy or girl suffers from mental and bodily lassitude. Were it not for the holidays recurring every three months, health would suffer considerably. In regulating the daily life for the young, it is too often forgotten that they not only have to repair waste—ordinary wear and tear—as we all have, but also to provide for growth ; thus, all their organs have extra work to do, and require, therefore, extra rest to recover daily strength. Moreover,

the young are more active in mind and body, and thus there is a further increased wear and tear, which needs a still further increased period of rest for repair.

Therefore, for the young, *under ten* years of age, eleven hours sleep should be permitted; and the best time—except on the hottest nights in summer—is from 8 p.m. to 7 a.m.

For those *under thirteen* years, ten and a half hours should be the amount allotted, from 8.30. p.m. to 7. a.m.

For those *above thirteen* years, nine and a half hours should be set apart, from 9 p.m. to 6.30. a.m.

Those who have the guidance of the young at heart should see to this, for it is impossible to have healthy brain tissue formed, if rest be not ample for growth as well as for repair after work.

Under the head of Bedrooms I have spoken of the importance of a sufficient cubic space, together with efficient ventilation. The room should not be too light by night; and if it can get the sun by day, so much the better for the healthiness of the room.

It should always be remembered that one-half the life of the young, and one-third of the life of the adult, is passed in bed.

For health and cleanliness, it is better not to sleep too warm, in order that the skin may not be kept in a constant state of moisture. Clothing at night should be always *short* of producing moisture of the skin in bed;

it is more cleanly, less debilitating, and the body will be more inclined to rise in the morning with freshness. All the coverings to the bed should be freely pervious to air, and good absorbers of moisture (the insensible moisture that is always exuding from the skin); blankets, therefore, are the best bed coverings, and not eider-down quilts.

Another point connected with sleep, especially as concerns the young and growing, is that the head only should be placed on the pillow. Sleep is better obtained when the head lies low, and in a line with the spine, the pillow when lying on the side fitting into the space between the head and the shoulder; the shoulders by this means are prevented from being made round by spending a third of every day in an unnatural curved position.

On rising in the morning the pulse is naturally feeble, and the skin, relaxed by the warmth of bed and sleep, less capable of resistance, and therefore very susceptible to "catching cold." Hence one advantage of the cold bath on rising, as I have advised in the early part of this paper, is the excitement of the heart's action, the stimulation of the vessels of the skin, and the contraction of its pores.

Further, something warm to drink—such as coffee, or warm milk—is of great value before going out in the morning after sleep, as a preservative of health.

(vi.) **Temperance in Occupation.**—For health to

exist, some occupation is necessary ; without it, neither mental, moral, nor physical health is possible.

Those who have employment, or *work*, generally have sufficient means to satisfy nature. Those who have no employment, should undergo what is called *exercise*, or recreation, and by this means the natural functions of the body are healthily performed.

Exercise is one of the greatest preservatives of health ; and it is a personal habit which may be indulged in too much or too little. It is beneficial to all, preserving health, preventing disease, and prolonging life. Yet it is often surprising how some persons exist—to say nothing of being healthy, and even attaining long life—who live and sleep in small rooms, who never have a window open, and who never go out from one month's end to another. The entrance to such houses is unpleasant—to use no stronger term—and one involuntarily holds one's breath as one enters, so as not to inhale the fœtid atmosphere, following, in fact, the excellent advice of Howard, “I seldom draw my breath deeply.”

But it is an indubitable fact that in order to carry on the natural functions in their highest development, *physical exercise*, taken either during work or pleasure, is a necessity,—in fact a man needs to digest his food with his legs as well as with his stomach. Besides, without *mental occupation* a human being is apt to become restless, morose, and ill-tempered.

In discussing every separate item of temperance, it

has been scarcely possible to avoid passing somewhat over the same ground in explaining facts and statements—so much is the subject wheel within wheel.

Thus, in *physical exercise* all the functions of the body are involved. The *circulation* of the blood is quickened, the necessary blood changes are more effectually carried out, and the action of the diaphragm aids the return of the venous blood; thus congestions are obviated, and the heart is not overtaxed in consequence of the increased exertion.

The effect on the circulation is productive of incalculable benefit to those who have a sedentary occupation with much brain work; for, as previously explained, all organs in full work have a determination of blood to them, and thus brain work relieves muscular weariness, and muscular exercise produces rest to the brain.

The increase in the circulation of the blood from exercise causes a more rapid destruction of tissue; and thus more detritus has to be got rid of—burnt up; there is, therefore, an increase of animal heat, and a slight increase of temperature is found by the thermometer after active exertion.

Added to this, the *respiration* is also quickened, and if the exercise be taken in the open air, more oxygen is inhaled; by this means the blood impurities are more rapidly oxygenated and destroyed; and the blood, being thus depurated, is more healthy, and so causes increased vigour, greater health, and longer life.

The *lungs* at *rest*, and the lungs when the body is undergoing *exercise*, are two different things ; during the latter, double the air is inhaled, and so double the changes are effected.

Dr. Edward Smith showed the *effect of exercise* on the *amount of inspired air*, thus :—

Lying position	...	...	...	...	...	1'00
Sitting position	...	...	...	...	...	1'18
Singing	...	...	...	...	...	1'26
Standing	...	...	...	...	...	1'33
Walking one mile per hour			...	...	...	1'90
„ two miles	„		...	...	...	2'76
„ three	„		...	...	...	3'23
„ „ „	„	and carrying 34 lbs.	...			3'50
„ „ „	„	„ 63 lbs.	...			3'84
Riding and trotting		...	...	...		4'05
Swimming	...	...	...	...		4'33
Walking three miles per hour, and carrying 118 lbs.						4'75
Walking four	„	...	...	...		5'00
Treadmill	...	...	...	...		5'50
Walking six miles per hour		...	...	...		7'00

Parkes, expressing the above in another way, shows that under ordinary circumstances a man breathes 480 cubic inches per minute.

Walking four miles per hour, he draws in $480 \times 5 = 2400$ cubic inches per minute.

Walking six miles per hour, he draws in $480 \times 7 = 3260$ cubic inches per minute.

Under exercise, too, the secretion of the skin is increased ; and the muscles become hard and strong. There is also a greater appetite, especially for meat and

fat. The brain is more eager for active mental exercise ; and good exercise tends to diminish the erotic desires in the young, and is therefore of inestimable value to them.

The *amount of exercise* for the ordinary healthy adult should average about an eight mile daily walk, or two hours' equivalent exercise. The best *time* for this is *not* when the system is hungry for nourishment ; nor immediately after food.

All exercise should be proportioned to strength ; and every *age* of life needs its own appropriate exercise. Thus, the *infant* in arms kicks and laughs, and after its excitement falls to sleep.

Children run and play, do all they have to do by spurts, and are incapable of sustained exertion ; steady walks are therefore out of place, and prevent proper development.

Boys require plenty of time for play, and for the expenditure of their superfluous force ; otherwise they will always be in mischief. What is temperance in exercise for them would be most intemperate for the adult. The great rule for all parents and masters to observe is to provide sufficient exercise for boys. Were more trouble taken over this, we should have better boys at school ; and parents would not so often complain that the vacations are too long. Not enough trouble is taken to organize games and other occupations for them, consequently they resort to every conceivable means of getting into mischief.

Girls need exercise as much as—or, more than—boys; and yet this is all but utterly neglected in this country; and as in the allowance of sleep for the young the error is on the side of too strict a temperance. Girls require as *lively* an exercise as boys; whereas they are too often doomed to a “two-and-two walk” on a pavement, about twice a week, weather permitting; and calisthenics and dancing once a week. This is not enough, nor is it suitable exercise. Skipping, trapeze exercise, lawn tennis, swimming, riding and rowing are more appropriate. Were girls allowed such exercises as part of their daily life, we should cease to see the frequent curvature of the spine, and consequent ill-health; and those wretched spine-boards, on which girls are still in some schools doomed to recline, could be used as “fire-wood.” A girl’s back is by nature long, and needs a chair with the support of a back during lessons; and during the three years of very rapid growth—from eleven to fourteen years—when the girl suddenly develops into a woman, rest on the sofa during the preparation of lessons may also be allowed with benefit. But the rule for straight backs in girls must be thorough exercise whilst growing, and not backboards.

Exercise for the *aged* should also be carefully regulated; it should be passive, rather than active, such as riding and driving; and always short of fatigue.

The *adult*, whose exercise is in a large proportion of cases his work, needs nothing further; but many are

occupied in sedentary occupations, and have no time for recreative exercise; and almost literally take none. Many could and should take their exercise in a daily walk to and from their occupation; but their bed takes its place, and they only rise in time to "catch the train."

Over-exercise, or intemperance in occupation, occurs more or less in nearly every walk of life, though it is most common in the man who takes a "holiday" once a year. He needs change of scene, change of thoughts, change of occupation, and to run in a different groove, as much as, if not more than, change of air.

Again, a man who has been famous at some sport at a previous period of life, thinks he can do now what he did then. It is attempts like this which so frequently lead to danger; and it should not be forgotten that severe exercise, such as mountain climbing or football amongst men after leading a sedentary life, is dangerous, and cannot be undertaken with impunity without previous careful training. Exercise should always be gradual in its increase; the highest exercise being attained in the same way as a man climbs a ladder, step by step, or as a trainer trains his horse.

The danger is that a man thinks that because he once rowed in the University eight, he is fit at any moment for a "scratch" race; consequently, if he fails, as he is almost sure to do, the exercise is condemned instead of the imprudence of the individual.

A man, again, has played football as a boy, and excelled

at it ; while leading a sedentary life, he suddenly has a chance to play with an "old team" ; he does so with his old vigour, and is surprised that he maims himself,—the wonder would be if he did not.

Or, an athlete has won "the mile" in years gone by ; he tries it again without training, and punishes his heart ; he and his friends are surprised, and athletics are abused.

The same may be said, too, about mountain climbing, hunting, and lawn tennis.

When not in constant daily use, all muscles become flabby and wanting in vigour—the heart included. The lungs lose their elasticity, and if overtried suddenly, something must "give" somewhere.

If we do not wish to hear of the "evils" of mountain climbing, of rowing and of football, of the rider's strain, and of the lawn tennis arm and leg, we must accustom the necessary muscles to the exercise by degrees. All muscles may be educated to any strain within reason ; but unused muscles are unable to bear sudden spurts.

Severe brain work precludes much bodily labour ; and severe bodily labour prevents great mental work : both cannot be borne together,—it is intemperate to try ; but the best amount of work is done with a reasonable amount of each.

Therefore it must be remembered that if these English "pastimes"—the glory of our country—are to be enjoyed without harm, the exercise must be regular, and if it has been omitted, as at the various seasons, it

must be resumed by degrees ; no man must think that he can take up the thread where he dropped it months (sometimes years) before.

All exercise requires *rest* in proportion to the exercise, in order to recruit the expended power.

(vii.) **Temperance in Mental Occupation.**—Perhaps there is no personal habit so within the control of every individual as his mental condition, while there is no habit that is allowed to run riot to such an extent. This field is so wide that we must not dwell upon it. But in passing we may just refer to "*worry*," as being a mental disposition which may be controlled or fostered. And according as it is controlled or encouraged, so are contentment, happiness, and health present or absent. Work rarely hurts any one ; worry kills.

Again, there is perhaps no mental habit that so tends to health and happiness as *good temper* ; and the reverse is also true, that bad temper leads to ill-health and misery.

Mental occupation is essential to a long and happy life. Mind should always be awake and active. Every one is the better for having some employment, even if he is not compelled to make it his "living."

In order that every one may have some mental occupation, *education* is necessary. The old prejudice concerning education is gone, and we as a nation are carrying it out through the length and breadth of the land. But in doing this we must not forget the material with which we have to work. Already the cry concerning *overwork* is

making itself justly heard ; for the material is not ripe for pressure. Overwork, with under feeding, must cause acute or chronic brain disease. Hard work, accompanied by hardships and exposure, together with improper feeding, cannot be borne by the young. But education is good for all when it is accompanied by temperance in carrying it out.

Howard says,¹ "The following extract from the considerations of the Chester school contains sentiments which I think very just. 'A strange and pernicious prejudice has too generally prevailed against educating the children of the poor, so as to check the beneficence of the charitable and humane. Some have absurdly maintained, that the most ignorant are the most virtuous, happy, and useful part of mankind. It is astonishing what injurious influence this doctrine has had, though so contrary to common sense and common observation. Let any one recollect the character of bricklayers, joiners, shoemakers, and other mechanics, as well as of domestic servants, and he will certainly discover, that the most honest, sober, industrious and useful, both to their own families, and the public, are those who have been accustomed to attend divine service, and who were instructed, when young, in moral principles, reading, writing and accompts.' "

There are few now who would gainsay that education is productive of incalculable benefit to all ; that it is one

¹ "Lazarettos," p. 121.

of the greatest causes of happiness, and, if of happiness, then of health. But be it remembered that there is no more certain source of disease than intemperance in education. For what is this education which is so good for all? Parents too often think that the only education which is necessary for their children, and for which they can pay without any trouble to themselves, is the education at school. No greater mistake was ever made; were this mistake not committed by parents, we should not see so many bad boys at school.

A child's education commences in its infancy; and according to the way in which it is taught as an infant, and as a child—whether it has enjoyed a mother's care, or has been left entirely to the charge of servants, often ill-chosen—so will it show itself at school and in after life.

Moreover, it is important for the schoolmaster to remember that in his intellectual education he has to endeavour to cultivate and bring to its prime the nervous tissue of the brain, just as much as the gymnast tries to develop and bring to its prime the muscular tissue. And just as the gymnast knows how far he may go, and how far he may not go, to produce the most healthy tissue, so should it be the schoolmaster's aim and duty to learn with every pupil how far he may go in order to produce the highest development of the nervous tissue of the brain. It is, unfortunately, too often forgotten by the schoolmaster that intellect is simply brain-function, and

nothing else. It should, therefore, be the master's aim to produce *quality* of brain substance, which can only be effected by having all the tissues of the body healthy, and then carefully teaching a few subjects thoroughly.

But schools and schoolmasters are unable to carry this out while examinations—for which they have to prepare their pupils—are made encyclopædic in character. The preparation of a few subjects thoroughly should be the rule instead.

Thus it will be seen that the schoolmaster's material is brain substance; that all his power over his pupil depends on quality and growth of brain; that growth of brain is dependent on growth of body; and that growth of body depends on a suitable and sufficient supply of good food and fresh air and exercise.

Those engaged in education should strive to elicit the natural good hereditary tendencies of each pupil, and develop them; and also endeavour to evoke and encourage new faculties, so as to educate the pupil as completely as he is capable.

It is the office of the educator to develop the brain, to increase its size and quality, and to keep a balance in all its parts; for as Crichton Brown says, "Education incontestably elaborates the structures of the brain, and enormously multiplies cell-connections."

Overwork in the young is almost always more relative than absolute; for it mainly depends on the immature brain-tissue, and on deficient food or fresh air, more

than on excess of work. In the adult, it is sometimes from actual overwork.

But it must be borne in mind more than ever nowadays, when education is compulsory, that underfed children cannot sustain hard mental work.

It is cruel too for even well-fed children of seven years of age to be kept in school for five hours daily. They must become absolutely dazed and stupid, to say nothing of the permanent damage done to the brain tissue itself.

For the average children in all schools, when well-fed, the following *amount of work* is sufficient:—

AMOUNT OF SCHOOL WORK.							Hours per Week.
Age.							
7-8	...	...	...	...	...	...	12
8-10	...	...	...	...	...	...	18
10-13	...	...	...	...	...	...	24
13-15	...	...	...	...	...	...	30
15-17	...	...	...	...	...	...	36
17-19	...	...	...	...	...	...	42

Not only are children overworked, but I see many teachers and pupil teachers in the primary schools, and teachers in private families, who are utterly broken down, owing in the one case to payment by results, in the other from sheer hard work in having too many pupils to superintend.

At Bradford, Dr. Rabagliati stated that the Registrar-General's returns showed that since the Education Act came into force, the deaths from "water on the brain"

amongst children of school age had increased by 20 per cent.; and from inflammation of the brain, by 50 per cent., the latter, however, not solely amongst children.

This is intemperance in education; and it must be remembered that of all causes of insanity, and all neuroses, those connected with excessive brain function in the young are the most prolific.

V.

PREVENTION OF DISEASE.

ALL we have said hitherto relates not only to the "Preservation of Health," but also to the "*Prevention of Disease*"; the one question involving and including the other.

By cleanliness and temperance in all the affairs of life, disease arising from functional or organic disease of the *internal organs* is averted or postponed, and health is enjoyed and life prolonged.

But this paper will be incomplete without some *few* observations on a subject which Howard had greatly at heart—the prevention of disease arising from *without*, or the *prevention of infectious disease*. For it is also by the personal habits of cleanliness and temperance which we have so strongly advocated, that infectious diseases are sometimes prevented, and always mitigated; thus preserving health with consequent prolongation of life.

This subject of *zymotic diseases* is one of great and urgent importance to every individual, and to every community; and, as I said in my introduction, no one can

afford to ignore his neighbour with impunity. For it is a question in which cleanliness of person, clothing, residence, and general surroundings are intimately concerned. If we could get rid of the death-rate from zymotic diseases, we should reduce the total death-rate to an enormous extent, for these diseases are one of the main causes of mortality.

(i.) And first, we must consider, **What is Infection?**

It is the communication of a disease from one person to another, by means of a material poison, which is capable of re-development in the system.

Parkes quotes three views of infection or contagion—

(1) The particles are of animal origin, born and growing in the body ; minute portions of bioplasm or protoplasm, upon which all germination, growth, and multiplication depend. These fomites are independent organisms, having movements, and growing and dying. Each kind is capable of manifesting only its own specific action, *i.e.* originating its own specific disease, as scarlatina or measles (Beale).

(2) The particles are supposed to be of a fungoid nature, and to grow in the body, after being introduced from without.

(3) The particles of contagia are considered to be of the nature of the Schizomycetes, *i.e.* members of the lowest stratum at present known to us in the animate world. They are variously called Bacteria, Bacilli, Microzymes, Vibrios, Spirilla, Monads, etc.

That these particles are *intimately concerned* in some way in many diseases is now beyond dispute. That they are the *actual cause* is within a measurable distance of being proved to be an indubitable fact.

Lister showed that they were concerned in Septicæmia. A bacillus has been discovered for splenic apoplexy. Another for typhoid fever. Cohn says the glistening particles of "vaccine" are bacteria. Koch traced phthisis to a bacillus; and has recently apparently, in Egypt and India, discovered the bacteria of cholera, which however Klein disputes; further investigation is requisite before this momentous question can be accurately decided—for there is special difficulty attached to its investigation, as the germ will only develop in a certain soil, and that, apparently, outside the human body.

Each disease has its own special physical signs; and the bacteria, as a rule, are found mostly in the special tissues affected. Thus, in scarlatina, they are found in the epidermis and the epithelium of the throat; while in typhoid fever they are discovered in Peyers patches; and in the case of small-pox in the pustules.

(ii.) The next point which concerns us is, **How can Infectious Diseases be prevented or diminished?**

1. *By cleanliness and temperance* producing the highest state of health, so that these germs of lower life—really parasites—have a greater difficulty in their growth and multiplication; it being a well-known law that all para-

sites exert their sway with greatest power on all animal and vegetable life whose vitality is diminished. The greater the vigour of the animal or plant, the less the chance for the parasite.

Howard says of himself,¹ "I have been frequently asked what precautions I use, to preserve myself from infection in the prisons and hospitals which I visit. I here answer, next to the *free goodness* and *mercy* of the *Author of my being*, temperance and cleanliness are my preservatives. Trusting in *Divine Providence*, and believing myself in the way of my duty, I visit the most noxious cells; and while thus employed, '*I fear no evil.*' I never enter an hospital or prison before breakfast, and in an offensive room I seldom draw my breath deeply."

And Howard² further advised persons, for preservation from the plague, "To dwell in houses well detached from the infected, and admit no infected person or thing. Habitation kept clean, and all filth removed. Ventilation—windows open only while the sun is up. Fires in each chamber, especially odorous woods. Flowers and aromatics strewed in the room. Sprinkling with vinegar; fumigations with resinous and balsamic matters. Spirits to be supported by amusements, mirth, music, etc."

2. *By Vaccination*.—Pasteur has shown that by vaccination with *modified* micro-organisms of chicken-cholera

¹ "Prisons," Appendix, p. 165.

² "Lazarettos," p. 44.

and anthrax, immunity is obtained from the action of *unmodified* micro-organisms.

Villemin, in 1864, noted that tuberculosis could be transmitted by inoculation. This has now been shown to be owing to the inoculation of the tubercle bacillus and its subsequent growth ; but it seems at present to need a *peculiarly receptive soil* for consumption to be produced.

Portal says he was brought up in the belief that phthisis was contagious, but calm reflection made him change his mind.

Howard says¹ " At the hospital at Civita Vecchia, a particular room was appropriated for such as had cutaneous disorders, and another for consumptive patients." He adds, " In this country, the physicians are persuaded that the consumption is a contagious disorder. Patients afflicted with it in hospitals have a separate ward. The same precautions are used to prevent infection, as in the plague. When this disorder has been in private houses, the furniture is removed and the rooms are scraped and fumigated, before they are again inhabited."

Of Madrid Howard reports,² " Here are likewise rooms (carefully separated) for insane, for dropsical, and for consumptive patients. The contagion of consumption is *supposed* to infect not only the clothes, bedding, and furniture of rooms, but also the walls and ceiling. Danger has been apprehended even from the horses

" Prisons," Appendix, p. 78.

² Ibid., p. 115.

of consumptive patients; and for this reason it was thought necessary, in an instance that was mentioned to me, to kill the horse of an officer who had died of this distemper."

It is perfectly possible, and most probable, that consumption did spread in the cases mentioned by Howard; but from unhygienic conditions—such as overcrowding, insufficient ventilation, and want of cleanliness. For the evidence of the contagiousness of phthisis is very small, as well as the possibility of its inoculation or vaccination; it apparently requires very special conditions.

Andrew, in his Lumleian lectures before the Royal College of Physicians in March, 1884, rejecting the contagiousness of consumption has argued, with great force, concerning the analogy between the origin of malaria and consumption; and has shown that where the one is prevalent, the other is also found; and that drainage diminishes or even removes both.

Dreschfield says that a micrococcus has been developed into a bacterium; this into a bacillus; and this again into a spirillum. The tubercle bacillus of Koch is found in tuberculosis, phthisis, scrofula, pearl disease, and lupus. It is discovered in all the secretions, and even in the expired air; hence consumption must be regarded as an infective disease.

We are, however, interested in a wider question still, and ask ourselves, Are these infectious diseases the result of bacteria, and if so, shall we soon obtain such specific

preventives for them all, as we have for small-pox, malignant charbon, chicken-cholera, and other diseases?

It is impossible to discuss this question here. We would only, in a word or two, point out what vaccination has done in the case of small-pox; and earnestly hope and believe that by-and-by the same beneficial results will be effected in the case of all the other zymotic diseases.

Dr. W. A. Guy, in his famous paper read before the Statistical Society on June 20, 1882, pointed out the course of small-pox during the last two hundred and fifty years, and what vaccination has achieved, saying, "Whatever the efficacy of vaccination, certain it is that this nineteenth century in which it has been increasingly at work, and the last forty years in which it has worked side by side with several sanitary reforms and improvements, have witnessed numerical phenomena which no sanitary reform can explain, and which vaccination alone appears competent to account for."

The statistical information given by Marson as to the various degrees in which vaccinated persons are protected from death by small-pox, are interesting and convincing.

His facts furnished to the medical officer of the Local Government Board, as the result of twenty-five years' observation as surgeon to the Highgate Small-pox Hospital, in nearly six thousand cases of *post-vaccinal* small-pox, are invaluable.

Cases of Small-pox, classified according to the Vaccination marks borne by each patient respectively.	No. of Deaths per cent. in each Class respectively.
1. Stated to have been vaccinated, but having } no cicatrix	21 $\frac{3}{4}$
2. Having <i>one</i> vaccine cicatrix	7 $\frac{1}{2}$
3. „ <i>two</i> „ cicatrices	4 $\frac{1}{8}$
4. „ <i>three</i> „ „	1 $\frac{3}{4}$
5. „ <i>four or more</i> „	$\frac{3}{4}$
Unvaccinated	35 $\frac{1}{2}$

Marson further states, that during thirty-five years' experience at the Small-pox hospital, he had never known a nurse or servant to contract the malady. He says, "I vaccinate them when they come there, and they never have small-pox, although they are exposed to the infection every day."

In the *Lancet* for May 3, 1884, there is a letter from Dr. Herbert Goude, who is Mr. Marson's successor at the Small-pox hospital, in which he says, "We have now an unbroken record of forty-eight years, during which no nurse or servant of the hospital has contracted small-pox even in a modified form. The only exception to this rule, that I am aware of, was in the case of an assistant-gardener, who was hired in 1881; this man refused to be re-vaccinated, caught small-pox, and died." Could stronger positive and negative evidence be desired? Vaccination, and no small-pox; no vaccination, small-pox and death! Is not even this conclusive enough for those opposed to vaccination?

Wherever vaccination *facts* are recorded the evidence is always as strong. Thus, Dr. Collie, in "Quain's Dictionary of Medicine" says, "At the epidemic of 1871, there were in the Homerton Fever Hospital, one hundred and ten persons, who acted as attendants on the small-pox patients. All these, with two exceptions, were re-vaccinated; and all but these two exceptions escaped small-pox. In the epidemic of 1876-77, all the re-vaccinated attendants escaped the disease; whilst the only one who had not been vaccinated took the disease and died of it. In the epidemic of 1881, of ninety nurses and attendants of the *Atlas* small-pox hospital ship, the only person who contracted small-pox was a housemaid who had not been re-vaccinated." Such facts are indisputable and need no word of comment.

3. *By careful Isolation of every Infectious Case as soon as it arises.*—If zymotic diseases are to be diminished, it can only be, at present, by careful separation of every case as soon as it occurs, accompanied by separation of the attendants. Means should be provided for this purpose, which, although costly, would save a large amount of money, as there is nothing so expensive as illness in the long run. But isolation is of no avail unless complete. Pet animals, such as cats, may spread it. *Flies* also are a frequent cause of the spread of infectious disease. Dr. Grassi found that ova of various worms were taken in at the mouth of the fly, and passed out of the abdomen unchanged. And as we know how

flies will settle where it pleases them, it is easy for us to swallow such ova, or germs of disease such as the bacteria. Flies can be expelled from sick-rooms, as they dislike the smell of disinfectants.

Spread of Infection by Books and Papers.—Most things can have the infection in them destroyed by various means, and the process is termed “disinfection,” which we shall consider presently. But books cannot be disinfected, unless every page is treated separately, which, needless to say, would rarely be safely carried out; books, therefore, which have been used during infectious illness should be destroyed. Circulating libraries, and second-hand books, undoubtedly spread the infection of all zymotic diseases; for it is one of the commonest habits to borrow books for the perusal of convalescents from such illness, without any thought for the next reader. In this way measles is spread by coughing or sneezing on the books. Whooping-cough in the same manner. Scarlatina from the scales of skin and throat. Variola and ringworm in the same way. Typhus fever from the germs from the breath. Typhoid fever from dried particles from diarrhœa.

It is therefore incumbent on every individual to destroy all books used by convalescents in infectious illnesses; and never to borrow from the circulating library for such cases, or if borrowed, not to return them.

4. *By “Disinfection” of Person, Clothes, and Room of the Sick and his Attendant.*—The process of disinfection

after infectious illness is a matter of such moment for the preservation of health and life, and one that is so cleanly in itself, and leads to such cleanliness in all the details of illness, that it demands an important consideration in this paper, where our text is "cleanliness."

Disinfection is essentially a method for the destruction of the lowest forms of life, on which disease so frequently depends, in order that the higher life may live in health, unmolested. In speaking of disinfection, I wish first to repudiate all connection with what is often called the disinfection of drains and heaps of refuse; such disinfection does incalculable harm, for it disguises and kills for the moment, but does not remove the injurious matter.

In this paper, we apply the term disinfection only to methods which can prevent the spread of infectious diseases by destroying their specific poisons.

(a) *Disinfection of the Person.*—This is best achieved by great cleanliness of the body, so that any poison on the skin, as in scarlatina, may be rendered inert as rapidly as it is formed. This can be carried out by the various disinfecting soaps, such as carbolic soap, terebene soap, coal-tar soap, etc.; or by fluids added to water, or oil, such as carbolic acid, terebene, sanitas, or Condyl's fluid; or by "acids," such as sponging the body with aromatic acetic acid, or simple vinegar, which is an excellent destroyer of organic poisons.

(b) *Disinfection of infected Clothes and Bedding.*—Disinfection of person is absolutely useless, so long as the

clothes and bedding remain saturated with poison, which they will retain for months.

Howard, so long ago as a century, said,¹ "There should likewise be an *oven*; nothing so effectually destroys vermin in clothes and bedding, nor purifies them so thoroughly when tainted with infection, as being a few hours in an oven moderately heated." The way this plan was carried out, was to put "his clothes into an oven, in a sack upon a pair of iron dogs." The verdict of sanitary science still is that the best plan for the disinfection of clothes and bedding, is dry, or moist, heat.

Henry, of Manchester, showed that vaccine virus lost its power, after being heated for three hours at 140° Fahr. He disinfected scarlatina clothing by exposure to a heat of 212° Fahr. for one hour. The woollen clothing worn by plague patients, after heating for twenty-four hours at 144° to 167° Fahr., was afterwards worn with impunity by fifty-six healthy persons for fourteen days. But experiments on bacteria have shown that they are difficult to kill.

Lex found that 260° Fahr. failed to kill them, and after boiling for half an hour they still showed vital movements.

Calvert found that 400° Fahr. was required to destroy them.

Bastian, before the Royal Society, stated that bacteria and vibrios are killed at a much lower temperature; 158°

¹ "Prisons," p. 45.

Fahr. either killed the bacteria germs or destroyed their powers of multiplication.

Sanderson says that bacteria in water are not developed in fluids heated to 366° Fahr., or even when boiled.

Tyndall, before the Royal Society, stated, that while prolonged boiling failed to sterilize, yet successive heatings for a short time, even below the boiling point, were successful.

It is said that "disease bacteria" are more easily destroyed than "putrefactive bacteria" (Parkes).

Dr. Vernon wrote a paper in the *Lancet*, in which he gave what is the minimum heat required to render the germs of disease inert. He reported that Parkes said 220° Fahr. was sufficient, but 250° Fahr. desirable. Ransome, 235° Fahr. sufficient, but 255° Fahr. desirable. Henry recommended 212° Fahr. for an hour. Wynter Blyth stated that 278° Fahr. retards, but that all the bacteria are not destroyed. Esse, Berlin, advised 234° Fahr. steam heat. Vernon said moist heat is more potent than dry heat, and that 250° Fahr. moist heat is effectual; but in experimenting he found that dry heat scorched linen at 255° Fahr., and ignited it at 380° Fahr., whereas moist heat of 340° Fahr. failed to scorch.

The heat required for disinfecting purposes is best generated in what is called a "disinfecting chamber," heated by gas, coal, or coke. Into this chamber the clothes and bedding are placed.

A large and daily experience with the use of the

disinfecting chamber makes me desirous to extol its virtues in no measured times ; for of all the inventions of modern times there is nothing that can excel in value this "gas disinfecting chamber" for the practical physician who has much infectious illness to deal with. There are several forms of it, and all of value.

In the one I use, we raise the heat until the thermometer registers a minimum of 140° Fahr. outside—inside the heat is about 60° Fahr. above this, or 200° Fahr; and it may range from 200° to 250° Fahr. inside without damage to articles of clothing or bedding. It takes about twenty minutes to get thoroughly heated for use ; and in this chamber every soiled and infected article of clothing can be rendered free from infection within a reasonable time—from twenty to sixty minutes, varying according to its size, material, and thickness.

I have never known a case of infection occur through imperfect or ineffectual disinfection by this hot-air process. Yet cases of infectious illness—after convalescence and disinfection—have been sent into school again where several hundred pupils are living together ; others have been sent home, where young children are residing ; and even mattresses on which scarlatina cases have slept for six weeks, have been re-occupied by those who have not already had scarlatina and in consequence were not protected. Such tests are crucial.

There should be a disinfecting chamber in every workhouse, prison, asylum, hospital and school ; one in

every town, too—it would pay its own expenses easily—for the use of the town and neighbourhood. Marseilles has already started a portable disinfecting oven, which can be wheeled to any house where clothes need disinfecting. It should be large enough to hold bedding too.

It has been suggested that these chambers should be used, and sulphur burnt in them, so as to submit all articles to the fumes of sulphurous acid at the same time. The suggestion is excellent, but unnecessary, unless it be found that by this addition, the degree of heat required may be lowered.

Where there is no disinfecting chamber in existence, the clothes and bedding may be effectually disinfected by soaking them in a solution of carbolic acid and water; this is the plan I adopted before I was able to use a heat chamber. Others insert them in chloride of lime; others in acids, and then expose them in the open air until they are dried. Another plan I have frequently used, and employ still, is by fumigation, in a well-closed room, by burning sulphur; with care, and method in spreading out the garments that need disinfection, it is a safe and easy plan, and purifies the room itself at the same time. I need scarcely add how important it is in disinfecting that every detail should be conscientiously carried out.

(c) *Disinfection of Rooms.*—The disinfection of the person and clothes must be supplemented by the purification of the infected room. The former can, I believe, be always thoroughly purified and made safe;

it is not such an easy matter always to make the poisoned room safe, for scarlatina has over and over again arisen in the unfortunate person who has been the next to occupy the room after it has been infected, even after a lapse of months. Is it from careless disinfection?

The greatest purifier for all infected rooms is plenty of fresh air, added to which there should be thorough cleansing with soft soap and water, to which carbolic acid may be added. The walls and ceiling should be treated as Howard advised,¹ "After the gaol-fever has prevailed in a prison in which the sides etc. are brick, stone, or plaster, nothing will be so effectual in destroying all remains of infection as scraping the walls, and then washing them with hot lime, slaked in boiling water. But, if the sides, etc. of the prison be wood, the mode of fumigation practised by the ingenious Dr. Lind for infected ships will be very proper. I shall, therefore, extract some of the most important particulars of this process from the account with which the doctor favoured me.

"Charcoal fires should be lighted in the morning, and allowed to remain till the evening, and half a pound of brimstone thrown upon each, their smoke in the meantime being closely confined. They may be made in iron pots. This fumigation should be repeated every day for a fortnight. Every evening after the fumigation, the ports and hatchways should be opened and the inside of

¹ "Prisons," Appendix, p. 166.

the ship washed with warm vinegar ; and after the last fumigation, before the men return to the ship, the decks should be thoroughly scraped and cleaned. If the infection has been very violent, the parts of the ship most exposed to it may also be whitewashed. Everything ragged and dirty should be destroyed, as also the clothes and bedding of such as brought the infection into the ship, the bedding of such as have died of the fever, and, unless the infection has been very mild, the bedding of such as have had the fever, though recovered. The remaining clothes and bedding should be purified by being exposed twice a week to the steams of brimstone and charcoal ; or, when the brimstone might be supposed to injure the clothes, they may be hung up in a close place, exposed to the smoke of tobacco strewed on charcoal fires. Linens and such articles as will admit of being wet, should after the first fumigation be steeped for several hours in cold water or leys, be well washed and then dried in the open air. If, during the fortnight of thorough fumigation, any person is taken ill of the fever, the fortnight should again commence from the day on which such person leaves the ship. Strict attention should be paid to the cleanliness of the men both in their persons and apparel ; such as are sluggish and dirty should be made to bathe and clean themselves, and a sufficient quantity of slops should be issued, that every man may have a change of clothes.’”

It will be seen from this extract what pains were taken

in the disinfection of rooms and clothes, etc. in past times.

In the *British Medical Journal* for November 8, 1879, there is an excellent paper by Dr. John Dougall on "Disinfection by Acids." The process is very old, and was very strongly advocated and practised by Howard himself.

Dougall says *disinfectants* are destroyers of organic matter; *antiseptics* are preservatives of organic matter, they arrest and prevent putrescent and fermenting change, and suspend zymotic action. He says that the mineral acids are true disinfectants, operating by both physical and chemical destruction, and also by transformation of organic molecules, as in fermentation, hence preventing and arresting putrefaction; they transform putrefaction into fermentation; they deodorize, and, moreover, they are highly anti-zymotic as regards vaccine, virus of glanders, virus of infective inflammation, and therefore, by inference, as regards all other infections.

Disinfection by "acids," as I have stated, is far from new; the fumes from burning sulphur having been used by the Greeks to fumigate their temples after sacrificial rites, and also for the destruction of the parasites which infested their sheep.

Dr. Lind, in his "Philosophy of Medicine,"¹ says, "It gives me the highest satisfaction to affirm that I seldom

¹ London, 1799.

or never knew a proper application of the fumes of sulphur (sulphurous acid) to be unsuccessful in effectually purifying all tainted places, materials, and substances. I have known, in several ships where there are the fairest opportunities of trying things of this nature, that the contagion of small-pox has been entirely stopped by means of wood fires sprinkled with brimstone, kept burning, and closely confined in the infected place."

Vinegar has been long in use. Howard himself relied on it, for he says,¹ "Even my antidote, a vial of vinegar." It is said, too, that Cardinal Wolsey carried a sponge soaked in acetic acid and various aromatics in an orange-skin when passing through the crowds which his fame attracted, so as to preserve himself from infection.

"The reputation of acetic acid as a disinfectant is said to have arisen from the confession of four thieves, who, during the plague of Marseilles, plundered the dead bodies with perfect security, and, on being arrested, stated, on condition of their lives being spared, that the use of aromatic vinegar had preserved them from the influence of the contagion. It is on this account sometimes called, *Le vinaigre des quatre voleurs*."

Further, Muratori, an Italian physician of the seventeenth century, and Dr. Mead, of London, advocated the use of vinegar as a disinfectant; and the Arabians praised its virtues.

¹ "Prisons," p. 13.

In 1773, Morveau brought forward hydrochloric acid as a disinfectant; and in 1780, Dr. Carmichael Smith used nitrous acid fumes with such efficacy in the Winchester gaol, that Parliament voted him £5000, and he was appointed physician-extraordinary to the king. He says, "When I arrived at Winchester I found the hospital in the following state:—

TABLE OF DEATHS.

Weekly Date.	Number of Spanish Prisoners.		
	In Custody.	Sick.	Dead.
March 26, 1780	1247	60	1
April 2, „	1243	106	4
„ 9, „	1475	150	10
„ 16, „	1457	172	18
„ 23, „	1433	142	21
„ 30, „	1412	171	21
May 7, „	1388	191	25
„ 14, „	1351	197	27
„ 21, „	1523	205	30
„ 28, „	1494	226	31

TABLE OF DEATHS AFTER THE ADMISSION OF NITROUS ACID VAPOUR.

Date.					Deaths.
June 17, 1780	...	...	...	...	9
„ 27, „	...	...	...	...	5
July 1, „	...	...	...	...	5
„ 8, „	...	...	...	...	1

“Here the contagion ceased. None after its admission

caught it, and the disease immediately showed a milder aspect."

Moreover, disinfection by acids is cheap, quick, easy, and certain. Diluted mineral acids may be used for disinfecting typhoid stools, for sprinkling on floors, and for pouring down drains with the evacuations from infectious cases; and sulphurous acid fumes or nitrous acid vapour for aërial disinfection in rooms.

In infectious illness Dougall set free sulphurous acid fumes daily throughout the house for fifteen minutes.

I have now said all that time and space will allow on this very important subject of the prevention, arrest, or mitigation of infectious diseases—too often simply filth diseases.

VI.

PERSONAL HEALTH.

WE now come to our final section in this paper, and under the head of *Personal Hygiene* we shall give a *general summing-up* and conclusion.

(i.) **General Summary.** 1. It is by "personal habits of cleanliness and temperance" that health is preserved and disease prevented or postponed.

2. Where health is good and vigorous, the internal arrangements are not easily disturbed, and diseases from without have a hard struggle in planting themselves.

3. In order to ensure this high state of health, the first great essential is "regularity of life." Nature abhors sudden changes of all kinds ; thus, there should be in the daily life, proper clothing, according to the seasons ; regular sleep ; proper time for regular meals ; proper time for regular exercise or work.

4. All hygienic rules should vary according to *age*—as infancy, youth, adult age, and old age.

5. The "amount of food and exercise" must be

balanced ; evil results from excess of either. What is an appropriate amount of food when work is being done, is excessive on a day of idleness ; many persons are intemperate from this reason. They usually take a fair amount of food according to their exercise ; but a succession of wet days occurring, they take no exercise at all, yet continue to eat the same quantity of food. This is not temperance. All diet should be justly balanced ; it should neither be in excess of exercise, nor should exercise be in excess in relation to diet—with either excess disease arises.

6. A “variety of diet” is important. Each individual must learn by experience what increases, what decreases, his health. Physicians can give their patients broad lines as guides ; but each individual, while following these, must himself learn to abstain from what he finds by experience to be harmful. Experience must always be the final teacher in these matters. Each must observe what he can eat, and what he cannot eat without discomfort. Each one must recognize that it is not wholesome to eat what disagrees with him, and that a frequent repetition of the error will either tend to make him ill at the present time, or certainly lead to disease by-and-by. Parkes says, “About 30 per cent. of those who consult physicians owe their ill-health to food ; and in many cases, although they are perfectly aware of their error or bad habit, yet, with the peculiar inconsistency of human nature, either conceal it from the physician to whom they

are professing perfect openness, or else blind themselves to its existence."

It is unhealthy to eat between meals; and to take active exertion immediately after. Much ill-health and discomfort are occasioned by eating too fast: all food needing careful mastication, not only to reduce it in size, but also to mix it with saliva. When not feeling quite well, and disinclined for food, it is better to abstain from eating altogether for a few hours, as it is unwholesome, when the appetite is so deficient that ordinary food cannot be eaten, to take "fancy" food to excite the appetite.

7. Temperance in alcohol is essential for all; total abstinence imperative for the young.

8. The importance of the "daily natural relief" to the individual is very great; its absence is nearly always simply the result of bad habit. No attempt is made to obtain the desired daily relief, unless a strong desire makes it imperative; whereas, we are such creatures of habit, that if only the practice be established inconvenience will be felt when it is interrupted. This relief is to be encouraged chiefly by regularity in carrying it out; but it is also aided by exercise, by drinking a glass of cold water on rising and on going to bed, by eating bran bread and porridge, and it should not be frequently effected by aperients. It is not only important for present health and comfort, but also in order to obviate a tendency to disease, which a neglect of this precaution entails in

after years. For constipation, besides allowing food to remain in the bowels and decompose, causing distension of the colon and hæmorrhoids, also produces foul-smelling breath, dusky-coloured complexion, and a skin covered with acne spots ; and is accountable for much of the ill-temper, moroseness, spleen, and melancholy that is so prevalent in the world. Moreover, to neglect the daily relief, is wanting in cleanliness ; for from the bowels—as from the common sewer—the contents require daily removal, so that stagnation may not occur, causing decomposition and generation of gases, and thus poisoning the system.

9. The “feet” should always be well shod, so that they may be kept warm and dry. When this is neglected, not only are acute illnesses occasioned, but chilblains too, which, preventing exercise, tend to ill-health.

10. The “amount of daily exercise” should be equivalent to about two hours good walking ; but it should depend essentially on the individual, and on his work. It should, as far as possible, be taken in the open air ; but in wet weather, it is better under cover than not at all.

11. It is difficult to say too much concerning the “skin,” for it is the most important gland in our body. It is essential that it should be clean and sweet, so as to enable it to act at the greatest advantage, as it is an excreting gland, and can only act perfectly when clean. It should also be properly clothed, having flannel next to

it, to absorb its moisture, and to prevent sudden changes of temperature affecting its continuous action. After exertion every effort should be made to encourage the skin to cool gradually, so as to avoid an acute illness ; a feeling of chilliness being a sure sign of its cooling too quickly, and indicating that exercise, or an extra coat, is required to delay it, if health is to be maintained. For cleanliness, cold bathing, followed by friction of skin, is essential ; the cold invigorates the blood vessels, and so the skin is better nourished ; the friction removes the worn-out and useless epidermis, and stimulating the blood-vessels and glands, improves the colour and texture of the skin tissue.

12. It is not dangerous to "drink cold water while heated," provided it be taken in sips ; the danger lies in drinking a quantity of cold fluid, which is very injurious.

13. To sleep as cool as possible, short of being cold, is a maxim that should always be followed, as being the most healthy plan for all. To spend the night in a bath of perspiration, as so many do, from excess of clothing, is most debilitating and unhealthy, and tends to laxity of morals in the young.

14. It is said that the regulation of the passions must be left to the individual ; this I cannot grant. It is purely a question of moral education in the young, as I have stated. If parents would use their influence before they first part with their boys, the passions would not be allowed to run riot so generally

as they do in the young ; for it is then that, by degrees, they gain such dominion as to become uncontrollable in later years.

Besides this influence, much can be wrought by woman's influence, and a more elevated tone of society—among women. What ladies do in high-life is only too vulgarly copied in low-life. It is not becoming, nor does it aid morality, for ladies to appear in that semi-nude state which excites but does not satisfy, and only increases desire.

Puberty is the time for the most active growth and development ; bones, muscles, nerves, and all tissues are growing and consolidating ; and in doing so absorb a vast amount of nourishment. We see that growth and development depend very much on exercise and food, and not only on the mould in which the individual has been cast. The exercise of the sexual functions in any form, at such a time, arrests this development to a great extent, and prevents the attainment of the strength and endurance which would ensure a healthy, vigorous, and happy life.

The diseases consequent on immorality, which are so injurious to young men themselves, are as nothing compared with the evil they bring upon wives and children ; they undermine the health and happiness of a family. Such intemperance is the greatest evil which we as a nation have to face.

I am fully persuaded in my own mind, from a very

large experience, that if immorality is to be lessened in this country, it can only be by a proper knowledge on such matters being furnished to the young of all classes—especially the upper classes, as their example is only too readily followed in this respect.

15. The “amount of mental work” that can be borne is very considerable, almost indefinite, if living under favourable hygienic conditions, with proper diet and exercise, sufficient cubic space, and enough sleep; together with an absence of hurry and worry.

Let it be remembered here, that physical exercise develops muscles; mental exercise, brains. That excessive physical exercise deteriorates muscles, and arrests growth and development; excessive mental exercise deteriorates brain tissue, and arrests its growth and development. Further, that excessive work, and deficient food (whether from actual lack of food, or from relative deficiency, shown where the food is normal but the growth excessive) deteriorates muscular tissue. And excessive mental work (first exhibited by restlessness, irritability, and sleeplessness) with deficient food, causes deterioration instead of growth of brain.

16. Besides all these physical conditions, we need “good temper, cheerfulness, and hope;” together with uprightness of life and purity of motive. Deeply interested as I am in the preservation of physical health, yet this must include moral health, else it cannot exist in its fulness.

In order to attain to both in a high degree, the training must be begun early in life. Herbert Spencer has well said, "Remember that the aim of your discipline should be to produce a *self-governing* being, not to produce a being to be *governed by others*. As your children are by-and-by to be free men, with no one to control their daily conduct, you cannot too much accustom them to self-control while they are still under your eye. Aim, therefore, to diminish the parental government as fast as you can substitute for it in your child's mind that self-government arising from a foresight of results. All transitions are dangerous, and the most dangerous is the transition from the restraint of the family circle to the non-restraint of the world. Hence the policy of cultivating a boy's faculty of self-restraint by continually increasing the degree in which he is left to his self-constraint, and by so bringing him step by step to a state of unaided self-restraint, obliterates the ordinary sudden and hazardous change from externally governed youth to internally governed maturity."

Strength of character, like strength of muscles, comes from active use ; from a struggle, not from retreat. Again, Sydney Smith said, "The purity of moral habits is, I am afraid, of very little use to a man unless it be accompanied with that degree of firmness which enables him to act up to what he may think right, in spite of solicitations to the contrary. Very few young men have the power of negation in any great degree at first. It

increases with the increase of confidence, and with the experience of those inconveniences which result from the absence of this virtue. Every young man must be exposed to temptation ; he cannot learn the ways of men without being witness to their vices. If you attempt to preserve him from danger by keeping him out of the way of it, you render him quite unfit for any style of life in which he may be placed. The great point is not to turn him out too soon, and to give him a pilot at first."

Again, he says, "I have always said that the greatest object in education is to accustom a young man gradually to be his own master."

(ii.) **Conclusion.** In the words of Parkes—to whom I am indebted for so much in this paper, and also for much of the good I am able to do in my daily life—I would conclude this paper: "Were the laws of health and of physiology better understood, how great would be the effect! Let us hope that matters of such great moment may not always be considered of less importance than the languages of extinct nations, or the unimportant facts of a dead history."

I am only too well aware of the imperfections of this paper ; all I can plead in extenuation is, that it is the work of odd moments in a very busy life.

It has, however, been a real happiness to have learnt, in writing this Essay, to love and admire John Howard, even if I have gained for myself, and pointed out to others, no other good. Previously to this work, I am

ashamed to say I knew comparatively little of John Howard. Now, one almost worships him as the upright man ; the generous philanthropist, who

“ Not for himself, but for the world, he lived ; ”

the courageous prison reformer, in the face of all difficulties and dangers ; and as a pioneer in sanitary science, who not only carried out unspeakable good in his own day, but to whom we, even a century after, are deeply indebted.

It is said that cleanliness is next to godliness ; but I would urge that there can be no godliness without cleanliness and temperance.

It is possible for a cleanly person, with appropriate surroundings and a temperate mode of life, to make his human frame a worthy tenement for the soul.

“ The end of life is to be like unto God ; and the soul following God, will be like unto Him ; He being the beginning, middle, and end of all things.”—SOCRATES.

June, 1884.